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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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The Honorable Lawton Chiles
United States Senate

April 27, 1984

The Honorable Lowell Weicker, Jr.
United States Senate

Subject: Review of the Alternate Fighter Engine Competition (GAO/NSIAD-84-104)

As you requested and as agreed to in subsequent discussions, we have reviewed the Alternate Fighter Engine source selection decision announced by the Secretary of the Air Force on February 3, 1984.

As you know, the General Electric Company and the Pratt and Whitney Aircraft Group of United Technologies have been competing to provide approximately 2,000 engines for new production F-15 and F-16 aircraft over the next 6 years. The Secretary's decision was for the procurement of the 160 engines to be purchased in fiscal year 1985. In that decision, the Air Force split the award between the two contractors, with General Electric to produce 75 percent of the engines.

We concluded that the Air Force acted properly and reasonably in making this award. Specifically, we found:

--The Air Force planned and executed the source selection in compliance with its established policies and procedures.

--The two manufacturers' proposals were fairly evenly matched if either were to receive a contract for the total number of engines to be supplied.

--Under a split award arrangement, General Electric's costs were lower.

By splitting the award, the Air Force will pay more than if all engines were bought from one manufacturer. Nevertheless, the

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Secretary believed the benefits gained from continuing competition, protecting against work disruptions, and expanding the mobilization base were worth the added costs.

In our opinion, the Secretary's reasons plus the fact that neither engine has yet been fully tested, provide sound bases at this time for splitting the 1985 award and continuing the competition. The Secretary has not yet decided how the more than 1,800 engines needed in 1986 and beyond will be allocated between the two contractors. We were told the Air Force will reexamine whether continued splitting is justified in these future awards.

Because the competition will continue beyond the 1985 procurement, much of the information we examined in reaching these conclusions is still considered source selection sensitive and may be protected by law. As agreed with your offices, this report was prepared for public release and, therefore, does not include information of this nature.

BACKGROUND

The Pratt and Whitney's F-100 engine, which became operational in 1974, has powered the F-15 and F-16 aircraft since their inception. However, due to concerns over the performance of the engine and the availability of spare parts, the Air Force sought to develop alternate fighter engines. The Air Force hoped, through competition, to obtain engines with improved operability, safety, durability, and supportability at reduced life-cycle costs, and to establish a broader industrial base for production of fighter engines.

In fiscal year 1979, the Congress funded development of alternate fighter engines by both General Electric and Pratt and Whitney. The result was a competition between General Electric's F-110-GE-100, which is a derivative of the engine used on the B-1 bomber, and the Pratt and Whitney F-100-PW-220, which is an improved version of the existing F-100 engine.

In May 1983, the Air Force asked both contractors to submit offers on an estimated 2,000 engines to be procured for F-15 and F-16 aircraft in fiscal years 1985 through 1990. Contractors were asked to submit offers on annual, as well as multiyear, bases and for split buys, as well as complete (100 percent) award.

Each company submitted proposals for its engines based on a wide range of award alternatives. Following extensive Air Force analyses of the contractors' proposals, the Secretary of the Air Force announced his decision on fiscal year 1985 requirements

only. He decided to procure the 120 engines needed for F-16 aircraft from General Electric and the 40 needed for F-15s from Pratt and Whitney. As a result of this decision, contracts were awarded to both General Electric and Pratt and Whitney covering long lead-time items relating to the fiscal year 1985 requirement. Each also contained options for engines to be procured through 1990. Actual production contracts for the fiscal year 1985 procurement will be awarded when fiscal year 1985 funds become available. The Secretary has made no decision about how the engine requirements beyond 1985 will be allocated between the two manufacturers.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objective was to determine whether the Secretary of the Air Force had a reasonable basis for the award decision he announced on February 3, 1984. We concentrated on (1) whether the Air Force planned and executed its evaluations and analyses of the contractor's proposals in compliance with its established source selection policy and procedures and (2) whether the Secretary's decision was consistent with the results of the proposal evaluations and analyses.

Most of our work involved reviewing Air Force evaluations and analyses of contractor proposals. We examined the source selection plan, the request for proposals, the proposals, the reports of the source selection evaluation board and source selection advisory council, the Secretary's decision memorandum, and the contracts awarded in February 1984.

