Audit Report

OFFICE OF THE INSPECTOR GENERAL

F-100 ENGINE REPLACEMENT PARTS

Report No. 95-156 March 27, 1995

Department of Defense

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Acronyms

SAALC	San Antonio Air Logistics Center

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

March 27, 1995

MEMORANDUM FOR ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Audit Report on F-100 Engine Replacement Parts (Report No. 95-156)

We are providing this report for your review and comments. The House Committee on Armed Services, Subcommittee on Oversight and Investigations (presently the House Committee on National Security), requested the audit. This report discusses the procurement of F-100 aircraft engine replacement parts. Comments on a draft of this report were considered in preparing the final report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. We request that the Air Force provide additional comments on the unresolved recommendation and the estimated completion date for any agreed-upon actions by May 26, 1995.

We appreciate the courtesies extended to the audit staff. If you have any questions on this audit, please contact Mr. John Gannon, Audit Program Director, at (703) 604-9427 (DSN 664-9427) or Mr. Gerald Montoya, Acting Audit Project Manager, at (703) 604-9430 (DSN 664-9430). The distribution of this report is listed in Appendix D. The audit team members are listed on the inside back cover.

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Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 95-156 **March 27, 1995**
(Project No. 4LB-5037)

F-100 ENGINE REPLACEMENT PARTS

EXECUTIVE SUMMARY

Introduction. The House Committee on Armed Services, Subcommittee on Oversight and Investigations (presently the House Committee on National Security), requested this audit. The Committee received an allegation that Air Force contracting personnel were inappropriately directing contracts for F-100 aircraft engine replacement parts to the original equipment manufacturer (Pratt and Whitney), which would result in increased prices to the Government. The Air Force procurement is valued at $351 million, of which $151 million was awarded in FY 1994. The Air Force plans to procure additional replacement parts in FYs 1995 and 1996, at an estimated valued of $200 million.

Objectives. The objective of this audit was to evaluate the Air Force procurement of F-100 engine replacement parts and the validity of the allegation. We also evaluated the effectiveness of applicable internal controls.

Audit Results. The audit partially substantiated the allegation in that the Air Force did not adequately justify its decision to procure, at a value of $151 million, 54 fracture-critical parts for the F-100 engine from 1 source. As a result, the Air Force was not assured that limiting the procurement of 54 F-100 engine replacement parts to Pratt and Whitney was necessary in order to ensure acceptably high quality (see finding).

The allegation that Air Force personnel inappropriately directed the procurement of 137 other F-100 engine replacement parts to Pratt and Whitney, resulting in increased prices to the Government, was not substantiated (see Appendix A).

Internal Controls. The audit did not identify any material internal control weaknesses or weaknesses in the DoD Internal Management Control Program. See Part I for details of internal controls assessed.

Potential Benefits of Audit. This audit may result in the reduction of the prices paid for fracture-critical replacement parts. However, we could not determine the potential for monetary benefits because DoD studies on the desirability of spare parts breakout for fracture-critical parts and the feasibility of establishing equivalent quality control standards at other manufacturers have not been completed.

Summary of Recommendation. We recommend that the Air Force defer exercising options on its contract for F-100 engine replacement parts until completion of a Tri-Service study on the desirability of spare parts breakout for fracture-critical parts and completion of an Air Force study to determine whether alternate sources can implement a quality control system that is equivalent to Pratt and Whitney's quality control system.

Management Comments. The Air Force disagreed that the decision to procure F-100 replacement parts from the original equipment manufacturer was not sufficiently justified, but partially concurred with the recommendation. However, the Air Force does not expect the Tri-Service and Air Force studies to be completed until June 1995. The Air Force believes that the June completion date will not provide sufficient opportunity to procure the critical parts in 1995 through any method other than exercising the first contract option. The Air Force will add an amendment to the sole-source approval document to require that results from the Tri-Service Study, together with mission requirements and acquisition lead times, be briefed to the Office of the Assistant Secretary of the Air Force (Acquisition), before it exercises the second option. See Part II for a discussion of management's comments and Part IV for the text of the comments.

Audit Response. The comments from the Air Force were nonresponsive. Cognizant procurement officials should have the best information available to them before they decide the manner of contracting for the remaining quantities of F-100 replacement parts that are pending. The basic contract for the procurement of F-100 replacement parts was awarded sole-source, in part, because of the Air Force belief that it did not have sufficient data from which to qualify alternate sources. Such data are not available and a component breakout study is long overdue. To risk losing the opportunity to save scarce spare parts procurement funds by exercising the first option without knowing whether less costly alternatives are feasible is unnecessary and imprudent. The Air Force and the Tri-Service study group should expedite work related to this issue and furnish Air Force procurement officials with their results. We request that the Air Force reconsider its position and provide comments by May 26, 1995.

