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AN ANALYSIS OF THE EFFECTIVENESS OF FIRST ARTICLE TESTING AND APPROVAL REQUIREMENTS

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AN ANALYSIS OF THE EFFECTIVENESS OF FIRST ARTICLE TESTING AND APPROVAL REQUIREMENTS

by

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and
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DEC 1976

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EXECUTIVE SUMMARY

1. Background. First Article Test and Approval Requirements minimize risk to the Government and contractor by insuring that a contractor can furnish a product which is satisfactory for its intended use prior to making a decision to enter into full production. These benefits must be equated against the increased costs and delay in delivery schedules associated with First Article requirements.

2. Objective. The objectives of this study are to: (1) evaluate the impact of First Article Requirements on procurement delivery, costs and quality and; (2) identify alternative methods that will reduce costs and improve delivery schedules while maintaining adequate product quality within acceptable risks.

3. Research Method. The research methods utilized included: review of recent studies and legal decisions regarding First Article Requirements; field visits to selected DOD activities; extensive review of contract files; analysis of First Article test results; cost benefit analysis of First Article requirements.

4. Findings and Recommendations. Although First Article requirements were found to substantially increase acquisition costs and delay production deliveries, there is a valid need for quality assurance and other information generated by such testing requirements.

Several deficiencies were observed in current contractual procedures which impede efficient utilization of a First Article Testing Requirement such as: (1) improper solicitation structuring of First Article line items, (2) provisions in the Initial Production Test clause which were deemed to be inequitable and in possible conflict with other contract terms; (3) failure to consider or document the additional benefits versus cost of either First Article or other alternate quality assurance requirements.

Also, increased usage of the authorization which permits contractors to procure material or commence production effort prior to First Article approval should offer potential improvements of production delivery schedules at lower contractual prices with little added risk to the Government.

Recommendations include adoption of a proposed cost model which will permit computation, comparison, and documentation of the costs associated with alternate First Article preproduction and initial production tests. Guidance is offered which should improve the effectiveness of First Article procedures by: eliminating improper solicitation structuring; increasing the number of authorizations permitting contractors to procure materiel or commence production effort prior to First Article approval.

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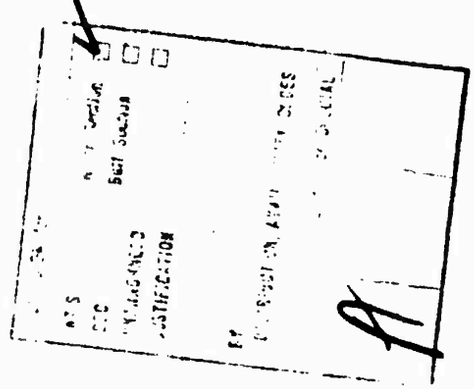

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CHAPTER I

INTRODUCTION

A. BACKGROUND

The Department of Defense (DOD) has seen its share of the Government budget continually decrease since the late 1960's. Furthermore, the impact of inflation during this period has further decreased the purchasing power of funds allocated to DOD. The combined effect of these two factors has made it imperative that DOD obtain maximum utilization of its resources in order to adequately maintain the country's defense posture. Procurement techniques and procedures need to be re-examined to determine if they are cost effective. As a part of such effort, the Army Materiel Development and Readiness Command (DARCOM) has directed the Army Procurement Research Office (APRO) to analyze the benefits versus costs derived from first article testing and approval requirements (FATAR).

B. PROBLEM

FATAR minimizes risk to the Government and contractor by insuring that a contractor can furnish a product which is satisfactory for its intended use prior to making a decision to enter into full production. There are various costs associated with FATAR requirements, including the cost of conducting the tests and administrative costs associated with the evaluation of the test results. Additionally, contractors normally postpone the acquisition of materials and parts prior to FATAR.

Besides delaying delivery of production units, the postponement of the acquisition of materials and production effort during an inflationary period will result in higher acquisition costs. Thus, there is a need to reassess the practical benefits the Army receives from preproduction constraints, such as FATAR, versus the increased material costs and delay in deliveries.

C. OBJECTIVES

An evaluation of the cost effectiveness of FATAR for materiel acquisitions must be based on an analysis of current practices, procedures, policies, attitudes, and experiences with both First Article (FA) and other alternate methods that will achieve the Government's quality assurance objectives. Thus, the objectives of the study are to: (1) evaluate the impact of FATAR on procurement delivery, costs, and quality; and (2) identify alternate methods that will reduce costs and improve delivery schedules while maintaining adequate product quality within acceptable risks.

D. SCOPE AND METHODOLOGY

Initially, various data sources were queried to obtain information regarding FATAR including: (1) the existence of any recent publications and/or on-going research throughout DOD in this area; (2) the basis for requiring it; (3) experiences with such procedures, etc. These data sources included the Defense Logistics Studies Information Exchange (DLSIE), Defense Documentation Center (DDC) the Federal Legal Information

Through Electronics (FLITE) System, and the DARCOM and its subordinate commands.

Field visits were made to four of DARCOM's Major Subordinate Commands (MSC's) to obtain data from approximately 54 randomly selected contracts necessary to ascertain if a "cost effective" basis for requiring FATAR could be developed. The plan called for gathering of the following contractual information.

1. Contractual versus actual time elapsed between the following dates:

Contract Award..... First Article Submittal..... First Article Approval..... Initial Delivery of Equipment..... Final Delivery of Equipment

2. Cost of FA effort, including Government testing, if applicable.

3. Cost of any material contractor authorized to procure prior to FA approval.

4. Number of times a disapproved FA sample was resubmitted prior to final approval.

5. Cost of modifications resulting from extensions of delivery schedules due either to disapproval of contractor's FA sample or late Government approval of the sample.

6. Government's required delivery of the material.

7. Cost of material.

8. If contractor furnished item previously.

9. Type specification - design or performance.

10. Other quality assurance provisions, such as initial production samples.

11. Cost of material made obsolete by revision of an item as a result of FA testing.

12. Percent of production effort which would have been completed as the date of final disapproval of FA.

Additionally, considerable information relative to FA costs was to be obtained from the Test and Evaluation Command. Finally, personnel at the four MSC's and a Defense Contract Administration Services [illegible]ion (DCASR) office were questioned relative to the costs associated with administering contracts containing FATAR.

In-depth interviews were conducted with personnel in various functional areas at the four MSC's and DCASR office. The interviews were based on structured questionnaires. Data obtained from these questionnaires provided further insight into problem areas, costs, and benefits derived from FATAR. Additionally, potential improvements to the current FA procedures and techniques were recommended.

E. ORGANIZATION OF THE REPORT

Chapter II initially defines FA requirement and describes its changing purpose as an item progresses through its materiel acquisition cycle. This chapter also traces the important delivery, quality, and cost considerations which must be considered relative to FATAR. Chapter III assesses the cost effectiveness of FATAR. Chapter IV contains findings and recommendations.

CHAPTER II

EVALUATION OF FIRST ARTICLE POLICY, PROCEDURES AND USAGE

A. GENERAL

Armed Services Procurement Regulation (ASPR) 1-1901 defines FA to include preproduction models, initial production samples, test samples, first lots, pilot models and pilot lots. Additionally, FATAR involves the testing and evaluating of the FA for conformance with specified contract requirements before or in the initial stage of production under a contract.

Normally, FATAR is associated by operating personnel with production follow-on contracts. However, the ASPR definition would expand the FA concept to include the initial prototype or production item offered by the developer. To maximize utilization of resources, some of the information generated by tests conducted during an item's research and development phase is used in the FATAR conducted prior to initial full production decision. Thus, the following section of the report will address the relationship of FATAR to the research, development, and production phases of a material acquisition life.

B. DERIVATION OF FATAR

1. Importance of Release Certifications

The primary quality assurance goal of DARCOM is to provide material conforming to the stated requirements specified by the user. Prior to issuance of material to the user for most of the items it procures, DARCOM

must issue a release certifying that the material is both suitable for its intended purpose and is logistically supportable. Such certifications are normally required for: (a) First time procurements of major items including separate release certifications for initial low rate and full scale production quantities; (b) Follow-on procurements for major items; (c) Reconditioning programs (i.e., renovating, repair, overhaul, etc.) involving major items, (d) Selected secondary items; (e) Configuration changes, which may affect an item's safety, performance, reliability, maintainability, durability, interchangeability, or which necessitates issuance of revised manuals, instructions, support equipment or training schemes. Release certifications are normally not required for follow-on procurements with a previous producer, providing the contractor has not: (a) changed his manufacturing site; (b) renovated his manufacturing processes; or (c) incurred a substantial lapse in production (normally a year) which requires revalidation of the contractor's manufacturing processes.

The Director of Quality Assurance is the DARCOM staff element assigned responsibility for developing and promulgating policy on release of material for issue. This element is also responsible for approving/disapproving requests for conditional release of material along with initiating any corrective actions needed to assure material is suitable for release.

2. Developing a Plan to Insure Item's Suitability

A plan must be developed early in an item's life cycle that will generate, at a minimum cost and delay in schedule, information needed to ascertain an item's suitability. This plan considers the item's required performance parameters in relation to the Army's environmental safety, reliability, maintainability, etc., requirements. A major portion of this information is obtained by tests conducted on the item. The Deputy Chief of Staff for Research, Development and Acquisition (DCSRDA) has been assigned responsibility for policy determination, planning, and program coordination for all research, design, acquisition and development test and evaluation activities. DCSRDA is also responsible for other test related matters, such as coordinated test programs which are discussed later.

3. Purpose and Type of Testing

A carefully conducted test program will generate data regarding: (1) the likelihood that the material system will meet its technical and operational requirements; (2) any developmental and operational risk associated with the material; (3) whether technical, operational, and support problems associated with the material has been resolved. Such information can be used to redirect or terminate a program, thus reducing the risk to the Government of incurring a substantial investment of cost

and time for a program that will not meet its objective. Additionally, contractor risk is reduced since he is assured, prior to incurring substantial production expenditures, that the item he intends to furnish is acceptable to the Government. Testing designed to provide this information has been classified into two basic types: Development Testing and Operational Testing.

A discussion of these two types of tests follows since they either generate information needed for FATAR or are the actual FA tests.

a. Development Testing. Development Testing is defined by AR 70-10 as that test and evaluation conducted to: (1) demonstrate that the engineering design and development process is complete, (2) demonstrate that the design risks have been minimized, (3) demonstrate that the system will meet specifications; and (4) estimate the system's military utility when introduced. The materiel developer is responsible for the planning, conducting and monitoring of such tests. Notice that the objectives of DT and FA are nearly identical. Also, the results of all DT tests are forwarded directly to (1) Defense System Acquisition Review Council, (DSARC), (2) Army Systems Acquisition Review Council (ASARC) or (3) In-Process Review (IPR). This information forms the basis for the decision to proceed with the acquisition cycle.

b. Operational Testing. Operational testing (OT) is defined by AR 70-10 as that test and evaluation conducted to estimate the prospective system's military utility, operational effectiveness, and operational suitability (including compatability; interoperability; safety; reliability, availability, maintainability (RAM); and logistics supportability; operational man (soldier) - machine interface and training requirements), and need for modification. The Operational Test and Evaluation Agency is responsible for the management of OT Such tests are conducted to the maximum extent possible by operational and support personnel of the type and qualifications who are expected to use the material when deployed. Operational tests are to be accomplished within controlled field exercises. Results of such tests are forwarded directly to the DSARC, ASARC and IPR.

4. Coordinated Test Program

a. Purpose. To achieve its objective of conducting the test program with maximum efficient use of resources, a Coordinated Test Program (CTP) must be approved for all new RDTE projects prior to approval of the Determinations and Findings for engineering developmental prototypes, which are developed in the validation phase. The CTP should be designed to generate at the earliest achievable date in the item's life cycle the information regarding the final product predicted performance.

TABLE 1

CHANGES IN TEST REQUIREMENTS DURING AN ITEM'S MATERIEL ACQUISITION CYCLE

PHASE	CONCEPTUAL	VALIDATION	FULL SCALE DEVELOPMENT	INITIAL PRODUCTION	FULL PRODUCTION	POST PRODUCTION
Hardware Configuration		Breadboard & Advanced Development Prototype	Engineering Development Prototype	Initial Production Items	Production Items	Production & Reconditioned Items
Type Testing		Development Test I & Operational Test I	Development Test II & Operational Test II	Development Test III & Operational Test III	(1) First Article (a) Preproduction (b) Initial Production Tests (2) Quality Conformance Tests (3) Comparison Tests	Reconditioning Tests (2) Product Improvement Tests (3) Systems Modification
Decision Points for						
DSARC/ASARC	DSARC I/ ASARC I	DSARC II/ ASARC II	DSARC III/ ASARC III	DSARC IIIA/ ASARC IIIA		
Decision	Enter Validation Phase	Enter Full Scale Development	Enter Either Initial or Full Production	Deploy System Enter Full Production		
IPR						
Decision		Validation	Development Acceptance	Production Validation		
Agency Responsible for Decision	DCSRDA	DCSRDA	DCSRDA	DCSRDA		

SOURCE: AR 70-10

Additionally, the CTP should be designed to support the decision maker who must decide whether the technical risks have been sufficiently identified and resolved to justify authorization to proceed to the next phase of a materiel's acquisition cycle. To this end, DT and OT are divided into three distinct phases as noted in Table I, "Changes In Test Requirements During An Item's Materiel Acquisition Cycle."

b. Content of CTP. This CTP should identify appropriate testing required by the contractor, materiel developer, and operational testing. It should specify the planning, coordination, evaluation and reporting necessary to obtain optimum utilization of required tests including the identification of required testing and test personnel and organizations, materiel, facilities, troop support, logistics support and funds for implementing the test program. Finally, the CTP should: (1) specify the planned development and operational tests; (2) identify the critical issues to be resolved by testing; (3) be updated prior to each major decision review to incorporate changes in plans, schedules, test resources, critical issues, etc. For major and selected non-major systems the CTP must be approved by the appropriate headquarters (ASARC or IPR).

5. Relationship of First Article Requirements to An Item's Coordinated Test Program

a. New Major Developmental Items. AR 70-10 requires that DT testing should be substantially completed prior to the first major production decision to insure that all significant design problems have

been identified and resolved and that engineering effort is reasonably complete. Additionally, OT testing must be completed so that a valid estimate can be made of the expected system operational suitability and effectiveness. As noted on Table I, DT III and OT III tests would be conducted on the initial production items. Thus, for new items for which the first major production decision has not been made, DT III and OT III tests are considered to be FATAR. For major developmental items, a prototype or an initial production unit on a limited quantity production contract is required, since DT III must be completed prior to the full production decision. The results would serve as input to ASARC IIIA, and the full production decision being the responsibility of DCSRDA. Finally, specified subtests required in DT III to fulfill FATAR should be included in the Coordinated Test Program.

b. Non-Major Developmental Item. For non-major developmental items, an initial production sample on a full-scale production contract may suffice since DT III can be completed after the full production decision. DT III tests are designed to verify that the transition from engineering development prototype to production item has been successful and that the item will meet the required design and peformance requirements.

c. Follow-On Production Contracts. FATAR are frequently required for follow-on production contracts, usually involving a new contractor or a previous contractor who has changed manufacturing processes

or incurred a substantial break in production, etc. Additionally, FA samples are appropriate when an item: (1) is covered by a performance specification, (2) is required as a manufacturing standard; (3) has critical safety or reliability characteristics, (4) has a poor quality history based on previous production or data reported by storage and using activities. Such test requirements, which are Deputy Chief of Staff, Logistics (DCSLOG) responsibility, are normally specified in the technical specifications as either preproduction or initial production tests.[1] FA preproduction tests are conducted on models built prior to mass production using substantially the same type of materials, processes and type of equipment that will be used for the mass production quantities. Initial production tests (IPT) are conducted on the first production units produced to verify the adequacy and quality of material when produced according to production drawings and mass production processes.