We held indepth dicussions with evaluation board members to obtain a fuller understanding of the analyses and the specifics of the proposals. We met with General Electric and Pratt and Whitney officials at their facilities to obtain their comments on the Air Force's request for offers and discuss their proposals. We met with the Assistant Secretary of the Air Force for Research, Development and Logistics to discuss the Secretary's decision and plans for the remainder of the competition. We also met with an official of the Office of the Secretary of Defense's Cost Analysis Improvement Group to discuss their review of the Air Force's life-cycle cost analysis. We did not independently evaluate the reasonableness of the contractor's proposals.

This report has been written so as not to disclose any sensitive documentation. Much of the proposal, evaluation, and analytical data that was generated in the Alternate Fighter Engine competition is still treated as proprietary or source-selection sensitive because the Secretary has not yet decided how the fiscal

year 1986-1990 engine requirements will be allocated between the contractors. This did not constrain our access to the documentation or compromise the thoroughness of our review. However, because you wanted us to provide a document for public release, this report does not include details such as contractor offers and comparisons.

Most of our field work was done at the Aeronautical Systems Division, Air Force Systems Command, located at Wright-Patterson Air Force Base, Dayton, Ohio, from February 8, 1984, through March 30, 1984. Our review was performed in accordance with generally accepted government auditing standards, except that as requested by your offices, we did not obtain formal agency comments.

SOURCE SELECTION POLICY AND PROCEDURES WERE FOLLOWED

Air Force Regulation 70-15 prescribes the policy and procedures for obtaining and evaluating contractor proposals and making source selection decisions. Essentially, the regulation requires that

--a source selection plan be prepared and approved by the source selection official,

--the request for proposal identify the basis to award the contract,

--contractors' proposals be assessed against evaluation standards,

--offerors' relevant past performance be assessed, and

--on-site reviews at each contractor's facility be conducted.

Our review of the source selection process showed that the Air Force complied with requirements defined in Air Force Regulation 70-15. The source selection plan was prepared and approved by the source selection authority on May 18, 1983. Subsequently, the contractors' proposals were evaluated according to the four factors identified in the request for proposal; specifically, overall capability, readiness and support, life-cycle cost, and program adequacy and competition. Additionally, contractors' past performances on completed and on-going contracts were considered, and an Air Force team of manufacturing and quality control assurance personnel conducted on-site reviews at the contractors' facilities.

We also discussed the source selection process with General Electric and Pratt and Whitney officials. They believed the Air Force followed standard source selection policies and procedures.

RESULTS OF AIR FORCE EVALUATION AND ANALYSIS

Extensive Air Force analyses indicate that the alternate fighter engine competition was a major success. The Air Force estimates that the competition could save up to $3 billion over a 20-year period as compared with continued procurement of the existing F-100 engine. According to Air Force officials, both new engines promise to be more capable, durable, and supportable than the current engine.

In evaluating each contractor's proposal, the Air Force focused on four assessment areas:

Overall capability--Engine's overall performance in fulfilling the aircraft's operational capabilities.

Readiness and support--Logistics availability and supportability of the engine.

Life-cycle cost--The cost to acquire and support these engines over a 20-year period.

Program adequacy and competition--Management, manufacturing, and support capability; competition in sourcing of spare parts; and coproduction.

These Air Force assessments did not incorporate unsolicited enhancements. However, information on items over and above those specified in the request for proposal was provided to the Secretary for his consideration.

The following sections describe the major findings in each assessment area. Overall, General Electric and Pratt and Whitney offers were comparable based on a 100 percent award, but when considering a split award, General Electric was superior.

Overall capability

There were no significant differences in the proposals when considering overall capability. Both competitors offered engines that would satisfy specification requirements and perform much better than the F-100 which is presently in service.

While both engines have demonstrated significant improvements over the current F-100 engine in simulated flight tests, neither engine has completed the official Air Force final qualification tests which will be used to qualify the engine for production. Qualification of General Electric F-110-GE-100 engine is scheduled in November 1984 and the Pratt and Whitney's F-100-PW-220 in March 1985. Air Force officials told us these dates may slip.

Readiness and support

In this assessment area, both contractors' offers were rated equally acceptable.

A logistics chain for both engines is in place, thus facilitating their support. The Oklahoma City Air Logistics Center provides depot level support to the General Electric F-101 which powers the B-1 bomber, and from which the F-110-GE-100 is derived. Similarly, the San Antonio Air Logistics Center handles depot level support for the existing F-100 engine, which has a high degree of commonality with the Pratt and Whitney F-100-PW-220 engine. The Air Force also analyzed the effect of two additional engines on North Atlantic Treaty Organization operations and concluded there was no adverse impact. The Air Force has decided that only one kind of engine will be introduced in each tactical fighter wing.