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This report was prepared by the Logistics Support Directorate, Office of the Assistant Inspector General for Auditing, Department of Defense.

Part I - Introduction

Background

The F-100 aircraft engine is used in F-15 and F-16 fighter aircraft. Since 1974, five versions of the engine have been produced. As of August 30, 1994, the Air Force has procured more than 3,600 engines at a cost of $9.6 billion.

The F-100 engine contains approximately 3,200 parts, including 412 parts with limited structural lives, which must be replaced periodically. On September 23, 1994, the Air Force awarded a multiyear procurement contract, valued at approximately $351 million, to replace 54 fracture-critical engine parts. Fracture-critical parts are parts in which failure will result in probable loss of the aircraft.

The House Committee on Armed Services, Subcommittee on Oversight and Investigations (presently the House Committee on National Security), requested this audit on March 23, 1994. The Committee received an allegation that Air Force contracting personnel were inappropriately directing the procurement of 191 F-100 engine replacement parts to the original equipment manufacturer (Pratt and Whitney), which would result in increased prices to the Government.

Objectives

The objective of this audit was to evaluate the Air Force procurement of F-100 engine replacement parts and the validity of the allegation. We also evaluated the effectiveness of applicable internal controls.

Scope and Methodology

Review of Records. We reviewed and evaluated Air Force procurement documents, engineering technical information, procurement history records, and other documents related to the procurement of F-100 engine replacement parts that were prepared from January 1, 1989, through August 30, 1994. To assess the reasonableness of the prices paid for the procurement of F-100 engine replacement parts from Pratt and Whitney, we relied on pricing data obtained from the San Antonio Air Logistics Center's (SAALC) procurement history files for the most recent procurements and price estimates we obtained from manufacturers in August 1994. We also interviewed cognizant engineering,

contracting, and program management office personnel at SAALC and F-100 engine parts manufacturers. We did not use statistical sampling procedures to conduct this audit or validate the accuracy of the computer-processed data (procurement history file) we obtained from SAALC because of the time-sensitivity of this report.

Auditing Standards. This economy and efficiency audit was made from May through August 1994 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. Organizations visited or contacted during the audit are in Appendix C.

Internal Controls

We evaluated the effectiveness of internal controls over the procurement of F-100 engine replacement parts by examining the applicable Air Force source selection procedures. We identified no material internal control weaknesses. We also reviewed the SAALC implementation of the DoD Internal Management Control Program applicable to the procurement of replacement parts and found it to be effectively implemented.

Prior Audits and Other Reviews

No related audits were performed on F-100 engine fracture-critical parts in the past 5 years.

Part II - Finding and Recommendation

Sole-Source Procurement of F-100 Engine Replacement Parts

The Air Force did not adequately justify its decision to procure 54 fracture-critical parts for the F-100 engine from 1 source. The condition occurred because Air Force personnel did not complete the extensive research needed to substantiate that the original equipment manufacturer (Pratt and Whitney) would provide better F-100 engine replacement parts than other manufacturers. As a result, the Air Force had no assurance that restricting the procurement of F-100 engine replacement parts to Pratt and Whitney would be necessary to ensure acceptably high quality. Although the prices paid under the original contract were not unreasonable, competition could decrease the prices paid for additional parts.

Background

DoD Policy on Spare Parts Breakout Seeks to Reduce Costs. The DoD Spare Parts Breakout Program attempts to reduce costs through competitive procurement or the purchase of parts directly from the manufacturer rather than the original equipment manufacturer, while maintaining the integrity of the systems and equipment in which the parts are to be used. Appendix E of the Defense Acquisition Regulation Supplement established the program and provides policies and procedures for its management within and between the departments and agencies. The Deputy Under Secretary of Defense for Logistics is responsible for direction and management of the program including the establishment and maintenance of implementing regulations.

Policy Requires Justification for Other Than Full and Open Competition. The Defense Federal Acquisition Regulation, subpart 6.301, prescribes policies and procedures and identifies the statutory authorities for contracting without full and open competition. Subpart 6.302 states that circumstances other than full and open competition require justification and approval.

One Source Decision

The Air Force did not adequately justify its 1 source decision for the procurement of 54 fracture-critical parts for the F-100 engine. The Air Force contended that high quality parts were available from only one responsible source; however, the Air Force did not complete the extensive research needed to validate its claim.

Air Force Decided to Procure Fracture-Critical Parts From One Source. The Air Force decided to procure all 54 fracture-critical engine replacement parts from 1 source because it was concerned that the quality of parts might vary among multiple sources. On April 1, 1994, the Air Force advertised in the Commerce Business Daily a solicitation for 54 fracture-critical engine components, in various quantities, for the F-100 aircraft engine. The fracture-critical engine parts are the most highly stressed rotating parts of the F-100 engine. A failure of any fracture-critical engine part could result in probable loss of the aircraft. Engineers at SAALC are concerned that, during the manufacturing of those parts, a variety of defects in material used to manufacture the components can occur that cannot be detected with current technology. In the engineers' opinion, procurement of the parts from one source will ensure controls over the manufacturing processes and improve the quality, reliability, and safety of the F-100 engine.