6. Alternate Quality Assurance Techniques

Prior to requiring FATAR, consideration should be given to whether less costly quality assurance techniques will achieve the Government's objective. For instance, in some situations it may be economical to require testing of contractor's items prior to award of the contract and establishing a Qualified Product List. For supplies

[1] DCSLOG has responsibility for quality assurance testing during production and post-production of Army materiel.

normally sold in the commercial market, contractor's standard commercial quality assurance practices may suffice. For items covered by detailed technical specifications, quality conformance inspections, which are normally performed by the contractor and witnessed by the Government Quality Assurance Representative (QAR) are often invoked. These examinations and tests are conducted on items to be offered for acceptance under the contract and include measurements or comparisons with specified design characteristics and tests of performance and reliability requirements.

7. Summary

Prior to issuing materiel to the user, DARCOM must certify that it is both suitable for its intended purpose and logistically supportable. A major portion of the information needed to make this certification is obtaining by extensive testing of the item. The overall test program is developed early in the item's life cycle and is specified in the CTP. FATAR are often required for new items during the initial production phase of an item's life. Such FA samples undergo tests designated as DT III and OT III. DCSRDA has been designated responsible for such tests. After an item enters the full production phase of its life, FA tests are normally those specified in the Specification. These tests, which are under DCSLOG responsibility, are classified as either preproduction or initial production tests. Finally, less

costly quality assurance requirements than FA often are available for many items the Army procures, such as reliance on contractor's standard commercial quality assurance procedures.

C. DETERMINATION OF NEED FOR FATAR WITHIN AN MSC

1. Responsible Organization

The organization at the MSC responsible for the establishment and conduct of the FA program within the MSC was found to be the Product Assurance Directorate or the Production Engineering Division of the RD&E Directorate.

2. Quality Consideration May Dictate Need

a. Production Assurance Directorate or Production Engineering Division Determines Need. Initially, the responsible organization must determine if a FATAR is appropriate for a procurement. Normally, such testing requirements are specified in the item's specifications. However, this is not the only criteria considered in requiring such tests. For instance, a FATAR may be included because a review of the item's history records reveal previous manufacturing problems or unsatisfactory user experience.

b. DARCOM Guidance Amplifies Criteria. Additionally, DARCOM guidance may authorize its usage. For example, ASPR 1-1902(b) (10) specified that FATAR are not appropriate for supplies covered by complete and detailed technical specifications, unless the technical or performance requirements are so novel or exacting that it cannot reasonably be anticipated that such supplies will meet technical or performance requirement without FA approval. DARCOM has interpreted "novel" or "exacting" technical or performance requirements to cover requirement for (1) material

with critically unusual features which are relatively new to the industry expected to produce it; (2) complex materials which can tolerate no compromise with capability, reliability, interchangeability or safety; (3) items whose past experience reveals that new producers are likely to encounter manufacturing problems, such as when FATAR is in reality a "shake down" process during which contractor's interpretation of the TDP materializes and technical issues resulting therefrom are surfaced and resolved; (4) former producers who have not produced the item for an extended period of performance.[2] Such production lapses are normally considered to be one year based on DARCOM Regulation 700-34 which requires that release certifications be obtained for such production lapses. The aforegoing DARCOM interpretation of "novel" or "exacting" technical or performance requirements probably contributed to the fact that the majority (35 out of 48) of the contracts reviewed were completely or primarily covered by design specifications.

c. ASPR Criteria. Finally, there are several additional circumstances cited in ASPR 1-1902 when the Government's need for assurance that the product is satisfactory for its intended use may justify inclusion of FATAR, such as: (1) the first time the contractor furnishes the item to the Government; (2) changes have occurred in items specifications or manufacturing processes since the last time that a prospective contractor furnished the item; (3) items covered by performance specifications; (4) when it is essential to have an approved FA serve as a manufacturing standard. (Seven of the contractors reviewed specified the items would serve as a production standard.)

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[2]ARMCOMR 702-7 citing AMC letter, 28 Sep 71, subject: First Article Testing and Approval.

d. Additional Criteria.

(1) Large Quantity. Interviews with field personnel revealed that FATAR are sometimes required solely because the contractual quantity and dollar value are large and the item is to be distributed to many locations. They felt that the FA costs were small in relation to the logistic problems and expense the Government would incur in replacing or refurbishing a large quantity of unsuitable materiel which had been distributed to many locations. Evidence of requiring FATAR for medium to high quantity requirements was noted in the sample FA contracts reviewed as follows:

TABLE II

QUANTITIES FOR CONTRACTS CONTAINING FATAR

Contractual Quantity	Percent of Contracts
1 - 1,000	50%
1,000 - 10,000	26%
10,000 - 100,000	13%
100,000 - 1,000,000	7%
1,000,000 - ∞	4%

Thus, approximately 25 percent of the contracts reviewed had contractual quantities greater than 10,000 units and over 50 percent had quantities greater than 1,000 units. The rationale for including FATAR on such procurements is questionable. A contractor's ability to successfully produce

a small pre-production quantity does not assure he can manufacture an acceptable item using mass production techniques. In view of this, one MSC required a production lot acceptance test, for each lot offered for acceptance, in addition to the FATAR. Some of the contracts reviewed at this activity involved previous manufacturers who had incurred substantial breaks in production. The value of requiring both FA and production lot acceptance tests for contracts with previous producers is questionable, inasmuch as the latter tests should give the Government adequate assurance regarding the materials acceptability.

(2) Large Dollar Value Contracts. There is also evidence that FA usage tends to increase with the dollar value of the procurement. For instance, data at one MSC for FY 75 revealed:*

TABLE III

PERCENT OF CONTRACTS WITH FATAR VS. CONTRACT DOLLAR VALUE

Dollar Value	0-10K	10K-100K	100K-1 Mil	Above 1 Mil	Total
Contract Award	3210	812	139	25	4186
First Article Required	63	119	30	7	219
Percent of Contracts w/First Articles Required	1.9%	14.7%	21.6%	28%	5.2%

*Similar data was not available at the other MSC

It must be noted that the number of FA required above is reflective of instances in which Product Assurance Directorate advised Procurement Directorate that a FATAR should be included in the solicitation. Ninety-eight FA requirements were waived at this command since a previous producer with past successful performance was the successful bidder. Thus, the actual number of contracts with FATAR is lower than indicated in Table III. However, the data does show this MSC: (1) had a low overall percentage of contracts with FATAR; (2) number of solicitations requiring FA varied directly with the dollar value of the procurement

d. Comptroller General (Comp Gen) Decisions Regarding Validity of Requirements. The Comp Gen has rarely challenged an agency's decision to include FATAR in a contract since the drafting of specifications to reflect the need of the Government are within the administrative determination of the agency. However, the Comp Gen has taken exception to using FATAR if relatively simple detailed design drawings areinvolved. In one case, the Comp Gen noted that since the specifications appear to be descriptive and instructive, the risk of a responsible contractor being unable to "follow the data" is small. In such situations, the possibility of inept performance by a competent firm is an unavoidable risk which is not necessarily removed by a contractor building or testing a pre-production sample.[3] The Comp Gen has constantly held it will not

[3] B-151709, 11 June 1965.

rule out such determination unless they are unreasonable. Contrarily, there have been numerous cases in which the Comp Gen has commented on the appropriateness of including a FATAR in situations differing from those previously noted as justifying an FA. In one case, it upheld the inclusion of FAT requirement since no contractor was listed on the Qualified Products List (QPL). However, in the subsequent procurement of the same item a bidder was unsuccessful in challenging award to the manufacturer who was listed on the applicable QPL because of successful completion of FATAR which was deemed to satisfy qualification testing requirements on the previous contract.[4] Additionally, an award was upheld despite admitted minor design deficiencies in the technical data package since the deficiencies could be corrected in the production of the pre-production sample.[5] Also, a FATAR has been upheld which only required submission of FA samples for contractors who proposed to furnish "or equal" components.[6]

3. Facilities Certification

Approximately 52 percent (28 out of 54) of the contracts reviewed contained the optional FA paragraph which requires that the contractor

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[4]B-177301, 21 May 1973.

[5]B-155710, 15 April 1975.

[6]B- 154590, 14 September 1964.

submit a certification that the FA is manufactured at the facilities at which the item is to be produced under the contract. Additionally, a solicitation can require that the pre-production units be produced with actual production tools.[7] Several of the contracts that required facilities certifications, also specified that contractor would have to resubmit an FA sample if there was a change in the production process.

D. COST VS. BENEFIT

1. Costs

a. Waiver Provisions Specified in Solicitations. Considerable savings may be achieved by both the Government and contractor if the FATAR can be waived. It is the contracting officer's responsibility to avoid burdening the Gove nment with the costs of unnecessary and unreasonable testing or sampling requirements. Thus, solicitations often contain a provision to adjust contractor's bid price for evaluation purposes, to reflect total savings, attributable to such testing waviers.

b. Submittal of First Article Price

(1) Separate Price for FA Line Items. Two techniques were observed, in the contracts reviewed, to permit a contractor to submit a separate price in the event his requested FA waiver was granted. The method primarily used required contractor to subm t a separate price or "no charge" for the FA line item.

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[7] B-154567, 28 December 1965

(2) Combined FA and Production Unit Price. The second method set up two subline items for the item being procured. Only contractors requesting waivers were eligible to bid on the line item not requiring FA testing. (The FA costs can be computed by subtracting the waiver price from the nonwaiver price). Other contractors were instructed not to submit a separate price for the FA line item. Thus, this technique does not permit identification of FA cost by contractor who cannot qualify for the waiver. Since many of these contractors would usually set up separate accounts to record FA costs, a possible area of conflict arises with Cost Accounting Standard 401, which requires contractors to establish accounts which will enable him to record costs in the same manner as they were bid. An alternate to this second technique requested contractor to submit the price, including FATAR, under the item description. The price reduction offered for granting a waiver was to be inserted in the solicitation provision requested waiver information. In addition to it's failure to obtain FA costs from contractors not requesting waivers, this technique separates the offered price reduction for the waiver from the other pricing information contained in Section E. In accordance with Army Materiel Command Procurement Instruction, Supplement 1, "Request for Proposal Format," all pricing information should be included in Section E.

(3) Progress Payment Problems Associated with Failure to Identify FA Costs.

(a) Determining What Costs Constitute FA Costs. Contract administration problems were reported in interviews as a result of the failure to identify FA costs in the contract. Normally, progress payments are payable based on the costs incurred during FA testing. If such costs are not specified, there is no basis to determine, without an audit, what percentage of contractor's incurred costs are allocable to FA testing. Often the FA costs may appear to be high in relation to the total contract price. For instance, an investigation was required by DCAA to substantiate contractor's alleged $175,000 FA costs on a $500,000 contract. Additionally, DCAS reported that a contractor's progress in fulfilling the FA requirement often was not reflective of his expenditures.

(b) Army Materiel Command Circular (AMCC) 715-16-74. To overcome this problem, AMCC 715-16-74 specified that a separate provision be included in the contract which would allocate a specific maximum percentage of the total contract price to the FA for the purpose of progress payments. Approval of the Head of the Procuring Activity is needed for all contracts, (including those in which FA is separately priced) in which allocation for FA exceeds 25 percent of the contract price. However, very few of the personnel interviewed were aware of this requirement. A 15 percent progress payment limitation for FA was observed on some of

the sample contracts. However, several contracts did not include either this provision, or separate FA price. Such oversights maybe caused by the failure of the Progress Payment clauses (ASPR 7-104.35) to include such a limitation provision.

(c) Verification of FA Costs Difficult. Verification of which costs are applicable to FA requirement often is difficult and requires judgement. Oftentimes, the FA material requirement may be below the minimum quantity the vendor offers for sale thereby necessitating procurement of the minimum quantity. The question arises whether such costs are allowable to progress payment purposes. It must be noted, the minimum buy quantity of material is allocable to the FA for termination settlements purposes.[8] However, the contractor would have the burden of proving that the quantity is a minimum order quantity. Many times, contractors will enter into a subcontract for the entire quantity. This is particularly true if the quality of the subcontract item may vary between production runs and the FA sample is to be used as a manufacturing standard. The prime contractor may have a problem substantiating what the minimum order quantity is for an item not normally sold commercially by the subcontractor. Also, a question is raised whether the subcontract price would govern if a price reduction had been offered by the subcontractor because of the larger contractual quantity.

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[8]Appeal of Switlik Parachute, Inc., ASBCA 18024, 8/7/75.

(d) Allocability of Tooling Costs. A similar problem involves the cost tooling which is normally prorated in the production unit price. Since contractors often are required to produce the FA on production tooling, such tooling is needed for FA testing. The question arises how much of the tooling cost should be allocated to FA versus production costs. The total tooling costs would be applicable in the event of a termination for convenience. Thus, there appears to be rationale for paying progress payments based on whether the costs would be permissable in a Termination for Convenience.

(4) Summary. In view of the foregoing, it is concluded that the Government should give the contractor an opportunity to submit a separate price for the FA line item. If a contractor is unable to identify FA costs or does not wish to divulge such costs he can always insert statement such as "no charge" or "included in price of item X." However, bidder should be warned that failure to comply with the provision to submit a price or statement of "no charge" for the FA line item would result in the bid being rejected as non-responsive. This was illustrated by a Comp Gen decision that the bidder was determined non-responsive for failure to comply with such a provision even though he stated elsewhere in the bid that he would comply with all IFB conditions.[9]

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[9] B-176071, 21 December 1971.

Conversely, a bidder's failure to grant a price reduction for waiver of FATAR requirements would not make the bid non-responsive.[10] Additionally, the progress payment clause contained in ASPR appears to be deficient in not specifying limitations of contract costs allocable to FATAR. Finally, guidance is needed regarding what costs constitute FATAR costs. It is felt that the same criteria used for Termination for Convenience, such as allowing minimum order quantities and tooling costs would be appropriate.

c. Failure to Include Government Costs as a Bid Evaluation Factor.

(1) Contractor Testing. Government cost savings attributable to waiver of FATAR were never included in the contracts reviewed when contractor testing was involved. However, review of the files indicated that the Government incurred surveillance costs. For the majority of procurements, these costs involved stationing an Administrative Contracting Officer (ACO) at the contractor's plant to witness the tests. For several contracts, personnel at the procuring agency also were sent to witness these tests. It is recognized that the observation of such tests may be only one of many tasks Government personnel may have to perform during the visit. On such multipurpose trips, the interrelationship of costs incurred for the purpose of FA versus other tasks may be difficult to reasonably estimate. However, for many other trips, personnel salary costs and TDY costs associated with FA costs could be reasonably predicted. For instance, travel costs could be computed as follows: (1) the travel distance from

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[10] B-138972, 10 June 1959.

the Government agency plus that from the contractor's plant to the nearest major airport times the reimbursable automobile rate (12¢) or care rental costs, (2) the commercial air fare between the major airports closest to the Government agencies and contractor's plant respectively.

(2) Government Testing. Additionally, Government FA tests were only used as a bid evaluation factor for five out of 12 or approximately 41 percent of the contracts reviewed. However, AMCC 715-16-74 provided such costs should be included if they can be realistically estimated. Deliberate analysis is required if the costs are a significant element of the total procurement cost. Finally, approval at a level higher than the contracting officer must be obtained to include such costs as a bid evaluation factor. (Similarly, the MSC's Deputy Commander approval, is often required for inclusion of bid evaluation factors if the Government's estimated cost of the test exceeds 10 percent of the acquisition price.).

(3) Costs Obtained from Testing Activity. Government testing costs are normally obtained from the testing activity. Interviews with personnel at the MSC's revealed a high confidence level in such estimated costs.