Warranties were a significant factor in this assessment area. While both proposals included the required warranties, the Pratt and Whitney price for the warranty was substantially higher than General Electric's in instances where Pratt and Whitney would receive award of less than 100 percent of the 6-year engine requirement. This is discussed in detail in the following section.

Life-cycle costs

The Air Force's extensive life-cycle costs analyses cover costs to acquire and support the 2,000 engines over 20 years. The analyses were performed on a variety of contract options including single, multiyear and a combination of both. According to the Assistant Secretary of the Air Force (Research, Development and Logistics), the Air Force decided not to ask the Congress for multiyear procurement authority in 1985 because the engines did not meet criteria relating to program maturity. The life-cycle costs relationships discussed below are basically similar on a multiyear or annual basis.

The Air Force's analysis showed that the General Electric and the Pratt and Whitney offers were essentially equal at the 100 percent award level. However, on a split award basis, General Electric's costs were lower than Pratt and Whitney's.

This difference resulted principally from one factor--General Electric offered more favorable warranty terms under a split award. The General Electric price on warranty coverage was slightly less than Pratt and Whitney's on a 100 percent award basis. However, as Pratt and Whitney's share of the award moved away from 100 percent, the cost of its warranties increased up to three times. In contrast, General Electric's warranty costs actually decreased as its share of a dual award declined. Thus, the life-cycle costs of any split arrangement would rise as Pratt and Whitney's share increased.

Pratt and Whitney officials informed us that their warranty terms reflected their corporate strategy to accept greater technical and cost risks for producing all 2,000 engines and less technical and cost risks on a dual award basis.

We discussed the Air Force's methodology in developing life-cycle costs with the Chairman of the Cost Analysis Improvement Group, Office of the Secretary of Defense. He told us it was the most comprehensive and thorough analysis that he had seen.

Program adequacy and competition

The General Electric proposal was evaluated as somewhat more advantageous in the last assessment area. The request for proposal contained special provisions to provide the Air Force with the capability to acquire spare parts competitively. Our review of the Air Force's analysis of the contractors' plans showed that General Electric's plan provided the Air Force greater flexibility in terms of qualifying alternate sources for its spares and exercising one of two cost options in the process.

The request for proposals also included offset requirements relating to the coproduction of F-16 aircraft and related engines by several NATO countries. The Air Force's analysis of the contractors' proposals found both were acceptable for a 100 percent award, but on a split award Pratt and Whitney terms provided for less coproduction offsets. Pratt and Whitney officials informed us that its offer for a dual award reflected credit due them for exceeding coproduction goal with its current F-100 engine.

They said they were willing to forego this credit if they had received an award for the total number of engines but not for a share.

SPLITTING THE AWARD WAS A JUDGMENT CALL

Thus far, the Air Force has not requested multiyear procurement authority from the Congress. The key decision made by the Secretary in this competition was to split the award for the first year's requirements. Once that determination was made, minimizing the government's cost required awarding General Electric the larger share because of its lower life-cycle costs.

The Secretary acknowledged that awarding the contract to two manufacturers was more costly than a single award. The Air Force evaluation shows that an award of the entire 6-year requirement for 2,000 new engines to either General Electric or Pratt and Whitney could save approximately 15 percent of the life-cycle cost of continuing procurement of existing F-100 engines. The Air Force evaluation also showed that splitting the entire requirement in the proportion the Secretary chose for fiscal year 1985 would reduce the savings to 10 percent. Dual award costs are higher primarily because Pratt and Whitney's prices increase under any shared arrangement.

The Secretary judged the benefits to be worth the added costs. The Secretary believed continuing competition would result in additional savings and increased contractors' responsiveness, both during this current competition and in filling future engine requirements. He also cited other benefits:

--An enlarged industrial mobilization base to meet the Air Force's needs.

--Protection from production disruption, particularly through expansion of the subcontractor/vendor base.

The Air Force did no studies or analyses to show the economic value of these anticipated benefits. No cost benefit analysis is required by law or regulation.

For fiscal years 1986 through 1990, Air Force officials informed us that all options are open, including multiyear awards and single or dual awards. The Air Force has acknowledged that

future awards will be influenced by experience with both engines and whether one of the engines may prove to be clearly superior to the other.

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As requested, we did not obtain formal comments. We did, however, discuss the contents of this report with Air Force officials, including the Assistant Secretary of the Air Force (Research, Development and Logistics), and their comments were considered in its preparation.

Milton J. Socolar

Acting Comptroller General
of the United States