Procurement Restrictions Limited the Bidding and Resulted in Sole-Source Justification. Consolidating all 54 replacement parts under 1 solicitation limited the number of contractors capable of supplying all the parts. Air Force contracting personnel at SAALC received only one bid in response to the advertised solicitation. That bid came from Pratt and Whitney. Because the Air Force received only one bid, it was required to justify a sole-source contract.

In its sole-source justification, the Air Force stated that the property or services needed were available from only one responsible source and no other type of property or service would satisfy the needs of the Air Force. The Assistant Secretary of the Air Force (Acquisition) approved the final acquisition action approval document on June 10, 1994. On September 23, 1994, the Air Force entered into a 1-year contract with Pratt and Whitney (with annual options for 2 additional years) for procurement of 54 fracture-critical F-100 engine replacement parts. The contract is valued at $151 million for the first year, and the estimated value for 2 additional years is $200 million. While the basis for the sole-source justification was properly prepared and approved, the basis for the procurement of fracture-critical parts from one source was inadequate.

Need for Extensive Research

The Air Force did not complete the extensive research it needed to substantiate that the sole-source procurement of F-100 engine fracture-critical parts from Pratt and Whitney was justified.

Quality Control by the Original Equipment Manufacturer. A key element in the Air Force justification to procure the parts from the original equipment manufacturer was Pratt and Whitney's quality control oversight over the manufacturing processes. Air Force personnel indicated that Pratt and Whitney had personnel in place in forging and metal processing facilities to ensure the production of the highest quality parts. The Air Force also claimed that Pratt and Whitney personnel were more knowledgeable in the intended design of parts, which allowed them to make certain that defects in material and deviations in the manufacturing process were not introduced into production.

Pratt and Whitney's high quality control standards in the manufacturing of aircraft parts are well known in the industry. Pratt and Whitney's reputation for requiring strict quality control standards was confirmed by its suppliers and other vendors we contacted.

Time is Needed to Assess Benefits of Quality Control. The added benefits of Pratt and Whitney's quality control oversight were not quantified. The Air Force could not document that, because of extensive quality control oversight, Pratt and Whitney parts had a superior safety and reliability record. The Air Force engineers also confirmed that they could not substantiate whether Pratt and Whitney parts had performed better than those parts supplied by other manufacturers. The engineers indicated that such an analysis would take time to perform. Additionally, some of the parts that were manufactured by alternate sources were installed more recently than Pratt and Whitney parts. Therefore, the parts purchased from alternate sources had not accumulated sufficient hours of usage to allow the engineers to assess whether they performed equal to or better than the parts manufactured by Pratt and Whitney.

Air Force Review of Other Manufacturers' Quality Controls. The Air Force did not document that quality control systems used by other parts manufacturers were inadequate. Air Force documents indicated that the engineers at SAALC reviewed the practices and procedures used by four other manufacturers of F-100 engine parts. The reviews showed that only Pratt and Whitney provided sufficient quality control to ensure that the fracture-critical parts it supplied satisfied the intent of the original design. The Air Force engineers indicated that they had performed an in-depth assessment of each manufacturer to determine whether that manufacturer had a system of quality control equivalent to that of Pratt and Whitney. However, Air Force personnel were unable to fully support their claims. No written documentation showed

the extent of their analysis. Additionally, the engineers could offer only anecdotal evidence of the quality control problems the Air Force had experienced when F-100 engine replacement parts were manufactured by other sources. No significant safety mishaps have occurred related to parts manufactured by alternate sources.

DoD and Air Force Studies. Studies are needed to determine the desirability of spare parts breakout and feasibility of attaining good quality from more than one source. A Tri-Service Joint Propulsion Committee on Alternate Source Selection is studying the desirability of breaking out fracture-critical parts from DoD contracts. Results of that study should be available in June 1995. Additionally, the Air Force plans to study whether quality control results equivalent to Pratt and Whitney's on fracture-critical F-100 engine parts can be achieved by other vendors. The two studies should assist the Air Force in determining whether Pratt and Whitney's quality control system is, in fact, beneficial to the Air Force and whether similar quality control systems can be duplicated by either another contractor or the Air Force.

F-100 Engine Parts' Prices

Price Reasonability. Our review of the prices being paid under the contract awarded in September 1994 to Pratt and Whitney, price estimates we obtained from other vendors in August 1994 for similar quantities of parts, and the most recent history of procurements of parts from other vendors indicated that the prices being paid to Pratt and Whitney for 54 parts were reasonable. No material difference existed in the prices that the Air Force will pay Pratt and Whitney and the prices that the Air Force would have paid had the parts been broken out to other potential bidders. Although negotiated prices appear reasonable, the reasonableness of future negotiated prices was uncertain because competition on the 54 engine parts had been eliminated.