(4) Reluctance to Include Costs. Part of the reluctance to include Government testing costs as a bid evaluation factor in the case of waiver may stem from Comp Gen decisions. In one case, the Comp Gen stated that the question in regard to including costs of tests as an evaluation factor is not whether they appear to exceed the difference in

price after receipt of proposals, but the extent to which they can be realistically estimated prior to issuance of the solicitation. In that case, the Government agency had not included the Government's costs as an evaluation factor since it was deemed impossible to extract the cost of testing from the overall tests of operating the laboratory.[11] In another case, the Comp Gen recognized the difficulty of obtaining agreement as to which costs constituted FATAR costs. It was recommended that input be obtained from all interested agencies. Based on a thorough evaluation of this data, a bid evaluation factor should be included based on agreement as to the applicable criteria and a determination that it is in the best interests of the Government to include such evaluation factors.[12] Thus, it is seen that bid evaluation factors must be reasonably estimated and must be specified in the solicitation prior to bid opening. This has probably resulted in agencies using a conservative bid evaluation factor or ignoring it altogether. Additionally, the realism of the testing activities' estimates must be evaluated based on analysis (page 75) that TECOM's actual costs were 14 percent under the original estimates.

(5) Lack of Documentation Regarding FA Costs. Sufficient documentation regarding the FATAR costs to be used as bid evaluation factors were normally not forwarded to the Procurement Division. Field interviews and review of the contracts revealed that Procurement was

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[11] B-177861(1), 13 July 1973.

[12] B-159582, 7 September 1966.

normally advised of the total cost and not given any backup data, such as a cost breakdown. Thus, the contracting officer did not have sufficient information to assess whether the bid evaluation figure was a pure guess or the result of extensive research and analysis.

2. Benefits

No documentation was forwarded to Procurement regarding the benefits to be derived from FA test. However, interviews with procurement personnel revealed that they were aware of the benefits of such testing for the majority of contracts they issued. However, numerous questions were raised regarding the relative benefits versus costs for some procurements, such as (1) those involving previous producers who had experienced a "substantial break in production (normally one year); (2) design specifications, etc. Thus, the benefits derived from FATAR are not always documented or apparent.

E. CONTRACT DELIVERY REQUIREMENTS

1. Importance of Realistic Delivery Requirements

Another area which substantially affects the FA decision is its impact on the contractual delivery schedules. The importance of including realistic delivery schedules for FA submittal and approval requirements have been cited by the Comp Gen in several decisions. For instance, in one decision, the Comp Gen concluded that the preproduction delivery and testing requirements were not well coordinated (either too much time was allowed for the preproduction testing and approval or not enough time

was permitted for production effort) and noted that tight or difficult to attain delivery schedules are inimical to full competition, inconsistent with small business policies and may result in higher contract prices.[13] In several formally advertised procurements, a bidder has been determined to be non-responsive inasmuch as the inserted FA delivery date plus the Government's specified approval time equaled the initial production delivery date. The FA clause used in these contracts did not authorize, except at the sole risk of the contractor, commencement of production effort or procurement of material prior to FA approval.[14] Additionally, a bidder was determined to be non-responsive on an IFB in which he did not take exception to the production delivery schedule but did indicate that 120 rather than 105 days would be required for submittal of the FA sample.[15] Contrarily, the Contracting Officer was upheld in permitting a contractor to submit an FA sample later than that specified in the solicitation in a negotiated procurement since: (1) the contracting officer has more discretion in such procurements and (2) the other contractors were not prejudiced by this action since the contractor still was required to meet the delivery schedule specified in the solicitation.[16] Thus, the importance of including realistic FA

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[13] B-158002, 28 February 1966.

[14] B-147958, 19 March 1962.

[15] B-151802, 19 September 1963.

[16] B-162400

and production delivery and approval times in the solicitation cannot be overstressed. Unrealistic delivery requirements may lead to rejection or exclusion of potential contractors who are unable to comply with them.

2. Determining Contractual Delivery Requirements

a. Input Obtained from Various Functional Areas. Normally, the Product Assurance Directorate gets input from other functional areas such as the Production division and from the testing activity regarding the recommended delivery schedule to be included in the solicitation for: (1) the FA sample or test report; (2) Government FA approval time; (3) the contractual delivery schedule. Interviews with personnel within the Production division revealed they use several determinants to arrive at the recommended contractual schedule, including: (1) knowledge of the item, including the type material and production processes used in manufacturing it; (2) knowledge of changes in vendor's lead time for raw materials or component parts; (3) whether a sufficient number of end item manufacturers are likely to have excess plant capacity; (4) testing requirements in specifications; (5) the Government testing activities workload; (6) the provisions normally included in such contracts, such as authorization to commence with production effort prior to FA approval.

b. Conflict with the Government's Required Delivery. The Production division input is forwarded to the Procurement Contracting Officer (PCO) who notifies the materiel manager of any conflict between

the Government's required delivery schedule and the recommended schedule by the Production divisior. At least 17 instances of such conflict occurred in the contracts reviewed. Oftentimes, the materiel manager will accept the later delivery schedule and then request acceleration effort after award of the contract. In one such contract, Procurement was requested to accelerate the contractual delivery schedule by three months. The delivery schedule in the solicitation that resulted in this award, had required advancement of the delivery schedule by 90 days for contractors granted waivers of FATAR. Since a new contractor was the low bidder, Product Assurance refused to waive the FATAR. A price increase in excess of $400,000 was proposed by the contractor for the requested delivery acceleration. The Government finally was forced to reject this delivery acceleration proposal because of the exorbitant price. In another case involving very urgent requirements, a contract was awarded to a previous contractor who has completed, within a six month period, production under a previous contract. Although Product Assurance refused to grant a FATAR waiver for this ammunition equipment contract, they did agree to an abbreviated test program which enabled the contractor to meet the Government's required delivery schedule.

3. Production Delivery Delays

a. Increased PALT. One of the production delivery delays associated with FATAR is caused by increased procurement administrative lead time. Interviews revealed that Invitation for Bids (IFB) are

usually given longer bid opening periods of approximately 7 to 10 days if FATAR is required. The additional time is needed because of the added effort and evaluation required by the contractor to prepare the bid. Additionally, pre-award surveys are frequently conducted on such contracts for new suppliers which extends PALT.

b. Provisioning and Spare Parts Requirements. Provisioning data, such as manuals, and spare parts normally must be available prior to the release of the item to the user. Since provisioning data and spare parts are not firm until the completion of FATAR, acquisition of these items is not finalized until FATAR is accomplished. Depending on the lead time of these items, production deliveries may be further delayed.

c. Contractual Production Schedule Delays. The contracts were reviewed to determine the total production schedule delay anticipated at time of contract award as a result of FATAR. The data, which is broken out by Command for both Government and contractor testing, revealed:

TABLE IV

ANTICIPATED PRODUCTION DELIVERY DELAYS
FOR CONTRACTOR AND GOVERNMENT TESTING

	CONTRACTOR TEST							GOVERNMENT TEST						
Command \ Delay in Days	0	1-60	61-120	121-180	181-240	241-270	Cum Ave	0	1-60	61-120	121-180	181-240	241-270	Cum Ave
A	2	2	7	3			92	0	5	2				58
B	0	1	2	6	5	1	174	0				4	2	228
C	1	4	4	2			69	0						
TOTAL	3	7	13	11	5	1	121	0	5	2	0	4	2	136

Analysis of the above data shows that there is little difference in production delivery delays associated with Government or contractor conducted testing. For the two commands for which contracts involving both types of testing were involved (A + B), the average production delay was almost identical (136 days for Government testing versus 135 days for contractor testing). Additionally, production schedule delays of less than four months were observed for approximately 57 and 53 per cent of the contracts requiring contractor and Government testing respectively. The greatest variation in production schedule delays occurred between the commands, with command B experiencing much longer delays This was probably caused by the fact that this command used FA requirements in procurement of equipment which was judged to be much more complex than the other commands. This is partially substantiated by the fact that the unit price of material procured was over $1,000 each on approximately 90 percent (19 out of 21) of the contracts reviewed at this MSC versus approximately 7 percent (2 out of 33) for the other two commands. Furthermore, the item's unit price exceeded $10,000 for over 60 percent (13 out of 21) of the contracts reviewed in this command. Finally, several of the procurements observed at this activity represented first production procurements of items built to performance specifications.

d. Actual FA Approval Delays Exceed Contractual Planned Delays. Further analysis of the data was conducted to determine if the FA delivery and approval requirements were realistic or if additional delinquencies occurred beyond that contemplated in the original contractual schedule.

(1) Late Submission of FA Samples or Test Reports. Initially, the data was examined to assess the likelihood of the contractor submitting the FA sample or test report in accordance with the original contract schedule. This data is listed in Table V.

TABLE V

SUBMISSION OF FA SAMPLES OR TEST REPORTS VS. CONTRACT REQUIREMENT

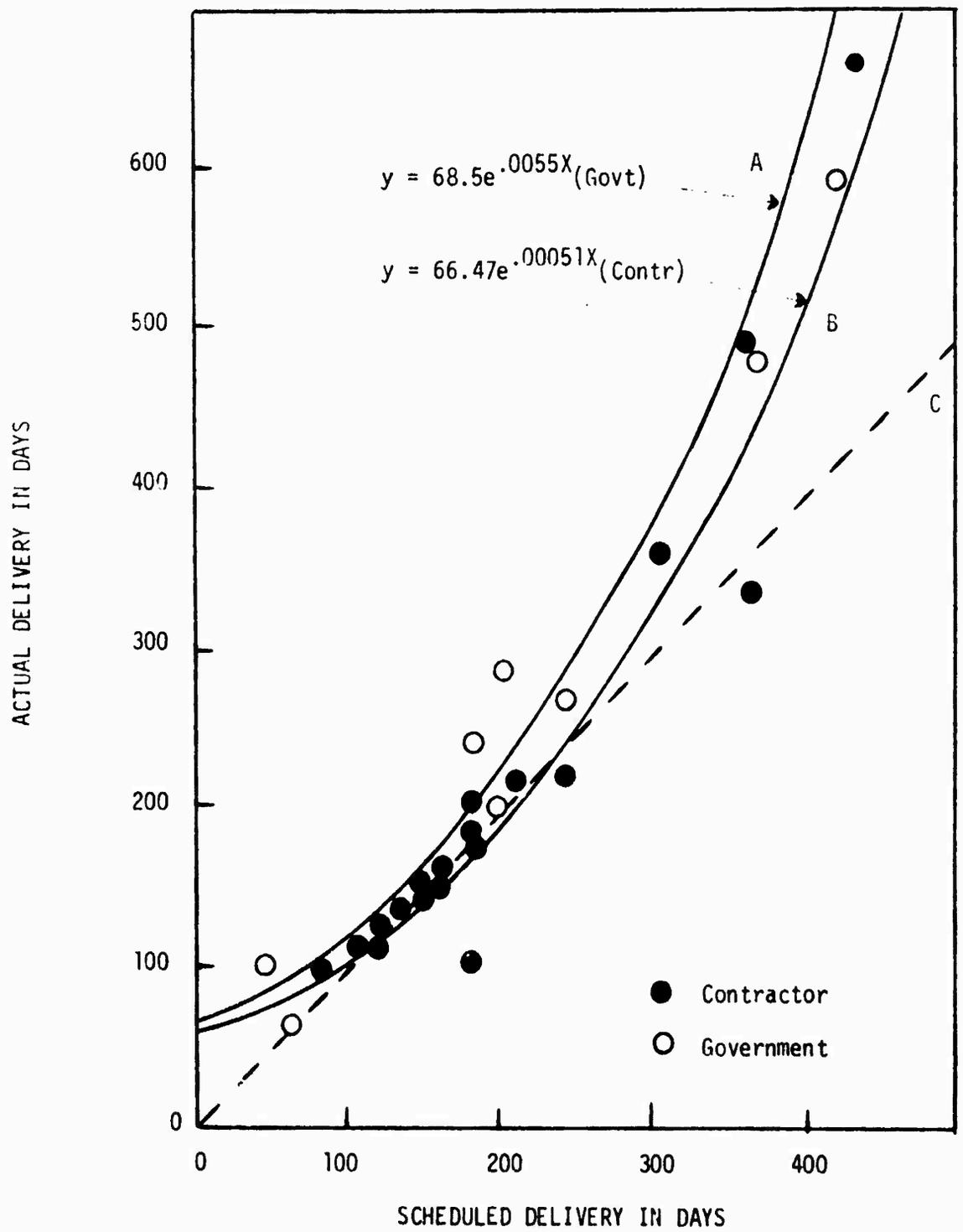
	CONTRACTOR TEST									GOVERNMENT TEST								
	Early			Late						Early			Late					
Delay in Days / Command	+30 to -∞	+30 to +5	+5 to -5	-5 to -30	-30 to -60	-60 to -120	-120 to -180	-180 to -∞	AVE.	+30 to -∞	+30 to +5	+5 to -5	-5 to -30	-30 to -60	-60 to -120	-120 to -180	-180 to -∞	AVE DAYS
A	1	1	3	2			1		10			2	1	1	1		1	68
B	1	1	1		1			3	98					1	1	1		115
C			6				1	1	48									
TOTAL	2	2	10	2	1	0	2	4	48	0	0	2	1	2	2	1	1	84

Evaluation of this data reveals that contractors experienced greater slippages in submitting FA when Government testing was involved. For the two commands in which both contractor and Government conducted testing was required, the average slippage was 51 and 84 days respectively. Furthermore, the data reveals that contractor submitted the FA test report within 5 days or earlier of the contractual delivery date approximately 60 percent (14 out of 23 cases) versus 22 percent (2 out of 9 cases) when Government testing was involved. Interviews with field personnel indicated that the greater slippage noted for submittal of FA samples for Government conducted tests is probably caused by contractor's: (1) increased tendency to question proper specification interpretation when Government testing is required; (2) carefully conducting preliminary FA tests on samples prior to submitting them to the Government. Finally, it is again noted that command B expereinced the greatest slippage in submittal of both FA samples and test reports. This was probably caused by the complexity of the items being procured.

The scheduled versus actual delivery by the contractor to submit either FA test samples (Government testing) or test reports (contractor testing) were subjected to regression analysis. Curve A and B on Figure 1, "Scheduled vs Actual Delivery of First Article Samples and Test Reports," revealed an extremely high relationship between these factors (both curves were significant at over the 99.9 confidence level

FIGURE I

SCHEDULED VS. ACTUAL DELIVERY OF
FIRST ARTICLE SAMPLES AND TEST REPORTS



and the correlation was .956 and .945 between these curves and the observed observations, respectively.) Curve C represents all points at which actual and contract schedule deliveries coincide.[17] Comparison of these two curves reveals that prediction of contractor's lead time to submit a test report as a result of contractor testing was very good for a period of up to 275 days. However, predictions became increasingly understated as the period exceeds 275 days. Contrarily, prediction for contractor submittal of samples for Government testing was understated for all periods and became increasingly understated as the period exceeded 250 days. It is important to note that no contract was terminated for untimely delivery of FA samples.

(2) Timely Approval of Samples of Reports. Finally, the data was examined to determine if the contractual time for the Government to approve/disapprove the FA test sample or report contributed to an additional delay. This revealed:

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[17] Four contractor and one Government-conducted testing requirement were eliminated from this analysis because significant events occurred after award of the contract which could not have been anticipated at the time that FA submission requirements were estimated. These events included: (1) substantial specification changes; (2) strikes; (3) sole source subcontractor no longer willing to furnish an item.

TABLE VI

ACTUAL VS. CONTRACTUAL TIME TO APPROVE FA AFTER SUBMITTAL

Early or Late Approval in Days	Early Approval		Timely Approval	Late Approval		
Contractor Testing	Over 10	1-10	0	1-10	11-20	Over 20
Command A	2	4	1	1	0	0
B	1	1	0	0	1	1(32)
C	1	0	2	0	1	0
Total	4	5	3	1	2	1
Government Testing						
Command A	0	1	2	2	1	0
B	1	0	0	1	0	0
Total	1	1	2	3	1	0

Thus, it is seen that the Government granted the necessary approval/disapproval of contractor's FA test report (i.e., contractor testing) in accordance with the contractual requirements for approximately 70 percent (12 out of 17) of the contracts reviewed.[18] Additionally, approximately

[18] FA submission time not included in this analysis.