Allegation on Directed Procurement Was Not Substantiated. The allegation that Air Force personnel were inappropriately directing the procurement of 137 other F-100 engine replacement parts to Pratt and Whitney, which will result in increased prices to the Government, was not substantiated (see Appendix A).

Conclusion

The Air Force did not adequately justify its decision to procure fracture-critical parts for the F-100 engine from the original equipment manufacturer, Pratt and Whitney, but the prices paid were not unreasonable. The Air Force could not substantiate that parts procured from alternate sources would be inferior and that Pratt and Whitney's system of quality control was so far superior as to justify extra cost. Therefore, additional research needs to be completed before the Air Force exercises remaining options on the contract and foregoes potential price decreases fostered by competition. Ongoing and planned studies in DoD and the Air Force will determine the desirability of spare parts breakout and the feasibility of duplicating, by alternate sources, quality control systems similar to Pratt and Whitney's system on fracture-critical F-100 engine parts. The studies should provide the Air Force with the additional information it needs to make a more informed decision before exercising additional contract options. The studies should be accelerated, the next procurement deferred, or both.

Recommendation, Management Comments, and Audit Response

We recommend that the Commander, San Antonio Air Logistic Center, defer exercising options on the contract for F-100 engine replacement parts until DoD and the Air Force complete studies on the desirability of spare parts breakout, and determine whether quality control equivalent to Pratt and Whitney's system on fracture-critical F-100 engine parts can be provided by alternate sources.

Management Comments. The Air Force disagreed that the decision to procure F-100 replacement parts from the original equipment manufacturer was not sufficiently justified, but partially concurred with the recommendation. However, the Air Force does not expect the Tri-Service and Air Force studies to be completed until June 1995. The Air Force believes that the June completion date will not provide sufficient opportunity to procure the critical parts in 1995 through any method other than exercising the first contract option. The Air Force will add an amendment to the sole-source approval document to require that results from the Tri-Service Study, together with mission requirements and acquisition lead times, be briefed to the Office of the Assistant Secretary of the Air Force (Acquisition), before it exercises the second option.

Audit Response. We consider the comments from the Air Force to be nonresponsive. Cognizant procurement officials should have the best

information available to them before they decide the manner of contracting for the remaining quantities of F-100 replacement parts that are pending. The Air Force and the Tri-Service study group should expedite work related to this issue. Determining whether competitive procurement is, or is not, beneficial before exercising the first option is consistent with the Assistant Secretary of the Air Force (Acquisition) June 10, 1994, justification and approval document, specifying the intent of the Air Force to take steps to foster competition, if possible, during the acquisition. The basic contract for the procurement of F-100 replacement parts was awarded sole-source, in part, because of the Air Force belief that it did not have sufficient data from which to qualify alternate sources. Such data may now be available and the long overdue component breakout study should be performed before the large pending procurement is made.

We request that the Air Force reconsider its position and provide additional comments in response to the final report.

Part III - Additional Information

Appendix A. Review of Allegation Related to F-100 Engine Replacement Parts

In response to a request from the House Committee on Armed Services, Subcommittee on Oversight and Investigations, we evaluated the following information provided to the Subcommittee members by a concerned individual. Additionally, we evaluated a list of 191 parts that the person claimed were not being procured competitively.

Concern 1. In 1992, Kelly Air Force Base identified 411 engine parts in the F-100 engine that they determined should be designated as fracture-critical or durability critical. This terminology was not an adjective used to describe jet engine parts as a result of any catastrophic disaster or simulated flight failure analysis, but rather a definition buried in the 1984 Military Standard.

Audit Evaluation. These statements are partially true. There are 412 engine parts in the F-100 engine that are designated fracture-critical or durability critical. The origin of the designation of fracture-critical and durability critical parts can be traced to a 1976 Scientific Advisory Board recommendation that the Air Force perform damage tolerance assessments of all fleet engines including the F-100. A damage tolerance assessment is an in-depth structural analysis of engine component life limits. The analysis began in 1978 and was completed in 1982. It resulted in identification of fracture-critical and durability critical parts. Fracture-critical parts are parts in which failure will result in probable loss of the aircraft. Durability critical parts are parts in which failure or deterioration will result in a significant maintenance burden, but will not impair flight safety.

Concern 2. Once uncovered, it (the fracture-critical and durability critical issue) has become the focal point of attention at Kelly Air Force Base, by providing a loophole to the 1984 Competition in Contracting Act. The Act allowed the Air Force to rescind contractor approval to manufacture those parts and direct those orders back to the prime manufacturer. Contractors who previously supplied specific parts to the Air Force suddenly found their approvals withdrawn, their contracts terminated for convenience of the Government, and the requalification requirements imposed by the Air Force so unreasonable that even the prime manufacturers would be hard pressed to meet them.

Audit Evaluation. The individual's statements are partially true. On February 26, 1992, SAALC removed 115 previously qualified manufacturers from the approved vendors list. According to SAALC, the change occurred because of a lack of confidence in the quality controls in the manufacturing process of previously qualified manufacturers. Personnel at SAALC believe

that procurement of those fracture-critical parts through an original equipment manufacturer will ensure control over manufacturing processes and the safe operation of the F-100 engine.

Although the Air Force's decision to rescind contractor approval to manufacturers may have initially caused a hardship for various manufacturers, many manufacturers have since been requalified to manufacture a majority of the F-100 engine parts. A review of F-100 engine parts disclosed that a majority of the parts are continuing to be competed. For example, in the information provided to Congress the concerned individual identified 191 parts that were being removed from competition. Our analysis of the parts showed that 136 (71 percent) were continuing to be competed (see Appendix B).

Concern 3. The Government would save more than $400,000 per F-100 engine, or $1.4 billion for 1 set of 191 fracture-critical and durability critical parts, if it competitively procured those items for the 3,400 F-100 engines currently in the U.S. Air Force inventory. This is based on a current analysis of Pratt and Whitney's stock list price to the Government and the last competitive procurement price for the 191 fracture-critical and durability critical parts. The figure of $1.4 billion does not include the unfathomable cost being incurred in ongoing termination settlements and reprocurement charges. To illustrate the point, the concerned individual submitted a detailed analysis showing the cost savings from competitive procurements.

Audit Evaluation. The individual's statements are not true. The analysis, as discussed above, was based on an erroneous assumption that all the parts listed are not being competed. This is not the case. The majority of the components are being competed and those that are not being competed have not resulted in unreasonable charges.

The individual's cost savings analysis was in error because the unit prices used in the analysis were inaccurate. Specifically, the individual stated that he used stock list prices and compared them to past procurement histories. Pratt and Whitney had not established unit prices for aircraft parts referred to as a stock list price. Each unit price set by Pratt and Whitney is dependent on the number of units bought; the cost of materials, labor, and overhead; and other factors. In lieu of a stock list price, we believe the individual used the standard price available in the Government procurement history data base. That standard price is the last manufacturer's price, which is burdened by a Government overhead surcharge (added at the depot level to cover handling, storage, and restockage). Unless the surcharge is added to all manufacturers' prices, the standard cost does not result in an accurate spare parts breakout analysis.

The unit prices that the individual used do not provide a valid comparison, because the unit prices are greatly affected by the number of units bought. For example, the unit cost to buy 1 turbine disk is higher than the price per unit cost of 1,000 disks. We believe the individual selectively extracted procurements in quantities that resulted in the greatest disparity between the standard unit price and the spare parts breakout prices. As a result, the individual's analysis does not result in a valid comparison.

Appendix B. Summary of Competitive Status of F-100 Engine Replacement Parts

There were 191 parts listed in the letter written by a concerned individual to Congress. We evaluated the competitive status of the components and found the following.

No.	Part Description	Part Number	Status of Procurement
1	Actuator Primary	4052340	Under Review [1]
2	Actuator Primary	4074746	Under Review
3	Air Oil Cooler	UA535953-7	Other [2]
4	Bearing No. 2	4000352	Competitive [3]
5	Bearing No. 2	4000425	Competitive
6	Bearing No. 2	4037050	Competitive
7	Bearing No. 3	4035421	Competitive
8	Bearing No. 3	4035594	Competitive
9	Bearing No. 3	4048700	Competitive
10	Bearing No. 3	4056777	Competitive
11	Bearing No. 4	4059297	Competitive
12	Bearing No. 4	4059298	Competitive
13	Bearing No. 4	4059299	Competitive
14	Bearing No. 4	4059349	Competitive
15	Bearing No. 4	4061007	Competitive
16	Bearing No. 5	4055599	Competitive
17	Bearing No. 5	4066596	Competitive
18	Bearing No. 5	4066597	Competitive
19	Bearing No. 5	4066598	Competitive
20	Bearing No. 5	4067082	Competitive
21	Blade Compressor Stage 2	4041272	Under Review
22	Blade Compressor Stage 2	4051092	Under Review
23	Blade Compressor Stage 4	4063904	Competitive
24	Blade Compressor Stage 5	4040205	Competitive
25	Blade Compressor Stage 6	4040806	Competitive
26	Blade Compressor Stage 8	4044908	Competitive
27	Blade Compressor Stage 8	4052808	Competitive
28	Blade Compressor Stage 9	4040809	Competitive
29	Blade Compressor Stage 10	4040810	Competitive
30	Blade Compressor Stage 11	4040811	Competitive
31	Blade Compressor Stage 12	4040812	Competitive
32	Blade Compressor Stage 13	4040813	Competitive

[1] Under Review - Identifies F-100 engine placement parts that are under review for competition.
[2] Air oil cooler (part UA535953-7) is a reparable item that is repaired versus replaced.
[3] Competitive - Identifies F-100 engine replacement parts that are being procured competitively.