24 percent of Government approvals were granted at least 10 days earlier than contractually required. Similarly, the success rate in meeting contractual approval requirements when Government testing is involved is very good. The latest approval was granted only 17 days after the contractual required date and 50 percent of the approvals were made in a timely manner. However, this may not be reflective of overall Army experience. Attention is called to the fact that six of the eight contracts were issued by command A, who normally required tests of short duration. Also, one of the two contracts observed at command B would have experienced substantial slippage, but FA approval was granted based on successful completion of 2,500 out of a 5,000-hour scheduled endurance test.

4. Dual Delivery Schedules

a. Equalization Factor. Since FATAR delay initial production deliveries, the contracting officer has the prerogative to insert an earlier delivery schedule in the solicitation which will be applicable to contractors granted FA waivers. This has been upheld by the Comp Gen as an equalization factor to offset the cost advantage associated with elimination of FATAR.[19]

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[19] 41 Comptroller General 788.

b. Effect on Non-responsibility Determination. In determining a contractor's responsibility on such bids, the contracting officer must make separate determinations regarding a contractor's ability to meet the production delivery schedules applicable if the waiver is granted or denied. In one decision, the Comp Gen noted that the contracting officer's decision, to reject a bidder as non-responsible based on an evaluation of only his ability to meet the waiver delivery schedule, deviated from requirements of the law and regulations in matters materiel enough to warrant cancellation of the award.[20] Additionally, in competitive negotiated procurements, the Government can pay a premium for an earlier delivery schedule attributable to acceleration efforts made possible by FA waiver. However, all contractors must be made aware that these earlier deliveries will be an evaluation factor in the award of such contracts.[21]

c. Only One MSC Included Dual Delivery Schedule. Of the contracts reviewed, only one MSC issued contracts containing a separate delivery schedule requirements for contractors eligible for waiver requirements. The dual delivery schedules were included in approximately 58 percent (14 out of 24) of the contracts reviewed at this activity. The other MSC's often included a provision that requested contractor to

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[20] B-161448, 7 February 1968.

[21] B-158528, 26 April 1967.

propose an earlier delivery schedule in the event that a requested waiver was granted. Thus, earlier deliveries on these contracts were desirable. However, since earlier deliveries were not specified as an evaluation factor in determining the successful contractor, no instances of contractor's proposing earlier deliveries were observed.

Thus, inclusion of dual delivery schedules in solicitations appears to be based on Command policy. One MSC used this technique successfully when earlier deliveries were desired. Successful use of this technique requires the establishment of reasonable dual delivery schedules. Contrarily, little success was noted by other MSC's in getting contractors to voluntarily propose a desired earlier delivery for granting waiver of FATAR on contracts awarded on the basis of lowest price.

5. Techniques Used to Specify Production Delivery Requirements

a. Normally Within a Specified Number of Days After Contract Award. Two methods were observed for specifying required production delivery requirements. The most commonly used technique specified production delivery schedule: (1) in a certain number of days after date of contractor, or (2) to be delivered in certain months. The primary problem with this method is that contract modifications are usually required to revise the production delivery schedule because of unanticipated delay in acquiring FA approval. A review of the data previously presented in Table V reveals that approximately 30 and 66 percent of the contracts involving contractor and Government conducted testing involved delinquent deliveries of FA sample or tests of over 30 days. Although it is not known how many of these delinquencies were solely contractor's fault, review of the files did reveal many problems revolved

around: (1) alleged discrepancies in the technical data packages; (2) late contractor receipt of Government furnished material; (3) defective test equipment furnished to contractor. Thus, some of the delinquency was probably excusable, and the contractor would be entitled to a revised delivery schedule reflective of the amount of excusable delay. Even if the delinquency was not excusable, the Government would probably have waived the production delivery schedule by permitting the contractor to continue performance beyond the contractual FA sample or report delivery date without issuance of the appropriate contract modification.

b. After FA Approval. Approximately 30 percent (16 out of 53) of the contracts reviewed stated that the production deliveries would commence within a certain number of days after FA approval was granted. This technique has the advantage of giving the contractor a reasonable time to produce the items after the FA sample was approved. Thus, the production delivery schedule would not necessarily be waived because the Government did not modify it in a timely manner after the contractor slipped the FA submittal date. However, a modification would be needed if the contractor was at fault to preclude the contractor from obtaining an automatic extension of the delivery schedule. Additionally, it may preclude the necessity of issuing a modification if the delay was caused by the Government. Finally, the Government would be entitled to earlier deliveries if FA approval was approved earlier than contractually required. Thus, this technique eliminates some of the problems associated with specifying production deliveries to commence within a certain number of days after date of contract.

F. GOVERNMENT VS. CONTRACTOR CONDUCTED TESTS

1. Contractor Testing Normally Required

For production contracts, the Government normally requires the contractor to conduct FA tests and submit a test report for approval by the Government prior to the full production decision. Normally such tests are witnessed by the Government. Approximately 75 percent (40 out of 54) of the contracts reviewed contained such contractor testing requirements. The following breakout by commands shows that one MSC relied entirely on contractor testing, while the other MSC's did use Government testing for a substantial number of contracts:

TABLE VII

GOVERNMENT VS. CONTRACTOR-CONDUCTED TESTS

	Contractor	Government
Command A	15	6
Command B	14	8
Command C	11	
Total	40	14

2. Government Testing

a. Justification. Several instances were cited in interviews which justify Government testing, including: (a) cost or acquisition lead time considerations make it unacceptable for the contractor to procure

the required test equipment; (2) inability of the contractor to obtain adequate testing facilities, such as a test range for ballistics; (3) need for user of item to test utility of item under operational conditions.

b. Contractual Requirements. Contractors are normally required to submit a specified number of units for such tests. On several of the contracts reviewed, the contractor or DCASR was required to conduct preliminary tests and submit a report of the findings with such samples. Such preliminary tests varied from the submission of objective evidence of the design compliance and the materials, and processes used to fabricate the material to actual conduct of all the tests except for those destructive in nature, specified in the specifications.

3. Impact of Requiring Both Pre-production and IPT

Additionally, 18 of the contracts reviewed required both pre-production and IPT. All such contracts were issued by one MSC and the majority (14 out of 18) required contractor conducted pre-production testing. All IPT was conducted by the Government. Such testing was conducted on relatively complex, sophisticated equipment as evidenced by the fact that the item's unit price exceeded $10,000 and $1,000 for approximately 60 and 90 percent, respectively, of these contracts.

The specifications for these 18 items requiring both FA pre-production and IPT were obtained and reviewed to determine if any duplication of effort existed.[22] The analysis revealed varying degrees of duplication

[22]A list of the 17 specifications are noted in the bibliography. Two contracts involved different items procured to the same specification.

with 100 percent duplication occurring in three specifications and a considerable degree of duplication in three additional specifications. At first glance, it would appear that the existing duplication of testing effort is wasteful. However, one must remember that FA preproduction testing and IPT serve different purposes in production contracts. The former is required to verify that contractor's contemplated design will yield the designed performance. The latter verifies that the contractor's full scale manufacturing methods and equipment are capable of producing an acceptable item. In view of this, the majority of the requirements were judged to be logical and rational since they allowed the Government to test when necessary. Thus, one would have to consider the cost of duplicative testing versus additional assurances derived from the tests that the item will meet the Government's objective. Inasmuch as the specifications have built in flexibility to permit waiver of tests, duplicative testing could be easily eliminated. However, such waiver determination should be required on a case by case basis after a detailed review by someone thoroughly knowledgeable of the specification, material and possible manufacturer. For instance, some of the duplicative testing noted involved examinations to verify contractors adherence to the design. A review of the specifications might restrict duplicative testing to only critical performance characteristics. In conclusion, elimination of duplicative testing requirements appears to be one area in which a reduction in Government expenses might be achieved.

G. WAIVER

1. Introduction

Because the Government does not know who the successful bidder will be on a competitive procurement, FATAR are included, when appropriate, in the solicitation. However, a provision is normally included in the solicitation stating the criteria which will be considered in determining a bidders eligibility for waiver of the FATAR. For instanc , bidders are frequently requested to furnish information relative to the contract they previously furnished the identical or similar item under. This information is forwarded to Product Assurance who makes the waiver determination.

2. Previous Suppliers Often Denied Waivers

Oftentimes previous manufacturers of an item are denied waiver requests on subsequent procurements. Surprisingly, approximately 58 percent (24 of 40) of the contracts reviewed, for which information was available regarding previous suppliers, involved previous manufacturers who were not granted waivers. Two additional contracts reviewed involved previous contractors who were granted waivers. Review of the contract files revealed the following reasons for not granting waivers:

TABLE VIII

REASONS FOR DENYING FA WAIVERS TO PREVIOUS PRODUCERS

	REASON	No. of Contracts
1.	Waiver not requested by contractor and/or no documentation found in which Purchase requesting waiver from Product Assurance.	8
2.	Substantial Break in Production.	4
3.	Testing not complete on previous contract.	3
4.	Design changes since last furnished.	2
5.	Contractor requested inclusion of FA provision.	2
6.	First Full Scale Production Run.	3
7.	Partial waiver (abbreviated test required).	1
8.	Waived after contract issued.	1

a. Failure to Request Waiver. For eight of these contracts, the contractor did not request a waiver of the requirement and there was no documentation to indicate that a waiver request was forwarded from Procurement to Product Assurance Directorate. It is conceded that some previous manufacturer of an item probably did not request a waiver of the requirements because they feel it would be denied. However, several of the invitations stated that the contractor would not be eligible for FA waiver if he did not furnish information with this b d regarding the

contracts he previously furnished the identical item under. Many agencies insert this requirement to cover situations in which they are unaware that a contractor previously furnished an identical item to Government, such as: (1) the item may have been procured by another agency; (2) faulty procurement history record. However, one contractor, who was the last known supplier of the item (and had last furnished it approximately two years prior to the contract reviewed) was not considered for a possible waiver because he did not insert a price which would be applicable in the event waiver was granted. A pre-award survey was conducted on this contractor which revealed his past performance was considered satisfactory and he is considered a good contractor.

The Comp Gen has ruled that the Government should not include a waiver of FA provision if it has been administratively pre-determined not to waive FATAR. Additionally no predetermination is deemed to have been made if the Government is unaware if there are any previous contracts under which the item was furnished.[23] However, in each of these cases, the successful contractor was known to be a previous supplier of the material. Finally, the Comp Gen has ruled that failure to furnish the required FA waiver information is done at the contractor's peril, but it

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[23]B-159800, 22 September 1960.

should not preclude a contracting officer from considering appropriate waiver.[24]

Thus, Product Assurance must have decided, when preparing their input to the procurement package, that such a waiver provision was appropriate since some previous contractors would probably qualify for the waiver. The failure to eliminate a FATAR for an eligible contractor must be deemed a useless and costly requirement. Thus, there is a need to establish a procedure that will result in consideration of waivers for previous suppliers, who have submitted the lowest price in a procurement, but have failed to request waiver of the FATAR.

The need for procedures to consider a current producer for waiver is pointed out in a Comp Gen decision in which the contracting officer's determination not to consider a current producer's alternate bid based on waiver of FATAR was judged to be an improper administrative decision. In that case, the Government tried to justify its decision based on the fact that FATAR were waived on the prior contract because of urgent material requirements. However, no evidence was presented to indicate that the contractor was furnishing faulty material under the prior contract. It was noted that the cost of FA testing should be borne on the first

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[24] B-169779, 6 August 1970.

production contract and there is no logical reason to repeatedly bear this cost on subsequent contracts. Thus, the Comp Gen felt the contractor was improperly penalized because FATAR were waived on the previous contracts for the Government's benefit.[25] Conversely, the Government was upheld in refusing to grant a waiver for a contractor who had obtained FA approval on a previous contract two months prior to bid opening, since the reliability of the equipment demanded frequent re-examination and re-test to establish that the processing and quality control procedure of the contractor continued to meet Government requirements.[26]

What constitutes identical equipment often is raised in waiver decisions. For instance, the contracting officer's decision to deny FA waiver was upheld because parts may not be identical even though they are physically, mechanically, functionally, and electrically interchangeable with the required item.[27]

b. Substantial Breaks in Production. Substantial breaks in production was the most frequently cited reason for not granting waivers to previous producers. The period of time deemed to constitute such a break varied from one year, for the majority of procurements, to a maximum two year period. The Comp Gen has constantly held this to be a valid

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[25] B-162438, 15 February 1968.

[26] B-153493, 5 August 1964.

[27] B-155853, 15 April 1965.

reason for refusing a waiver. For instance, in one case the contract stated that contractors would be considered for waivers only if a period not exceeding 90 days had elapsed since completion of production under a previous contract. The contracting officer postponed the bid opening which precluded the contractor from qualifying for the waiver. In upholding the contracting officer's decision as reasonable, it was noted that waiver is not a matter of right but granted in discretion of the contracting office. Such discretionary decisions will not be overturned unless they are found to be arbitrary or capricious.[28] However, a question is raised regarding the realism of establishing arbitrary time periods as constituting substantial break in production. For instance, one contractor may plan to produce the item with substantially the same personnel, tools, manufacturing processes, etc., as he did when he last furnished the item three years ago. A second contractor may have experienced considerable personnel turnover since he last produced the item six months ago. Thus, it appears that each waiver request should be considered on an individual basis.

c. FA Not Approved on Previous Contract. Another waiver problem area involves contractors who have been previously awarded a contract for the same item but have not successfully completed FATAR thereunder.

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[28] B-169779, 6 August 1970.

The Navy has recently issued a Procurement Directive regarding this problem which states that the award of additional procurements for the same item prior to FA approval under a previous contract is inconsistent with the objectives of reducing risk to the Government. Therefore, approval of such contracts must be made by the Head of the Procuring Activity or his designee for urgent requirements. The risks involved in such follow on procurements must be considered and documented in the contract files.[29]

Three of the contracts reviewed were awarded under these circumstances. In each case, FATAR was retained in the subsequent contract, with possible thoughts of eliminating the requirement by modification upon successful completion of FATAR under the prior contract. However, one of these contracts vividly illustrated this danger of such practices. A contractor, upon successful completion of FATAR on the prior contract, submitted a value engineering change proposal for the elimination of FATAR on the subsequent contract. Since it met the criteria for a value engineering change proposal, the contractor was awarded 40% of the $10,043 cost reduction for the elimination of the requirement. One of the methods suggested to eliminate this problem is to waive FATAR on the second contract contingent upon successful completion of such tests

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[29]FCR, 11/11/74 citing Navy Procurement Directive Revision No. 2, p. 8.

under the first contract. However, contractors may be reluctant to agree to such a provision, since separate contractual testing provisions in each contract provide the contractor a second chance for a contractor to successfully complete such tests if the FA were rejected on the initial contract. Conversely, such a provision would enable the Government to terminate the second contract at an early date if tests result under the initial revealed little likelihood that the contractor could eventually pass the FATAR.

Another method which has been successfully used when an FA approval/disapproval decision is eminent on the prior contract is to delay the pending award. In one such case, the contracting officer was upheld in his determination that a contractor was non-responsible based on rejection of the contractor's third submission of an FA sample on a previous contract.[30] In another case, the Comp Gen held up award pending FA test results for the two lowest bidders under previous contracts. Both contractors were given approval and award was made to the low bidder based on FA waiver.[31]

3. FA Approval Rates for Previous vs. New Suppliers

The data were examined to determine if there were any significant differences between the FA approval rates for previous vs new contracts.

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[30] B-151579, 12 July, 1963.

[31] B-175015, 29 September 1972.