Appendix B. Summary of Competitive Status of F-100 Engine Replacement Parts

No.	Part Description	Part Number	Status of Procurement
33	Blade Retaining Ring Assembly	4066777	Sole-Source [4]
34	Blade Retaining Ring Assembly	4057239	Sole-Source
35	Blade Turbine Stage 1	4057491	Sole-Source
36	Blade Turbine Stage 2	4057002	Sole-Source
37	Blade Turbine Stage 4	4067004	Under Review
38	Case Assembly 10-13	4056162	Competitive
39	Case Assembly 10-13	4062766	Competitive
40	Case Assembly Compressor	4040995	Competitive
41	Case Assembly Compressor	4037989	Competitive
42	Case Assembly Compressor	4046497	Competitive
43	Case Assembly Diffuser	4068322	Competitive
44	Case Assembly Diffuser	4070870	Competitive
45	Case Fan Inlet	4001727	Competitive
46	Case Fan Stage 3	4043285	Competitive
47	Convergent Nozzle	4077809	Competitive
48	Coupler Assembly Gearbox	4067183	Competitive
49	Damper Blade	4024039	Competitive
50	Damper Blade	4012715	Competitive
51	Disk Compressor	4059171	Sole-Source
52	Disk Compressor	4069904	Sole-Source
53	Disk Compressor # 5	4030605	Sole-Source
54	Disk Compressor Stage 8	4040108	Sole-Source
55	Disk Compressor Stage 8	4061508	Sole-Source
56	Disk Compressor Stage 9	4022609	Sole-Source
57	Disk Compressor Stage 10	4022610	Sole-Source
58	Disk Compressor Stage 10	4069910	Sole-Source
59	Disk Compressor Stage 11	4022611	Sole-Source
60	Disk Turbine Stage 1	4059091	Sole-Source
61	Disk Turbine Stage 2	4059092	Sole-Source
62	Disk Turbine Stage 4	4043704	Sole-Source
63	Divergent Nozzle	4056264	Competitive
64	Divergent Seal	4072683	Competitive
65	Divergent Seal	4076459	Competitive
66	Driveshaft Compressor	4047579	Sole-Source
67	Duct Fan Forward	4046405	Competitive
68	Duct Fan Forward	4065899	Competitive
69	Duct Segment Turbine	4057521	Competitive
70	Duct Segment Turbine	4070422	Competitive
71	Duct Segment Turbine	4066963	Competitive
72	Duct Segment Turbine	4063721	Competitive
73	Fuel Oil Cooler	UA539800-1	Under Review
74	Gearbox Cover	4047095	Competitive
75	Gearbox Link Assembly	4031264	Competitive
76	Housing Assembly Bearing	4018466	Competitive
77	Housing Assembly Bearing	4018467	Competitive
78	Housing Assembly Bearing	4035597	Competitive

[4] Sole-Source - Identifies F-100 engine replacement parts that are being procured on a sole-source basis from the original equipment manufacturer.

No.	Part Description	Part Number	Status of Procurement
79	Housing Assembly Bearing	4040284	Competitive
80	Housing Assembly Bearing	4061549	Competitive
81	Housing	4068639	Competitive
82	Housing	4057683	Competitive
83	Liner Assembly	4057394	Other [5]
84	Liner Combustion	4066944	Other
85	Liner Convergent	4060955	Competitive
86	Liner Convergent	4068401	Competitive
87	Nut Driveshaft	4026463	Competitive
88	Nut Driveshaft	4047224	Competitive
89	Oil Tank	4043161	Competitive
90	Oil Tank	4066024	Competitive
91	Ring Assembly Bearing 4	4071088	Competitive
92	Ring Assembly In	4037628	Competitive
93	Ring Assembly In	4061761	Competitive
94	Ring Assembly In	4067727	Competitive
95	Ring Assembly Out 1	4032800	Competitive
96	Ring Assembly Out 1	4060230	Competitive
97	Ring Assembly Turbine 2	4023077	Competitive
98	Ring Assembly Turbine 2	4063436	Competitive
99	Ring Assembly Turbine 3	4042692	Competitive
100	Ring Assembly Turbine 3	4066127	Competitive
101	Ring Segment Turbine	4057764	Competitive
102	Ring Segment Turbine	4066963	Competitive
103	Seal Air Bearing 4	4036962	Sole-Source
104	Seal Air Compressor	4066997	Sole-Source
105	Seal Air Compressor	4064666	Sole-Source
106	Seal Air Compressor	4061280	Sole-Source
107	Seal Air Compressor	4064667	Sole-Source
108	Seal Air Compressor	4064670	Sole-Source
109	Seal Air Compressor	4079078	Sole-Source
110	Seal Air Compressor	4062764	Sole-Source
111	Seal Air Compressor	4062765	Sole-Source
112	Seal Air Compressor	4061976	Sole-Source
113	Seal Air Compressor	4061977	Sole-Source
114	Seal Air Compressor	4050978	Other [6]
115	Seal Air Compressor	4061978	Sole-Source
116	Seal Air Compressor	4061979	Sole-Source
117	Seal Air Compressor 10	4043280	Sole-Source
118	Seal Air Compressor 10	4050980	Sole-Source
119	Seal Air Compressor 10	4061780	Sole-Source
120	Seal Air Compressor 11	4041591	Sole-Source
121	Seal Air Compressor 11	4047471	Sole-Source
122	Seal Air Compressor 11	4061771	Sole-Source