TABLE IX

FA APPROVAL RATES FOR PREVIOUS VS. NEW PRODUCERS

	Previous Producer	New Producer
Approve as submitted	14	6
Approve after on rejection	2	0
Rejected, resubmission required	0	2
Not due	8	9
TOTAL	24	17

For the contracts under which FA samples were submitted, the percentage which were approved as originally submitted was very high for both previous and new suppliers (87 vs. 75% respectively). Further analysis was conducted to determine the reasons for the rejections. One of the rejections for both previous and new suppliers had occurred as a result of material discrepancies. The previous supplier corrected the noted deficiencies and obtained the required approval on the second submittal. The new supplier had been rejected a total of three times and was given another opportunity to resubmit the sample. After the third rejection, the Government was furnishing assistance to the contractor in investigating the cause of the problem because of the possibility of both defective Government furnished equipment and technical data. The other rejection

for a previous supplier resulted from the failure of the contractor to include some of the required test results in the report. The report was subsequently amended and approved as a result of additional tests. Interviews with field personnel repeated referred to rejection of FA reports because of bad report form or incomplete reports in lieu of faulty material. For the other new supplier, the rejection occurred because of the Government's allegation that the contractor did not conduct his inspection tests with the required gauges. After considerable debate regarding the adequacy of the gauges, the Government agreed to furnish the contractor inspection gauges and the tests were rescheduled. Thus, one of the two rejections for both new and previous suppliers was based on unacceptable or omitted test requirements rather than faulty material. Hence, the probability of rejecting a previous or new supplier as a result of faulty material was very low (approximately 6 and 1% respectively) of the contracts reviewed.

H. AUTHORIZATION TO PROCURE MATERIEL PRIOR TO FA APPROVAL

1. Alternate ASPR FA Provision

a. Provisions. The FA clause specified in ASPR 7-104.55(b) specifies that prior to approval of FA, the acquisition of materiels or components for, or the commencement of production of the balance of the contract quantity shall be at the sole risk of the contractor. However,

the contracting officer can select the alternate provision contained in ASPR 7-104.55(c) which authorizes the contractor, upon written approval by the contracting officer, to procure materiel and commence production effort to the extent necessary to meet production delivery requirements.

b. Benefits vs. Risks. This alternate provision places considerable risk on the contractor since he is liable to correct or replace, at the location designated by the Government, all items manufactured under the contract at no change in the contract price.

Contrarily, the Government stands to benefit by incorporating such a provision through possible earlier production deliveries or lower procurement costs. The cost savings result from factors such as: (1) earlier production effort and procurement of materiel results in the reduction of the contingency pricing factor needed to cover labor and materiel price increases; (2) payment of progress payments for incurred production costs, prior to FA approval, enable the contractor to undertake such action without endangering his cash flow position and/or overall rate of return.

c. Use of the Alternate FA Clause Provision. Slightly more than 41 percent (22 out of 53) of the contracts reviewed included this alternate provision. Furthermore, review of the 22 contracts containing such a provision revealed that written authority to commence production effort or procure materiel had been given for only 11 contracts with one additional

request pending. Finally, one contractor was authorized by a letter from the PCO to procure specified long lead materiel despite the fact the contract did not authorize such authority. Thus, issuance of the authority to proceed with production effort prior to FA approval was given on approximately 23 percent of the contracts reviewed. Five of the contracts were previous producers of the item, one involved a first production run and one was a new contractor.[32] Thus, a higher proportion of such authorizations was given to previous contractors.

Further evaluation of the data revealed that usage of the alternate provision varied considerably among the MSC's with 77, 24 and 0 percent of the contracts reviewed at the three MSC's respectively, containing such a provision.

2. Analysis of Actual Authorizations

a. Type of Materiel or Production Effort. The 12 contracts, for which authority to proceed with production effort was given, were analyzed to determine the type materiel or production effort involved.

[32]Information was not available to determine if the other contractors were previous producers.

This revealed:

TABLE X

TYPE MATERIAL CONTRACTOR AUTHORIZED TO PROCURE PRIOR TO FA APPROVAL

Type Materiel	Number of Contracts
1. Components identified by: mfg part number, military standard	3
2. Raw or processed materiel (steel, aluminum, etc.)	2
3. Long lead components	2
4. Components proved by testing	2
5. All materiel & prod effort necessary to meet production delivery schedule	3

Approvals were granted for the first three categories of materiels, involving seven contracts based on evaluation of contractor's requests which usually specified: (1) description of materiel; (2) quantity needed; (3) manufacturer or Government (military standard) part number; (4) procurement lead time. Only three of these requests specified the approximate dollar value of the materiel to be purchased. The contracting officer normally requested a recommendation from the Production and/or Product Assurance Division regarding whether the items listed in contractor's

request were actually long lead time items. The contracting officer then issued the written authority to proceed with the procurement or fabrication of the long lead time items.

Two contractors were authorized to procure materiel prior to final FA approval based on partial FA evaluation. One of these contractors was authorized to buy different parts based on the percentage of FA endurance testing completed. For instance, after successful completion of 500 hours of endurance testing, the contractor could procure complete cooling group and items not subject to deterioration. After 1500 hours, he could procure batteries and connectors. A second contractor was authorized to procure component parts upon successful FA evaluation of the specific parts. In both cases, close coordination was required between the contractor and testing activity. However, improved deliveries of production units were observed in both cases.

The other three contracts involved situations in which the contractor was authorized at the time of award to procure materiel necessary to meet production delivery schedule.

b. Risk Associated with Authorizations

(1) Authorizations Frequently Granted for Materiel Involving Low Risk. The previous analysis revealed that five of the nine contracts for which such written authorization was given after award, involved

materials such as raw or processed material and components. A large portion of such material could, in the event of contract termination, probably be used by the contractor in his other work or furnished to another contractor as GFE. Furthermore, the lead time of some raw material such as steel was reported to be very long in 1975 thus delaying production effort at a probable considerable cost increase in view of the large inflation rates experienced during this period. Additionally, two other contracts involved low risk authorizations inasmuch as the material had been partially verified by FA tests. Thus, little cost risk was associated with these authorizations for seven of the nine contr.cts.

(2) Rejection of FA after Issuance of Authorization. All four of the contracts in which a rejection of the FA sample was observed included the alternate provision. However, only one of these contractors had been given written authority to proceed with the production effort. Inasmuch as the materiel procured under this contract was a common metal (aluminum), no materiel was made obsolete due to the discrepancies noted in FA testing.

Additionally, two cases were reported in interviews in which a contractor was terminated for default after receiving written authority to procure materiel. In one case, the contractor was able to utilize materiel elsewhere. In the second, the Government acquired title to the

materiel because progress payments had been paid. The Government was able to use this sole source QPL materiel elsewhere. This illustrates that there are many materiels the Government could let the contractor procure prior to FA approval with little risk to either party.

3. Waiver of Risk Provision

The provision which places the sole risk on the contractor for the procurement of materiel or commencement of production effort has been upheld in several decisions. However, it is not applicable if it would be impossible to wait until first article approval before ordering production materiels or commencing production effort and still meet production deliveries.[33] This again points out the need to establish a realistic production delivery schedule in relation to the FA approval date. Additionally, the contracting officer should be receptive to contractor's request to purchase materiel or commence production effort prior to FA approval if extensive changes have occurred in production lead times for the item's component parts or materiels. Additionally, a waiver of this FA risk provision may occur if: (1) the Government gives directions or actively encourages a contractor to proceed with purchasing

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[33]Appeal of Switlik Parachute, Inc., ASBCA, 18024, 8/7/75.

of materiel or production; or (2) the contracting officer refuses to grant a requested extension of the delivery schedule the contractor is entitled to.[34] Inasmuch as some of the delay previously noted in the FA submittal was the Government's fault, the contracting officer should be prompt in revising production delivery schedules to preclude waiver of this risk provision. Finally, the contracting officer should insure that no acceleration of delivery schedule requests are made to the contractor which may be construed as a waiver of this risk provision.

c. Failure to Obtain Adequate Consideration: The Government did not obtain a price reduction in any of the nine contracts in which written approval was granted after contract award. Such authorizations are beneficial to the contractor because of factors such as: (1) improved cash flow and rate of return on investment since he can obtain progress payments for production effort; (2) ability to buy materiel or commence production effort immediately at a probable cost savings in an inflationary period. Interviews with field personnel indicated no attempt was normally made to get a price reduction reflective of contractor's potential savings. Occasionally, consideration would flow to the Government in the form of early production deliveries. However, since the authorizations were usually granted by letter, contractor was not legally obligated to improve deliveries. Thus, there appears to be a need for guidance in this area.

I. ACCEPT, REJECT OR CONDITIONAL APPROVAL

After FA testing results are known, the contracting officer must approve, reject, or conditionally approve the FA sample. Conditional

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[34] Ibid.

approvals are normally granted for FA defects that are minor in nature and readily correctable in production. It has been held that such defects do not serve as a basis for a default termination.[35] Contrarily, major FA defects do serve as a basis for default termination. No conditional acceptances were noted in the contract reviewed. However a contractor was refused FA waiver because the FA submitted under the previous contract was conditionally accepted. The conditional acceptance had been based on defects caused by a specification misinterpretation and dimensional discrepancies caused by contractor's laxity, both of which were correctable during production.

Of the contracts reviewed, 22 out of 27 were approved as initially submitted. Another contract involved approval based on granting of a specification waiver. Finally, contractors were permitted to resubmit the FA sample in all four contracts in which it was initially rejected. Thus, a default termination because of FA sample rejection was not observed in the contract reviewed.

The relatively high acceptance rate may have been caused by the high proportion of previous suppliers and design specifications. previously noted. This suggests that FA testing may be required in instances where a waiver could be granted with little risk to the Government.

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[35] Ibid.

J. INITIAL PRODUCTION TEST CLAUSE

1. Locally Proposed IPT Clause Used by MSC's

a. Provisions. As previously noted, IPT were required for approximately 34 percent (18 out of 53) of the contracts reviewed. Since ASPR does not provide for an IPT clause, MSC's used locally developed clauses. One such clause provided in part, that: (1) contractor had to furnish, within 96 hours to the testing activity, parts which did not function satisfactorily during testing to preclude the Government's refusal to continue to accept production units; (2) all deficiencies discovered during IPT are prima facie evidence, unless contractor can prove otherwise, that items previously accepted or manufactured under the contract are similarly deficient, and contractor is required to correct such units at no change in contract price.

b. Analysis of IPT Clauses.

(1) Correction of Defects. Both of the provisions previously cited in the IPT clause appear to be inequitable. They are very similar to the correction of deficiencies provision contained in ASPR 7-105.7(c). Initially, it must be noted that the contracts normally require the contractor to furnish production unit for acceptance prior to completion of the IPT tests. The Government accepts such items based on their acceptance procedures. The inspection clause provides such acceptance

is final and conclusive except as otherwise provided in the contract for specified exceptions such as latent defects. Thus, this IPT provision gives the Government the right to revoke its final and conclusive acceptance of the item. In a similar situation, the court struck down the effect of a warranty provision inasmuch as the words in the inspection clause "except as otherwise provided" were not clear and strong enough to establish if the warranty clause provision took precedence over the inspection clause. In that case, neither clause referenced the other in words or by clear reference. The court reasoned that contractors might reasonably and practically interpret the inspection clause as protecting them from post acceptance discovery of non-latent defects. The contract did not specifically provide that such acceptance was reasonably conditional on the Government's later inspections and acceptance of supplies. Since ambiguities are resolved against the drafter, the warranty clause was interpreted as amplifying the Government's rights regarding latent defects.[36] Since neither the inspection clause nor initial production test clause used by the MSC specifically referenced each other, the same situation could occur.

Finally, although the contractor is liable for correcting previously accepted items based on deficiencies discovered during IPT, interviews with field personnel indicated this rarely occurs. This was primarily attributed to the problems associated with returning the equipment back to the contractor.

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[36] Instruments for Industry vs United States, Government Contracts Reports, New York, Commerce Clearing House, Inc. 1974.

(2) Furnishing Replacement Parts to Testing Activity. The contractor must furnish replacement parts to the testing activity within 96 hours after notification of the defect. This appears to be an unrealistic time period to evaluate the defect and furnish an acceptable item. Additionally, the question is raised regarding items tendered for acceptance during this 96 hour period.

2. Need for New IPT Clause

Faced with such an inequitable provision, contractors would normally increase their selling price to reflect the contingency cost factor reflective of the risk. Thus, inclusion of such provisions do not appear to be in the best interest of the Government. Hence, there is an apparent need for the development of an IPT clause which will:
(1) equitably allocate the risk associated with defective materiel;
(2) insure the provisions are not ambiguous.

3. Inclusion of Both Pre-production and IPT Clauses

Fourteen contracts contained both pre-production and IPT requirements. Since the contracting officer approves the First Article pre-production sample, a possible conflict could occur if deficiencies were discovered in the IPT which were present on the pre-production unit. To illustrate, the contracting officer approved an FA sample for a dishwasher even though it did not contain the required detergent dispenser.

The Government accepted many units before the discrepancy was discovered. Upon learning of the discrepancy, the contracting officer required the contractor to furnish additional units with the automatic dispenser and correct previously furnished units under a warranty provision. The court ruled that although the contractual specification required the automatic detergent dispenser, the Government had waived this requirement based partially in its: (1) approval of the FA sample, without the dispenser; (2) acceptance of production units with the dispenser.[37] The contractor was entitled to an equitable price increase to include the dispenser on units still to be delivered under the contract plus the costs to repair units previously accepted thereunder. Thus, a similar specification waiver is likely to occur if the Government approves an FA pre-production sample and then discovers during IPT that the production units it is accepting contain a defect which should have been discovered during pre-production or acceptance testing. Thus, the value of including redundant pre-production and IPT test requirements is questionable.

K. ADMINISTERING FA TESTS

1. Quality Assurance Letter of Instruction

Frequently, the procuring activity will give the ACO special instructions regarding the FA approval requirement. This is sometimes achieved either by a post-award conference or a Quality Assurance Letter of Instructions (QALI). Information contained in QALI often specify

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[37] Gresham & Company, Inc. vs The United States, 40 F 2nd 363, 1972.

information and tests to be included in the contractor's preliminary or final test report such as: (1) Contractor/vendor statement of findings attesting to raw material conformance with contract requirements; (2) DCAS should conduct and include results of 100 percent actual measurement needed to assess conformance to drawings and specifications. Instructions may involve circumstances requiring resubmittal of FA samples such as: (1) major changes to technical data; (2) changes in production process and/or type of material.

Finally, information regarding Product Verification tests are often specified in the QALI. For instance, 100 percent mandatory level A inspection may be required until three consecutive lots are approved. Thus, the QALI is a valuable means of disseminating valuable information to the ACO regarding FA and other quality assurance provisions.

2. QAR Participation in FA Tests. The Government Quality Assurance Representative (QAR) has the responsibility to witness and participate in all FA testing, including preliminary tests when Government testing is required to: (1) assure all examinations are done in accordance with contractual requirements; (2) verify data is correct and representative of the FA; (3) insure any variation in procedures, retesting or nonconformance with the specification are identified and included in the test report; (4) assure subsequent production units are manufactured to the same requirements as the approved FA; (5) provide

comments and recommendations to the PCO regarding FA approval. Prior to the commencement of such tests the QAR is required to conduct a pre-award conference to identify FA actions required by the contractor and the Government quality assurance personnel. Thus, the QAR plays an important part in the proper administration of an FA program.

CHAPTER III

COST EFFECTIVENESS OF FIRST ARTICLE TESTING

A. INTRODUCTION

Is FA testing really worthwhile? That is, do the benefits which accrue due to rejection or conditional approval of a "first article" pay for the increased costs and extended schedules caused by the utilization of FATAR. The answer to this question obviously depends on the relevant facts, figures and frequencies.

Some form of early product inspection is, without a doubt, a vital and necessary part of the overall defense procurement process. The abolition of all product inspections will not be suggested here. It is suggested, however, that the inspection of a pre-production model, and a test of one or more initial production models is, in most cases, not cost effective. An FA pre-production test does not guarantee the Government an acceptable full production model. Rather, it is a mechanism for checking on overall contractor capability and interpretation of a technical data package. It therefore provides a measure of insurance to the contractor against losses due to improper initial tooling and the like, at a cost to the Government of thousands of dollars and hundreds of days delay.

The protection for the contractor which FATAR provides, indirectly creates the two main potential benefits to the Government. (1) Assuming that the contractor is to be held responsible for product performance

and design characteristics, FATAR increases contractor motivation for obtaining new contracts. (2) When a contract is terminated for the convenience of the Government, the Government is liable only for those costs which are authorized before termination. Since contractors are normally authorized to purchase or provide little or no material or services for production models before the FA test has been approved by the Government, Termination for Convenience before that time are much less costly to the Government. The difference in the liability early in a contract could be as much as 70 or 80 percent of the total contract price. Naturally, termination for default of contractor performance minimizes Government liabilities in any case, but this type of default has been extremely difficult to obtain.

The original cost effectiveness question can be answered by measuring the average benefits and costs to the Government resulting from the use of FA pre-production requirement, and the average reduction in costs and decrease (or increase) in the use of the IPT to achieve the goals of FATAR. Then the decision table can be completed as shown below.

TABLE XI

DECISION MODEL FOR USING FA PRE-PRODUCTION REQUIREMENTS

	p	1-p
Use FA pre-production	C_{11}	C_{12}
Do not use FA pre-production	C_{21}	C_{22}

The table symbols represent:

p = probability of accepting FA pre-production sample

1-p = probability of rejecting FA pre-production sample

C_{11} = average cost and benefits to the Government for using FA pre-production requirement when FA is accepted

C_{12} = average costs and benefits to the Government for using FA pre-production requirement when FA is rejected

C_{21} = average cost and benefits to the Government for not using FA pre-production requirement when test model satisfies FATAR requirements. (criteria)

C_{22} = average cost and benefits to the Government for not using FA pre-production requirement when test model does not satisfy FATAR criteria.

If $p\ C_{11} + (1-p)C_{12} > p\ C_{21} + (1-p)C_{22}$,

then $p > [C_{22} - C_{12}]/[C_{11} - C_{21} + C_{22} - C_{12}]$ and the use of FAT pre-production requirement is not cost beneficial compared to an IPT.

This cost effectiveness analysis obviously requires an extensive data base from which to extract the required information. One was developed from a quasi-random sample of 50 contracts incorporating FATAR clauses at three major subordinate commands. Each contract was examined for measurements in approximately 50 categories. Unfortunately, less than 30 of the contracts had been completed. Furthermore, the information in a few of the categories was generally missing - no doubt a result of

the complexity of contract files. However, each of the categories of information would be available to the decision maker. Therefore, information from other sources was sought to augment or complete the sample data. Appendices A, B and C contain the information from the sample, TECOM, Testing Resources Management System (TRMS) reports and the AMC - Product Quality Analysis and Liaison Operations (PQA/LO) reports. The next section consists of a compendium of facts derived from this sample, particularly as it relates to FATAR. Other useful information is also included.

B.. DATA CHARACTERISTICS

One of the most important data measurements for the analysis is the rate of FA approval. The sample data appears as follows:

TABLE XII

FA APPROVAL RATES FROM SAMPLE CONTRACTS

	NO. TESTED	NO. APPROVED	NO. DISAPPROVED	% APPROVED
First Test.	27	23	0	85 (.07)*
Second Test.	4	1	0	25 (.22)*
Third Test.	1**	0	0	

The data in the PQA/LO summary report (Appendix III) represents number of items tested and their final disposition. Of 1930 combined major

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*The information in parenthesis represents the standard error of the estimate.

**This testing is not completed

and secondary item FA tests, 257 were rejected yielding an 86.7 percent approval rate, with standard error .0077. Although this agrees with the sample data (85%) the two percent do not measure the same rates, since there were no actual final disapprovals in the sample data (see Table XII). Furthermore, the sample data indicates a significantly higher rejection rate than for the FY 74 data.

Perhaps the most important discovery from the sample data is that the average increase in cost for FA pre-production requirements due only to inflation for material and labor, is $69,300 per contract. This figure is based on the inflation suffered during a "delay" due to FA pre-production requirements for each contract, based on the Dept. of the Army Commodity Inflation Factors given in Appendix IV. The delay was estimated separately for each contract and was based on (though not equal to) the time required to conduct the FA tests. Note that the average time required to approve the FA test report was 276 days. (The planned approval time was 226 days on average.) See Chapter IV for more analysis of this data.

Approximately 26 percent of the FA testing (from the sample) is conducted by the Government. However, the Government pays in excess of $107,424 for FATAR conducted by the contractor on the average. The TRMS report shows that the testing conducted at TECOM costs only $67,047 on the average. This, incidentally, is an underrun of about 14 percent!

C. COST ANALYSIS

Some of the costs related to FATAR are simply not available. For example, the TDY, travel fare and possible overtime expenses for Government monitoring of FA tests are not known. Attempts were made to obtain these in interviews of the personnel who actually did FA tests monitoring, but not even a rough estimate was obtained. These costs would tend to contribute to cost ineffectiveness of requiring both FA pre-production and IPT requirements because when only IPT is required, each monitor trip would serve two purposes.

The additional procurement administration costs resulting from FATAR are not available. Those costs pertaining to re-procurement (including inflation, procurement administration, additional monitoring, and cost arising from termination for convenience) are not available. Presumably, these costs are recoverable by the Government but, in fact, rarely are.

The most important unavailable information is the extra cost which would be incurred, if any, when the IPT replaces an FA pre-production requirement. The FY 74 TRMS reports indicate that IPT at TECOM costs $128,084 on the average, almost double the cost of FATAR. The average number of days required for completion of the IPT is 263. Interesting to note that both pre-production and IPT tests require 41 days for preparation of the test report.

Since the costs resulting from FATAR rejection are (theoretically, at least) borne by the contractor, the cost model is greatly simplified because the costs to the Government for using FATAR are the same for

accepting or rejecting the FA samples, except for some relatively small costs such as procurement administration, etc. The relevant costs and frequencies are as follows:

a1 - Cost of FA pre-production tests conducted by Government

a2 - Proportion of FA pre-production tests conducted by Government

a3 - Cost of FA pre-production tests conducted by contractor

a4 - Proportion of FA pre-production tests conducted by contractor

a5 - Cost of FA pre-production tests due to inflation

a6 - All other costs (administration, etc.)

p - Probability of accepting FA sample

a7 - Additional IPT costs for FATAR procedures

a8 - Non-recoverable costs which are due to rejecting an item due to FA pre-production considerations which would not have been rejected for IPT.

a1 = $67,047

a2 = .264

a3 = $84,490

a4 = .736

a5 = $69,300

p = .867

The cost of FA pre-production requirement is, therefore, approximately $154,000 + a6. The cost of FA performed as part of an IPT is a7 + a8 (.133).

Therefore, if -a6 + a7 + a8 (.133) < $154,000 on the average, FA pre-production is not cost effective compared to IPT.

This inequality does not involve the cost of time explicitly, even though the increase due to inflation is nearly half of the $154,000.

The costs a6 and a7 are probably relatively small. The value a8 would probably be small, on the average, because of its relative infrequency. The analysis indicates that FA pre-production testing is probably not cost effective compared to IPT.

D. USE OF THE COST MODEL

The cost model developed herein should aid the decision maker in fulfilling the requirement of ASPR 1-1902(a) that the additional costs and delay in time of FATAR versus less costly methods of achieving desired quality be considered prior to invoking FATAR. This model can be used either on an item basis or for a group or class of items expected to have similar costs. Use of the model for a class of items is particularly warranted in situations where the computation of such costs on an item basis would be administratively prohibitive.

Additionally, the model could be used in the establishment of a budget by fiscal year for a reasonable total test program at an MSC. Establishment of such a budgeted test program is advocated by some field personnel as a technique to insure objective use of FATAR. Since quality assurance organizations are committed to furnish quality items to the field, there is a temptation to include FATAR as a means of further increasing the confidence level regarding an item's quality, even though less costly quality assurance procedures should provide adequate assurance. This possible temptation is abetted on production contracts by the fact that hardware funding is used for FATAR. Thus, the failure to establish a separate test fund causes FATAR and other test requirements to be invoked without the presence of the restraining forces normally at work in allocating budget dollars.

CHAPTER IV

FINDINGS AND RECOMMENDATIONS

A. FINDINGS

1. Valid Need for First Article Testing and Approval Requirements (FATAR)

FATAR is an integral portion of the overall test program, specified in the CTP, to be conducted during an item's life cycle. Such testing is designed to generate information regarding the likelihood that the materiel will be fit for its intended purpose and is logistically supportable. Based on this information, a decision maker can determine if the developmental and/or production risks have been sufficiently overcome to justify release of the materiel to the next phase of an item's acquisition life cycle. Additionally, DARCOM uses this information in preparing release certification which are required prior to issuing the majority of materiel it procures to the user. Thus, there is a valid need for quality assurance and other information generated by FATAR.

Hence, the primary question is whether a FATAR is the best procurement technique to maintain adequate product quality within acceptable risk levels. It is recognized that the decision on each individual procurement will differ.

2. Factors to Consider Prior to Requiring FATAR

The following findings will present factors which a decision maker should consider prior to invoking a FATAR.

a. Cost Effectiveness.

(1) Failure to Analyze Government FA Costs. A review of contract files and other sources of information, such as the TECOM TRMS report and the DARCOM PQA/LO reports revealed the sufficient information is currently being generated to permit a decision maker to estimate the entire costs associated with an FA pre-production requirement and comparing them to alternate quality assurance techniques, such as an FA Initial Production Test. However, there was no documented evidence of an analysis of Government FA tests costs being conducted at the MSC's which included all of the additional costs of FA such as: (1) anticiapted contractor's costs; (2) increased costs caused by inflation because of delay in purchasing material and commencing production effort, etc.

(2) Bid Evaluation Factors. For slightly less than half of the contracts involving Government testing, a bid evaluation factor was used based on input from the testing activity regarding test costs. Although high confidence was expressed by personnel at the MSC's regarding the validity of these cost estimates, they are not extensively used despite the requirement by AMCC 715-16-74 to include such costs. This is attributed to Comp Gen decisions that such costs must be realistically estimated. This has probably resulted in the reported tendency to use conservative or omit such bid evaluation factors.

An analysis of actual versus planned Government FA costs revealed an average cost underrun of 14 percent. However, contract files did not contain sufficient documentation to permit the contracting officer to evaluate the estimated costs of the test activity. Government FA costs were not considered when contractor conducted testing was required, despite the facts that the ACO and possibly a team from the procurement activity witnessed such tests. The salary and travel costs of such individuals can be reasonably estimated.

(3) A cost model was developed in Chapter III which can be used to compute and compare the cost for an individual item or class of items of FA pre-production requirement to an alternate quality assurance technique, such as FA initial production test requirements. The cost model could also be used in the development of a fiscal year budgeted total test program. ASPR 1-1902(a) requires that this analysis be made prior to the decision to incorporate an FA requirement. The documentation regarding this analysis should be made part of the contract file.

(4) The cost model was used to compare the relative cost effectiveness of FA pre-production and initial production tests for the sample contracts. Nearly half of the average $154,000 FA costs were attributed to inflation. Additionally, this analysis in Chapter 3 based on a decision cost model concluded that FA IPT are probably more cost effective than FA pre-production tests.

(5) Two techniques were observed for permitting a contractor to submit prices on contracts requiring FA test requirements. The first allows him to submit separate bid price for the FA line item. The second method requires a contractor to submit one price for a line item

requiring both FA and production units and a second price for a line item requiring only production units. Contractors who do not qualify for an FA waiver are instructed not to submit a bid for the line tem only specifying production quantities. Failure to obtain information regarding contractor's FA costs has caused administrative problems regarding whether a materiel or tooling cost constitutes FA costs for payment of progress payments. Oftentimes, the same principles used for Convenience Termination were used in payment of such progress payments. Finally, AMCC 715-16-74, requires a 25 percent of the contract price limitation on progress payment for FA purpose. However, some contracts did not contain this progress payment limitation provision in which FA were not priced. This may be caused by the failure of the progress payment clauses in ASPR 7-104.35 to include such limitations.

(6) Benefits.

(a) No documentation was found in the contract files regarding the benefits derived from FA tests.

(b) Two advantages of FA pre-production over IPT provisions are: (1) the Government learns of inherent product deficiencies prior to acceptance of materiel for pre-production tests, thus, eliminating the problem of returning previously accepted materiel; (2) contractors do not incur substantial potential liability for correction of a substantial number of units which would be accepted during the average 263 day time for IPT.

(7) Production Contract Funding.

Production hardware funding is used to fund FATAR and other test requirements on production contracts. The failure to establish

a separate testing fund causes FATAR and other testing requirements to be invoked without the restraining forces normally at work in allocating budget dollars. In situations where both FATAR and less costly quality assurance techniques would give an adequate level of technical quality confidence, the responsible quality assurance elements not constrained with budget restraints, would be tempted to invoke FATAR if it resulted in a higher quality confidence level. The establishment of a fiscal year budget for a total reasonable test program for production contracts at each MSC should alleviate this problem.

a. Delivery Schedules

(1) FATAR caused appreciable delay in production deliveries. Frequently, this caused a conflict with the Government's required delivery schedule. Normally, the materiel manager was apprised of this delay and agreed to accept it. However, occasionally efforts were made to reduce this delay by: (a) abbreviating FATAR; (b) procuring sole source from a previous supplier; (c) requesting the contractor to accelerate his effort.

(2) An increase of approximately 7 to 10 days in PALT was attributed to longer bid opening periods because of FATAR.

(3) Production delivery delays reflected in the original contractual delivery schedule tended to increase with the complexity of the equipment. This caused the delays noted at one MSC to be appreciably greater than the other MSC's.

(4) No significant difference was noted in the original contractual average production delay when contractor or Government testing was required.

(5) Late submittal of FA samples and test reports frequently occurred. This slippage was greater when: (a) Government-conducted testing was required; (b) the complexity of the item procured increased. Late FA submittals were primarily responsible for the 49 average day slippage (275 actual versus 226 specified in the contract) in approving the samples. No contracts were terminated for late FA submittals.

(6) Prediction of the time required by a contractor to submit FA test reports as a result of contractor testing were very accurate for a period of 275 days. Contrarily, predictions for contractor submittal of samples for Government testing were understated for all periods. These predictions became increasingly understated as the time period exceeded 250 to 275 days.

(7) The Government normally granted FA approvals within the time period allocated for such approval in the contract.

(8) Contractor's do not normally volunteer earlier production delivery schedules in order to obtain FA waivers. Only one MSC used dual delivery schedules to obtain earlier deliveries in the event of waiver.

(9) Production delivery requirements are normally specified within a certain number of days after date of contract. Since a substantial number of contracts were found to have delinquent submittal and/or approval of FA, a contractual modification revising the production delivery schedule is often necessary, especially if the delay was excusable. Furthermore, waiver of the production delivery schedule could occur if the Government permitted performance beyond the FA delivery date without

appropriate action. A technique used which resolved many of these problems required production deliveries to commence within a specified number of days after FA approval was granted.

c. Quality Considerations.

(1) Basis for Contract First Article Test and Approval Requirements (FATAR). FATAR are normally specified in the item's specification. Additionally, the Product Assurance Directorate may require FATAR based on: (a) previous manufacturing problems or unsatisfactory user performance revealed by the item's history record; (b) novel or exacting technical performance requirements, which have been interpreted by DARCOM to include: (i) material with critically unusual features which are relatively new to the industry expected to produce it; (ii) complex materials which can tolerate no compromise with capability, reliability, interchangeability or safety; etc.