[5] Liner assembly (part 4057394) and liner combustion (part 4066944) are procured from the prime manufacturer because of proprietary restrictions.
[6] Seal air compressor (part 4050978) is purchased for foreign military sales only.

Appendix B. Summary of Competitive Status of F-100 Engine Replacement Parts

No.	Part Description	Part Number	Status of Procurement
123	Seal Air Compressor 12	4047472	Sole-Source
124	Seal Air Compressor 12	4061772	Sole-Source
125	Seal Air Compressor 12	4041592	Sole-Source
126	Seal Air Turbine	4057764	Sole-Source
127	Seal Air Turbine	4064338	Sole-Source
128	Seal Air Turbine	4063721	Sole-Source
129	Seal Air Turbine	4064337	Sole-Source
130	Seal Assembly Face	4031516	Competitive
131	Seal Assembly Face	4031517	Competitive
132	Seal Assembly Face	4033283	Competitive
133	Seal Assembly Face	4012468	Competitive
134	Seal Assembly Face	4035883	Competitive
135	Seal Assembly Face	4014756	Competitive
136	Seal Assembly Face	4014757	Competitive
137	Stator Assembly 6	4064066	Competitive
138	Stator Assembly 7	4064067	Competitive
139	Stator Assembly 8	4064068	Competitive
140	Stator Assembly 9	4064069	Competitive
141	Stator Assembly 11	4064071	Competitive
142	Stator Assembly 11	4067481	Competitive
143	Stator Assembly 12	4056232	Competitive
144	Stator Assembly 12	4067482	Competitive
145	Stator Assembly 13	4064083	Competitive
146	Sump Assembly Bearing	4053992	Competitive
147	Support Assembly 2	4034875	Competitive
148	Support Assembly 3	4041794	Competitive
149	Support Assembly 5	4034246	Competitive
150	Support Duct	4055259	Competitive
151	Support Duct 2	4063469	Competitive
152	Support Duct 2	4070421	Competitive
153	Support Ring	4066128	Competitive
154	Support Ring	4061514	Competitive
155	Support Seal 4	4065651	Competitive
156	Support Seal 5	4028004	Competitive
157	Support Stator 1	4037612	Competitive
158	Support Stator 1	4056576	Competitive
159	Support Stator 1	4073624	Competitive
160	Sync Ring Assembly	4043182	Competitive
161	Tierod Nut	4027072	Competitive
162	Tierod Nut	4046424	Competitive
163	Tierod Nut	4054479	Competitive
164	Tierod Nut	4059418	Competitive
165	Tierod Nut	4070809	Competitive
166	Tierod Rear	4048151	Competitive
167	Tierod Rear	4048152	Competitive
168	Tierod Rear	4048153	Competitive
169	Tower Shaft	4011830	Competitive
170	Turbine Exhaust Cone	4043522	Competitive
171	Turbine Exhaust Cone	4057104	Competitive

No.	Part Description	Part Number	Status of Procurement
172	Turbine Exhaust Cone	4067118	Competitive
173	Valve Oil	4069248	Under Review
174	Valve Oil	4065818	Under Review
175	Vane Assembly Turbine 3	4039683Cln	Competitive
176	Vane Variable Compressor	4038450	Competitive
177	Vane Variable Compressor	4038550	Competitive
178	Vane Variable Compressor	4066750	Competitive
179	Vane Variable Compressor	4066950	Competitive
180	Vane Variable Compressor 4	4043454	Competitive
181	Vane Variable Compressor 4	4062264	Competitive
182	Vane Variable Compressor	4043455	Competitive
183	Vane Variable Compressor	4062265	Competitive
184	Vane Compressor 8	4063958	Competitive
185	Vane Compressor 9	4063959	Competitive
186	Vane Turbine	4056771Clj	Competitive
187	Vane Turbine	4056771Clk	Competitive
188	Vane Turbine	4056771Cll	Competitive
189	Vane Turbine	4056771Clm	Competitive
190	Vane Turbine	4056771Cln	Competitive
191	Vane Turbine	4056781Cll	Competitive