(2) Accept, Reject, Conditional Acceptance. A very high FA acceptance rate was observed for all Army contracts. Based on the sample contracts, this may have been caused by the high proportion of items involving design specifications and awards to previous suppliers denied waivers. This suggests that FA testing could be deleted in many instances wtih little risk to the Government that the contractor would not produce material fit for its intended purpose or logistically supportable. However, it is often contended that contractor devotes more quality effort to a procurement involving FATAR to insure Government acceptance of the FA. Thus, the true quality impact of FATAR is

difficult to evaluate. Logistical and cost considerations prevented a direct comparison of FA contracts with non FA contracts to determine the impact of FATAR on item quality characteristics and performance.

d. Government vs. Contractor Conducted Testing. Contractor testing is normally required for pre-production testing unless it was impractical or uneconomical. The Government normally conducts IPT testing. Because of the small number of FA rejections noted, no significant differences could be detected regarding the quality of Government versus contractor testing.

e. Duplication of Testing.

(1) A large number of contracts contained both FA pre-production and IPT. A review of the items specification revealed varying degrees of duplication, with considerable or 100 percent duplication occurring in several cases. Although the duplicative testing was judged to be justified based on the different purposes served by these tests, it was felt that elimination of some of the duplicative testing requirements is an area in which a reduction in Government test expenses might be achieved. However, an analysis should be made on a case-by-case basis of the additional costs versus assurances derived from such testing.

(2) One MSC required both FA pre-production and extensive 100 percent acceptance lot testing for each lot. Inclusion of both testing requirements is justified if FATAR is, by necessity, more complex or time consuming than the acceptance requirement. Some of the contracts involved previous manufacturers who had incurred a substantial break in

production. The value of including both FA and production lot acceptance tests on such contracts is questionable inasmuch as the contractor has previously proven he can produce the required item and the later tests should give the Government adequate assurance regarding the materiel's acceptability.

e. Waiver. Surprisingly, a major portion of contracts reviewed involved previous manufacturers of the item who were not granted waivers. An analysis of these contracts revealed instances where it was felt that the possibility of a waiver was not properly explored including:

(1) Many times, no documentation regarding a possible waiver was found. These contracts involved cases in which the contractor had not requested a waiver with his bid, probably because he felt a waiver would be denied. The Comp Gen has held that a contracting officer should not be precluded from considering an appropriate waiver because of the contractor's failure to comply with the waiver provision. In view of the previously noted costs of FA, procedures are needed to insure that an eligible contractor is considered for a waiver.

(2) Activities often denied waivers based on substantial break in productions. Frequently, this period was established at one year based on DARCOM Reg 700-34 which states release certifications are required for such production breaks which are normally considered to be one year. Although it is recognized that such production breaks may justify FATAR, the establishment of arbitrary time periods as constituting substantial production breaks is questioned. Information

should be obtained regarding any changes experienced by the contractor since the last production run in areas such as tooling, manufacturing processes, and personnel. This information would permit an evaluation of waivers on an individual basis.

(3) Several contracts involved instances where FATAR was not waived because the contractor had not obtained approval under the previous contract. Guidance is needed regarding the procedure that should be used which will protect the Government interest in such cases. One method used to eliminate this technique involves waiver of FATAR on the second contract contingent upon successful completion of such tests under the first contract.

f. Authorization to Procure Materiel Prior to FA Approval.

(1) The alternate FA provision authorize procurement of materiel or commencement of production effort prior to FA approval. When used, this provision can result in earlier production deliveries at lower contract prices.

(2) Less than 50 percent of the contracts reviewed contained this alternate provision. Actual authorizations to commence production effort or procure materiel had been issued for less than 25 percent of the contracts. Inclusion of this provision varied greatly among the MSC's visited.

(3) The cost risk associated with granting such authorizations was judged to be minimal for the sample contracts primarily because the materiel was either: (1) partially verified by pre-production testing; or

(2) raw or processed materiel or component parts which could be used by the contractor in his other business or even furnished to another contractor as GFE. Furthermore, several cases were reported in which a rejection of the FA occurred after such authorization was granted. No obsolete or unusable materiel was alleged in any of these cases. Finally, the probability of terminating a contract based on defective FA samples is considered to be very low based on: the very high FA acceptance rate coupled with the fact that a number of rejects were based on faulty or omitted test procedures rather than defective materiel. Finally, the Government would gain title to the material for such termination. Thus, increased use of this alternate provision for specified materiel and production effort could result in improved production deliveries and reduced contract prices at very little additional risk.

(4) A recent decision by the Armed Services Board of Contract Appeals has determined that the provision which places sole risk on the contractor for the procurement of materiel or commencement of production effort prior to FA approval is waived if: (1) it would be impossible to wait until FA approval before ordering production materials or commencing production effort and still meet production deliveries; (2) the contracting officer refuses to grant a requested extension of the delivery schedule the contractor is entitled to. Thus, contracting officers must insure realistic delivery schedules are included in solicitations and contractor's request for delivery extensions are properly evaluated.

(5) No price reductions were obtained when authorizations were granted reflective of the benefits received by the contractor. These benefits include: (1) improved cash flow and rate of return on investment since progress payments can be obtained for production effort; (2) ability to buy materiel immediately at savings in an inflationary period, etc. Occasionally, the Government did eventually receive consideration as a result of earlier production deliveries. However, since the authorizations were normally issued by letter, no contractual modification obligated the contractor to earlier deliveries.

3. Guidance

The following findings relate to guidance regarding FATAR:

a. IPT Clauses.

(1) Inasmuch as ASPR does not specifically provide for an IPT clause, MSC's use locally developed IPT clauses. These clauses were found to contain inequitable provisions, such as requiring correction of previously accepted units at no change in the contract price. Since completion of the average IPT was approximately nine months, contractors would have to increase their acquisition price to cover the potential liability for correction of a large number of previously accepted items.

(2) Potential conflict exists between requiring both FA preproduction and IPT. The latter may be found to be inapplicable if the contractor can prove that the deficiency existed in the approved preproduction model.

(3) Recent court decisions have raised the question regarding the enforceability of the IPT provision which requires "no cost" correction of previously accepted items. The inspection clauses specify that acceptance is final and conclusive. Since the clauses do not reference each

other, the clauses may be interpreted as ambiguous, and resolved against the drafter, making the inspection clauses prevail.

(4) Field personnel, indicated that the inclusion of two clauses specified by ASPR 7-104.55 are not adequate for contracts containing both preproduction and IPT test requirements because: (a) of possible inconsistency with other contract provisions, such as is the progress payment limitation for First Article costs (required by ASPR 715-16-74) applicable only to pre-production First Article costs or does it limit costs until all categories of First Article testing, including IPT are completed; (b) the alternate FA paragraph (7-104.55(c)) states that prior to FA approval, only costs incurred essential to meet production quantity deliveries are allocable for purposes of (1) progress payments; (2) termination for convenience. Precluding the recovery of customary progress payments will increase the contract's cost because of the interest cost associated with using his funds to finance production effort. Additionally, contractor costs risks increase since he may not recover all costs, in the event of T for C, if he follows economical business practices such as buying the entire quantity of material instead of only the quantity, necessary to meet quantity deliveries prior to IPT production approval.

(5) DARCOM Quality Assurance directorate has issued a draft copy of AR 702-XX, 9 Aug 76, which indicates that for production testing, one of two types of first article testing is generally utilized; i.e., preproduction or initial production testing.

b. Quality Assurance Letter of Instruction (QALI). QALI's were

found to be a good technique to inform the ACO and the contractor regarding FATAR and other quality assurance techniques.

c. The guidance specified in ASPR and amplified by DARCOM guidelines are determined to be adequate. However, a large number of sample contracts involved design specifications. This raises the possibility that DARCOM guidelines regarding the interpretation of novel or exacting technical performance requirements, which are used to justify FATAR for detailed design specifications, are being used in questionable situations. Additionally, the practice of including FATAR because of the large procurement quantity is questioned.

B. RECOMMENDATIONS

1. Contract Structuring

a. Establish a separate line item for the FA sample, for which all bidders are required to submit a bid price or "no charge" notation.

b. Include a dual delivery schedule in all instances where the delay attributed to FATAR can be reasonably assessed and earlier deliveries are desirable in the event of FATAR waiver.

c. Establish the production delivery schedule based on a specified number of days after FA approval. Also, a contractual provision should specify that an equitable reduction in this specified number of days will be made by contract modification if contractor is responsible for the delay.

2. Guidance

a. ASPR. Forward to the ASPR Committee a proposed addition to the progress payments clause specified in ASPR 7-104.35 to include a maximum limitation to progress payments allocable to FA costs. This

provision would be applicable only in the event that contractor does not submit a price for the FA line item.

b. DARCOM.

(1) Include the following FA policy in the DARCOM Procurement Instruction.

(a) In compliance with ASPR 1-1902 which requires consideration of the costs associated with FATAR and the risks of foregoing such tests, the functional area (Product Assurance) responsible for initiating an FA requirement should prepare and forward to the Procurement Division a comprehensive analysis of the additional costs, benefits, delivery schedule and quality considerations resulting from incorporating an FA requirement. To preclude costly time-consuming efforts, such cost/benefit analysis should only be made when information is reasonably available. All reports and other information regarding additional FA costs, or benefits, should be forwarded to the functional area to aid in this analysis.

(b) Provide guidance which will result in greater contract usage of the alternate FA provisions which permits. upon written approval of the contracting officer, procurement of materiel or commencement of production effort prior to FA approval. Include suggested guidelines for granting such authorizations such as: (1) previous contractors who were denied waivers because of substantial breaks in production; (2) specific parts which have been verified by partial FA tests; (3) materiel or production effort involving low cost risk (such as raw or processed materiel, parts with good reliability records from sole source producers). Also, recommend that equitable price reductions or earlier deliveries be obtained for granting such authorization.

(c) Re-emphasize the importance of granting a waiver to an eligible contractor. Establish procedures which will: (1) insure that previous manufacturers are evaluated for waivers; (2) eliminate use of arbitrary time periods as constituting a substantial break in production; (3) protect the Government's interests if FA waiver cannot be granted because the contractor has not obtained approval on the previous contract.

(d) Re-emphasize the importance of establishing realistic FA submittal and approval dates and production unit delivery dates. Advise that waiver of the risk provision can occur if contractor: (1) does not have a realistic time period to commence production effort and order material after FA approval and still meet the production delivery schedules; (2) is refused a requested delivery schedule he is entitled to.

(e) Re-emphasize that the clause provided by ASPR 7-104.55 (c) should be used for IPT requirements when the contract does not contain a preproduction requirement.

(f) Provide guidance regarding the clauses to be used in any contracts containing both preproduction and IPT requirements. Consideration should be given to the development of a sample IPT clause in view of; (1) iniquities found in the IPT clauses reviewed: (2) possible inconsistencies resulting from inclusion of both ASPR 7-104.55 clauses. Approval at a level higher than the contracting officer should be required for usage of such clauses.

(g) Provide guidance which would permit prior to IPT approval; (1) payment of customary progress payments; (2) contractor's recovery of costs incurred in accordance with standard business practices,

such as recovery of cost associated with buying the entire quantity necessary to meet production quantity deliveries prior to IPT approval.

(2) Implement the portion of AR 702-XX which specifies that generally only IPT or preproduction testing requirements should be included in a production contract.

(3) Re-emphasize the policy specified in AMCC 715-16-74 requiring inclusion of a bid evaluation factor reflective of Government FA costs. Also, require documentation regarding why these costs cannot be reasonably estimated.

3. Since cost is only one of the factors which influence the decision to invoke FATAR, the cost model developed in Chapter III should be used to aid the decision maker in assessing the relative costs of FATAR versus the risk of foregoing it.

4. Make it a DARCOM objective to eliminate duplicate or unnecessary testing requirements which give little added quality assurance in relation to the cost.

a. Require thorough examination of contracts containing possible duplicate testing requirements such as FA pre-production and (1) IPT requirements, or (2) 100 percent acceptance testing.

b. Reiterate the interpretation and application to be given to DARCOM guidelines regarding usage of FATAR for items covered by design specifications with novel or exacting technical performance specifications.

c. Challenge the use of FATAR strictly because the procurement involves a very large quantity of low priced material.

d. Establish for each MSC on a fiscal year basis a budget for a total reasonable test program.

SELECTED BIBLIOGRAPHY

Comptroller General and Appeal Board Decision.

1. _____. Appeal of Switlik Parachute, Inc., ASBCA, 18024, (1975).
2. _____. B-138972, (1959).
3. _____. B-147968, (1962).
4. _____. B-151579, (1963).
5. _____. B-151709, (1965).
6. _____. B-151802, (1963).
7. _____. B-153493, (1964).
8. _____. B-154567, (1965).
9. _____. B-154590, (1964).
10. _____. B-155710, (1965).
11. _____. B-155853, (1965).
12. _____. B-158002, (1966).
13. _____. B-158528, (1967).
14. _____. B-159582, (1966).
15. _____. B-159800, (1966).
16. _____. B-161448, (1968).
17. _____. B-162400, (1967).
18. _____. B-162438, (1968).
19. _____. B-169779, (1970).
20. _____. B-175015(1), (1972).
21. _____. B-176071, (1972).
22. _____. B-177301, (1973).
23. _____. B-177861(1), (1973).
24. 41 Comptroller General 788, (1962).

Court Decisions

1. Gresham & Co., Inc. vs The United States. 40 F2d 363, 1972.

2. Instruments for Industry, Inc., vs United States, (Ct of A p. 2d Cir), Commerce Clearing House, Inc., para 83, 105 (1974).

Military Specifications

Department of Defense

1. _____. MIL-A-52767, Int Amend 1 (ME), Air Conditioners, Vertical and Horizontal, Compact, 10 Jan 75.

2. _____. MIL-B-52088D (ME), Amend 2, Bridge, Armored-Vehicle-Launched, Scissoring-Type, 9 Jul 75.

3. _____. MIL-B-52734 (ME), Bridge, Floating: Ribbon, Interior Bay and Ramp Bay, 7 Aug 72.

4. _____. MIL-B-58022E (ME), Amend 1, Boat, Landing, Inflatable: Assault Craft, 15 Man, 2 Apr 75.

5. _____. MIL-B-13831F (ME), Amend 1, Boat, Reconnaissance, 3 man, 12 Sep 73.

6. _____. MIL-D-52736 (ME), Duster, Insecticide, Dust and Granules, Helicopter-Mounted, 12 Oct 72.

7. _____. MIL-G-52732, Amend 1, Generator Sets, Gasoline Engine Driven, 5 Aug 74.

8. _____. MIL-H-11049E, Int Amend 1 (ME), Heater, Duct Type, Portable Gasoline, 250,000 BTUH, 19 Mar 75.

9. _____. MIL-P-52144B (ME), Pumping Assembly, Flammable Liquid, Bulk Transfer, 30 Aug 72.

10. _____. MIL-R-13312J, Amend 2, Refrigerator Units, Mechanical, Panel Mounted For Refrigerator, Prefabricated, Panel Type, 12 Jun 75.

11. _____. MIL-S-52356D (ME), Superstructure, Interior and End Bay for Mobile Floating Assault Bridge/Ferry, 11 Nov 74.

12. _____. MIL-T-40136E (ME), Amend 1, Tank and Pump Units, Liquid Dispensing, for Trailer Mounting, 20 Aug 74.

13. _____. MIL-T-52402B (ME), Amend 1, Tool Outfit: Pioneer, Portable, 25 Jun 75.

14. _____. MIL-T-52703A (ME), Transporter: Welded Hull for Mobile Floating Assault Bridge/Ferry, 18 Nov 74.

15. _____. MIL-T-52742 (ME), Amend 1, Truck, Lift, Fork, 11 Jun 73.

16. _____. MIL-T-52741 (ME), Amend 1, Truck, Lift, Fork, 10 Apr 73.

17. _____. MIL-T-52735 (ME), Transporter: M812 Chassis, for Ribbon Floating Bridge, 7 Aug 72.

Department of the Army

1. _____. Army Materiel Command Circular 715-16-74, HQ, USAMC, Alexandria, VA, 15 Nov 74.

2. _____. Army Materiel Command Regulation 700-34, Release of Materiel for Issue, HQ, USAMC, Alexandria, VA, 1 May 75.

3. _____. Army Materiel Command Regulation 702-1, Quality Assurance Independent Product Assessment, HQ, USAMC, Alexandria, VA, 29 Jul 65.

4. _____. Army Regulation 70-10, Test and Evaluation During Development and Acquisition of Materiel, HQ, Dept of Army, Washington, DC, Unp.

5. _____. Army Regulation 700-78, Production and Post Production Testing of Army Materiel, HQ, Dept of Army, Washington, DC, 6 Feb 70.

6. _____. Army Regulation 1000-1, Basic Policies for Systems Acquisition by the Department of the Army, HQ, Dept of Army, Washington, DC, 5 Nov 74.

Miscellaneous

1. Defense Supply Agency, Manual 8200.1, Procurement Quality Assurance, HQ, DSA, Alexandria, VA, Aug 73.

2. Federal Contracts Reports No. 555, Contract Policy: Navy NPD Revision Modifies Claims Review First Article Approval Treatment, Bureau of National Affairs, Inc., Washington, DC, 11 Nov 74.

3. Raiffa, Howard, Decision Analysis, Addison, Wesley, Reading, Massachusetts, Jul 70.

4. US Army Armament Command, ARMCOM Regulation 702-7, Product Assurance First Article Program, HQ USARMCOM, Rock Island, Illinois, 23 Jan 75.

5. US Army Tank Automotive Command, RD&E Pamphlet 70-2, Processing Secondary Item Technical Data Packages, HQ USATACOM, Warren, Michigan, Oct 73.

6. US Army Test and Evaluation Command, Research and Development: TECOM Testing Concepts and Definitions, HQ USATECOM, Aberdeen Proving Grounds, MD, Oct 73.

APPENDIX A

SYNOPSIS OF RANDOM SAMPLE DATA

ITEM DESCRIPTION BY VARIABLE NUMBER

1. Contract number, consecutively by command.
2. Contract value, ($000).
3. Year of award (Last digit of FY).
4. 1 = Government testing, 2 = Contractor testing.
5. Testing cost, contractor ($000).
6. Testing cost, government ($000).
7. Contractual F/A submittal date, days after award.
8. Actual F/A submittal date, days after award.
9. F/A scheduled approval date, days after award.
10. F/A actual approval time, days after award.
11. Type specification; 1 = design, 2 = performance.
12. Additional requirements; 1 = IPT, 2 = Ballistics, 3 = QA support, 4 = Product verification.
13. GFE ($).
14. Government FAITE ($).
15. Initial production delivery, days after award.
16. Final production delivery, days after award.
17. Approval status; 1 = approve, 2 = Final reject, 3 = conditional, 4 = Reject; resubmit, 5 = Approve with special waiver.
18. Number of times F/A disapproved.

SPECIAL NOTES

N = not due when sample taken; W = waived

L = Late, i.e., due at time sample taken, but not completed;

U = Unknown.

COMMAND 1

Variable Number

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	792	4	2	6	5	180	390	210	N	1	1	0	0	390	570	N	--
2	474	5	2	7	+	200	N	230	N	1	1	0	0	240	390	N	--
3	424	3	2	7	0	210	215	240	250	1	1	0	0	360	540	1	0
4	1,817	3	1	0	13	180	240	240	270	3	1	0	0	540	780	1	0
5	645	4	1	0	0	180	U	210	U	2	1	0	0	690	900	N	
6	967	4	2	0	99	180	174	210	180	1	1	0	0	420	695	1	0
7	896	5	1	0	24	365	M	395	M	1	1	0	0	480	510	N	
8	2,690	3	2	1	+	369	335	399	561	1	1	0	0	520	790	4	1
9	7,280	5	2	5	656	365	N	412	N	3	1	U	12,634	670	970	N	--
10	1,285	4	2	0	+	270	N	300	N	3	N	U	0	[illegible]	660	N	--
11	326	5	2	0	27	300	N	390	N	1	1	0	0	480	480	N	--
12	368	4	2	5	+	260	N	290	N	2	1	0	0	[illegible]	750	N	--
13	291	5	2	46	+	355	N	385	N	1	1	0	0	445	655	N	--
14	574	5	2	7	+	476	N	465	N	1	1	0	0	675	1,095	N	--
15	260	4	2	7	+	150	382	210	N	2	4/1	0	0	360	390	N	--
16	4,143	4	1	48	108	372	L	492	N	2	--	0	0	730	1,095	N	--
17	1,379	3	1	13	+	365	482	485	N	2	--	0	0	640	790	N	--
18	353	5	2	76	+	390	N	420	N	3	1	0	0	675	915	N	--
19	32,858	1	2	641	+	305	360	463	550	2	--	0	0	725	1,265	1	0
20	12,701	3	2	1,398	+	440	665	450	678	1	1	0	0	470	1,460	1	0
21	31,645	1	1	-----	17	420	590	550	725	3	1	0	0	712	1,012	1	0

COMMAND 2

Variable Number

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	91	3	2	2	+	180	202	210	232	1		3,608	3,615	360	480	1	1
2	34	4	2	M	+	90	232	120	253	1				210	330	1	0
3	14	3	2	3	+	90	106	120	139	1		419		180	300	1	0
4	59	4	2	3	+	150	150	180	174	1		164		330	450	1	0
5	15	4	2	1	+	120	120	150	146	1		53		240	330	1	0
6	15	4	1	U	1	46	99	65	127	1				186	186	4	3
7	3	5	2	+	+	180	M	210	M	1			349	360	360	M	
8	8	4	2	+	+	180	102	210	132*	1			U	330	330	4	1
9	269	5	2	1	+	120	M	150	M	1				290	410	1	U
10	29	3	2	1	+	150	150	100	167	1				240	330	1	0
11	2,200	5	1	U	+	150	M	180	M	1				225	405	M	M
12	7,140	4	1	4	+	200	283	220	303	1				275	425	1	0
13	2,783	4	1	52	+	200	200	220	217	1				290	440	5	0
14	5,007	4	1	204	+	90	335	120	382	1	2			175	415	1	0
15	1,142	5	1	M	M	45	M	90	---	1				210	420	M	
16	12,581	3	1	2	+	60	60	65	65	1	2			120	390	1	0
17	2,032	4	1	+	+	244	267	288	327	2				270	540	1	0
18	11,207	4	2	11	+	575	M	605	---	2	3/1			545	635	M	
19	272	4	2	U	+	240	220	270	230	1				300	720	1	0
20	1,188	5	2	150	+	240	M	270	M	1		4,563		360	570	M	M
21	2,891	5	2	12	+	300	M	337	M	3		2,313	2,720	390	840	M	M
22	24,888	4	2	10	+	454	M	484	M	2				425	1,755	M	M
23	5,885	5	1	M	M	90	M	130	---	1				45	165	M	

COMMAND 3

Variable Number

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	23	5	2	0	0	120	120	135	135	1		0	0	210	240	1	0
2	973	3	2	14	0	180	180	240	240	1		0	0	390	480	1	0
3	51	4	-	0	2	120	120	150	135	2		0	0	210	420	1	0
4	98	4	2	0	0	120	377	136	N	2		0	0	390	450	N	-
5	841	6	2	0	0	150	N	166		2		0	0	210	300	N	-
6	111	5	2	0	0	132	132	147	137	1		0	0	300	N	N	-
7	12	5	2	0	0	M	M			1		0	0	240	240	N	-
8	21	5	2	0	0	142	142	N	N	U		0	0	N		N	-
9	36	4	2	1	0	160	160	N	N	1		0	0	180	180	1	0
10	22	5	2	1	0	M	M			1		0	0	240	240	N	-
11	973	3	2	14	0	360	490	M		2		0	0	540	720	1	0

APPENDIX B

SYNOPSIS OF SELECTED DATA ELEMENTS OBTAINED FROM THE TECOM TRMS REPORT, FIRST ARTICLE TESTING, FY 74

READY TIME	TEST TIME	REPORT TIME	$ EST COST	$ ACT COST	EST M/H	ACT M/H
2	46	54	22,911	33,611	647	679
0	315	5	76,642	75,227	2,165	2,456
0	205	50	42,600	35,662	1,580	1,562
1	314	87	104,332	79,006	2,797	2,937
60	200	77	79,816	63,984	4,552	4,255
0	72	48	27,451	25,641	2,808	2,614
7	66	44	32,469	23,485	3,252	2,438
7	831	48	269,104	180,623	13,560	14,084
0	612	51	274,700	251,104	13,560	9,838
9	99	18	35,171	35,971	3,560	4,015
69	416	32	73,500	16,533	2,825	2,225
1	120	40	7,405	6,456	317	286
3	250	18	305,400	324,788	13,069	14,852
1	120	62	7,405	8,886	317	350
30	70	24	5,000	6,806	200	193
16	18	28	11,000	11,531	449	--
12	4	26	4,024	5,757	119	178
4	95	27	25,380	21,772	1,136	1,028
12.33[1]	214.0	41.05	78,017	67,047	3,760	3,765
(4.7)[2]	(50.3)	(4.85)	(22,664)	(20,952)	(1,067)	(1,094)

[1]Averages

[2]Standard Errors

APPENDIX C

PQA/LO SUMMARY REPORT
MAJOR ITEMS FY 1974

COMMAND	TESTED	APPROVED	COND	DIS	% DIS
ARMCOM	4	3	0	1	25
2nd Q	14	12	0	3	21
3rd Q	1	1	0	0	0
4th Q	2	2	0	0	0
AVSCOM					
2nd Q					
3rd Q	262	141	54	67	26
4th Q	250	148	55	47	19
ECOM	11	11	1	2	18
2nd Q	13	3	8	1	8
3rd Q	16	12	1	3	19
4th Q	21	7	12	2	10
MICOM	0	0	0	0	--
2nd Q					
3rd Q	55	31	20	4	7
4th Q	46	30	10	6	13
TACOM	11	1	10	0	0
2nd Q					
3rd Q	20	2	18	0	0
4th Q	14	2	12	0	0
TROSCOM	14	4	1	0	0
2nd Q	9	3	0	6	67
3rd Q	15	9	0	3	20
4th Q	3	3	0	1	23

PQA/LO SUMMARY REPORT
MAJOR ITEMS FY 1975

COMMAND	TESTED	APPROVED	COND.	DIS.	% DIS.
ARMCOM	213	125	37	51	24
2nd Q	218	144	28	37	17
3rd Q	247	111	41	67	27
4th Q	231	143	24	65	28
AVSCOM	3	2	0	1	33
2nd Q	6	5	0	1	17
3rd Q	1	1	0	0	0
4th Q	1	1	0	0	0
ECOM	25	11	1	10	40
2nd Q	63	30	2	31	49
3rd Q	22	5	2	15	68
4th Q	30	9	5	2	7
MICOM	33	15	10	8	24
2nd Q	15	5	7	3	20
3rd Q	7	4	1	2	29
4th Q	13	8	2	3	23
TACOM	18	1	17	0	0
2nd Q	20	5	15	0	0
3rd Q	8	2	6	0	0
4th Q	2	0	2	0	0
TROSCOM	9	1	0	4	80
2nd Q	7	2	1	4	57
3rd Q	9	6	0	3	33
4th Q	6	1	1	4	67

PQA/LO SUMMARY REPORT
SECONDARY ITEMS FY 1974

COMMAND	TESTED	APPROVED	COMD.	DIS.	% DIS.
ARMCOM	187	103	27	49	28
2nd Q	---	---	---	---	---
3rd Q	---	---	---	---	---
4th Q	---	---	---	---	---
AVSCOM	26	23	1	2	8
2nd Q	26	16	0	7	29
3rd Q	25	19	0	6	24
4th Q	31	26	0	5	16
ECOM	297	256	10	13	4
2nd Q	187	218	0	9	5
3rd Q	130	123	0	5	4
4th Q	88	87	0	1	1
MICOM	75	40	19	4	5
2nd Q	73	39	25	9	12
3rd Q	---	---	---	---	---
4th Q	---	---	---	---	---
TACOM	2	1	1	0	0
2nd Q	---	---	---	---	---
3rd Q	8	1	7	0	0
4th Q	4	1	3	0	0
TROSCOM	0	0	0	0	---
2nd Q	0	0	0	0	---
3rd Q	0	0	0	0	---
4th Q	1	0	0	1	100

PQA/LO SUMMARY REPORT
SECONDARY ITEMS FY 1975

COMMAND	TESTED	APPROVED	COMD.	DIS.	%DIS.
ARMCOM	---	---	---	---	---
2nd Q	---	---	---	---	---
3rd Q	---	---	---	---	---
4th Q	---	---	---	---	---
AVSCOM	43	36	2	5	12
2nd Q	35	22	1	5	14
3rd Q	50	43	0	7	14
4th Q	30	27	1	1	3
ECOM	269	269	0	0	0
2nd Q	145	53	0	92	63
3rd Q	261	170	0	91	35
4th Q	113	102	0	1	1
MICOM	---	---	---	---	---
2nd Q	---	---	---	---	---
3rd Q	---	---	---	---	---
4th Q	---	---	---	---	---
TACOM	1	1	0	0	0
2nd Q	7	2	5	0	0
3rd Q	2	1	1	0	0
4th Q	2	1	1	0	0
TROSCOM	0	0	0	0	0
2nd Q	0	0	0	0	0
3rd Q	0	0	0	0	0
4th Q	0	0	0	0	0

APPENDIX D

COMMODITY INFLATION FACTORS
COMPILED BY THE DEPARTMENT OF THE ARMY

YEAR	FACTOR
65	1.643
66	1.601
67	1.549
68	1.493
69	1.410
70	1.294
71	1.223
72	1.159
73	1.099
74	1.068
75 (Base Year)	1.000

Obtained 28 Jan 75 from Mr. William Ferron, DRCRP

APPENDIX E

LIST OF ACRONYMS AND ABBREVIATIONS

ACO	Administrative Contracting Officer
AMCC	Army Materiel Command Circular
APRO	Army Procurement Research Office
AR	Army Regulation
ASARC	Army System Acquisition Review Council
ASPR	Armed Services Procurement Regulation
Comp Gen	Comptroller General
CTP	Coordinated Test Program
DARCOM	Army Materiel Development and Readiness Command
DCSRDA	Deputy Chief Staff for Research, Development and Acquisition
DDC	Defense Documentation Center
DLSIE	Defense Logistics Studies Information Exchange
DOD	Department of Defense
DSARC	Defense System Acquisition Review Council
DSCLOG	Deputy, Chief of Staff, Logistics
DT	Development Testing
FA	First Article
FATAR	First Article Testing and Approval Requirements
FLITE	Federal Legal Information Through Electronics

IFB	Invitation For Bids
IPR	In Process Review
IPT	Initial Production Tests
MSC	Major Subordinate Commands
OT	Operational Testing
PCO	Procurement Contracting Officer
PQA/LO	Product Quality Analysis and Liaison Operations
QAR	Quality Assurance Representative
QPL	Qualified Product List
TECOM	Test and Evaluation Command
TRMS	Testing Resources Management System

APPENDIX F

STUDY TEAM

Harold F. Candy, Project Officer, Procurement Analyst, US Army Procurement Research Office, ALMC. BS, Pennsylvania State University, 1962. Prior to joining APRO in August 1969, Mr. Candy was employed as a Contract Specialist for 7 years with the US Navy Aviation Supply Office, Philadelphia, Pennsylvania. Mr. Candy received an MS in Contract and Procurement Management at Florida Institute of Technology, Melbourne, Florida, in September 1974. In addition to his research assignment, Mr. Candy instructs in a graduate level procurement program at a local university.

Robert L. Launer, B.A., University of Texas, 1962; M.A., 1964; Ph.D., VPI and SU, 1970. Operations Research Analyst, US Army Procurement Research Office, ALMC. Dr. Launer has authored several studies dealing with the problems of cost growth in Army contracts, in addition he has worked in the areas of cost estimating and forecasting methods. Dr. Launer has previously held research positions at Texas Nuclear Corporation and Bell Telephone Laboratories, and teaching positions at the US Naval Academy and Radford College. Dr. Launer presently teaches in several local colleges and universities.