Competitive Status Summary

Status of Parts	Number of Parts
Competitive	136
Sole-Source	43
Under Review	8
Other	4
Total	**191**

Appendix C. Organizations Visited or Contacted

Office of the Secretary of Defense

Office of the Under Secretary of Defense for Acquisition, Washington, DC
Office of the Deputy Chief of Staff for Logistics, Washington, DC

Department of the Air Force

Office of the Deputy Chief of Staff (Logistics and Engineering), Washington, DC
Headquarters, Air Force Material Command, Washington, DC
San Antonio Air Logistics Center, Kelly Air Force Base, TX

Non-Government Organizations

Alamo Aircraft Supply, San Antonio, TX
Beacon Industries, Manchester, CT
Dean Machine Products, Bloomfield, CT
Electro Methods, Windsor, CT
Independent Defense Contractors Association, Alexandria, VA
Pratt and Whitney Jet Engines, Palm Beach, FL
Seidman & Associates, P.C., McLean, VA
Stowe Machine Co., Windsor, CT
Techspace Aero, San Antonio, TX

Appendix D. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
Under Secretary of Defense (Comptroller)
Deputy Under Secretary of Defense (Acquisition Reform)
Deputy Under Secretary of Defense for Logistics
Assistant to the Secretary of Defense (Public Affairs)

Department of the Air Force

Secretary of the Air Force
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force
Commander, Air Combat Command
Commander, San Antonio Air Logistics Center

Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
Director, National Security Agency
Inspector General, Central Imagery Office
Inspector General, National Security Agency
Director, Defense Logistics Studies Information Exchange

Non-Defense Federal Organizations and Individuals

Office of Management and Budget
U.S. General Accounting Office
- National Security and International Affairs Division, Technical Information Center
- National Security and International Affairs Division, Defense and National Aeronautics and Space Administration Management Issues
- National Security and International Affairs Division, Military Operations and Capabilities Issues

Non-Defense Federal Organizations and Individuals (cont'd)

Chairman and Ranking Minority Member of Each of the Following Congressional Committees and Subcommittees:

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Committee on National Security

Non-Government Organization

Pratt and Whitney Aircraft Engines, Palm Beach, FL

Part IV - Management Comments

Department of Air Force Comments

Final Report Reference

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
OFFICE OF THE INSPECTOR GENERAL
DEPARTMENT OF DEFENSE

FROM: HQ USAF/LG

SUBJECT: Draft DOD Report of Audit, F100 Engine Replacement Parts (Project No. 4LB-5037)

This is in reply to your 8 Dec 94 memorandum requesting Air Force comments on subject draft report of audit.

The draft report of audit concluded the Air Force did not adequately justify its decision to procure 54 fracture critical parts for the F100 engine from one source. The audit Executive Summary requested the Commander, San Antonio Air Logistics Center provide comments on the subject audit. The SA-ALC/CC's comments (atch 1) have been received and reviewed.

Attachment Deleted

We non-concur with the audit conclusion that the Air Force did not adequately justify its decision to procure fracture-critical parts for the F100 engine from the original equipment manufacturer for the same reasons identified in the SA-ALC/CC Memorandum. The Air Force justification and approval for the sole source procurement decision was accomplished IAW appropriate guidelines. The decision was made on sound management and engineering judgment based on consideration of the probable consequences of failure, impact of manufacturing processes on predominant failure modes, and the knowledge and systems required to minimize component failures.

We partially concur with the audit conclusion that the Tri-Service and Air Force Studies should provide the Air Force with the additional information it needs, to make a more informed decision before exercising additional contract options. We agree the studies should provide valuable information so we can make a more informed decision on exercising additional contract options. However, these studies are not expected to be completed until June 1995. Our first option must be exercised by September 1995. The time required to digest and implement the results of these studies, if they are in fact completed by June, will not provide sufficient opportunity to procure these critical parts in 1995 through any method other than exercising the first contract option. Parts from this contract are critical for the F100-PW-220 engine recovery program and any delay in parts procurement will exacerbate an already critical support problem with this engine.

However, an amendment will be added to the sole source approval document to require the results from the Tri-Service Study, together with mission requirements and acquisition lead-times, be briefed to SAF/AQ prior to exercising the second contract option.

HQ USAF/LG Point of Contact is Lt Col Donald R. Richardson, AF/LGMY, DSN 227-9233.

Kenneth G. Miller

Attachment:
SA-ALC/CC Memorandum w/atch

Audit Team Members

Shelton R. Young	Director, Logistics Support Directorate
John A. Gannon	Program Director
Christian Hendricks	Program Director
Gerald P. Montoya	Acting Project Manager