



UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

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PROCUREMENT AND SYSTEMS
ACQUISITION DIVISION

B-152600

with on form #15 MARCH 9, 1979

The Honorable Harold Brown
The Secretary of Defense

Attention: Assistant for Audit Reports
Room 3A336
ASD (Comptroller)

AGC 00005

Dear Mr. Secretary:

Our Office has completed its review of the reasonableness of prices negotiated between the Department of the Air Force and Pratt and Whitney Aircraft Group (P&WAG), Government Products Division (GPD), United Technologies Corporation, under contract F33657-75-C-0377, modification P00050. The modification is a comprehensive amendment which (1) sets definite prices, terms, and conditions for domestic and European participating industry coproduced F-100 aircraft engines and (2) exercises production options. The engines are for the Air Force F-15 and F-16 and the European Participating Government (EPG) F-16 aircraft. The negotiated target price is about \$2 billion for 1,120 equivalent engines, as follows:

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ENG01523

<u>Program</u>	<u>Equivalent engines</u>	<u>Amount</u>
		(millions)
F-15	662.730	\$1,098
F-16 USAF	309.118	587
F-16 EPG	<u>148.345</u>	<u>334</u>
Total	<u>1,120.193</u>	<u>\$2,019</u>

The review was performed at the Aeronautical Systems Division, Wright-Patterson Air Force Base, Dayton, Ohio; Pratt and Whitney Aircraft Group--the Government Products Division, West Palm Beach, Florida, and the Manufacturing Division, East Hartford, Connecticut--United Technologies Corporation; and the cognizant Defense Contract Audit Agency (DCAA) and Air Force plant representative offices at the contractor's plants. We reviewed the Air Force's



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price negotiation memorandum and made in-depth evaluations of selected aspects of a comprehensive Air Force Fact Finding Team evaluation of the contractor's proposal, including a review of supporting data. A similar, but less extensive, effort was performed on a comprehensive DCAA evaluation. We also interviewed pricing, contracting, and auditing officials and made selective tests of the contractor's records.

Our selective analysis of the work performed by the various Defense team members indicated that a comprehensive and thorough analysis of the contractor's proposal(s) had been made. We found no indication that the established negotiation objective and the final negotiated price was other than fair and reasonable. However, there could be conditions not discernable at the time of our review that a postaward audit at the conclusion of contract performance might disclose which could modify this determination.

Sincerely yours,



J. H. Stolarow
Director

Enclosure

OUR ANALYSIS OF AIR FORCE ACTIONS
RESULTING IN THE NEGOTIATION
OF MODIFICATION P00050 TO
CONTRACT F33657-75-C-0377

The Air Force, in preparing for the above negotiation, had a 26-member multidisciplined (price analysts, contract specialists, engineer, and mathematician) Fact Finding Team (FFT) extensively analyze the contractor's proposal. The efforts of this team established the pricing team's negotiation objective. Concurrent with this activity, the Defense Contract Audit Agency (DCAA) made a comprehensive audit of the contractor's proposal. The results of this analysis were considered during negotiations. Both of these groups were provided technical support by the Air Force (formerly the Navy's) Plant Representative Office.

We reviewed FFT's methodology in its review of estimated material and direct labor costs in the Pratt and Whitney Aircraft Group (P&WAG) proposal dated March 21, 1977. We selected these cost elements because they represent about \$995 million, or about 59 percent of the Air Force objective. We also made an in-depth analysis of one of FFT's reviewed variation-in-quantity formulas, reviewed DCAA's determination of recommended general and administrative expense rates, and made selected tests of proposed material costs to the contractor's purchase order files. The results of our review are discussed below.

MATERIAL COST

The estimated material cost of about \$926 million represents 55 percent of the target cost in the Air Force objective. This cost element includes standard material and variances for both Air Force and European Participating Government (EPG) engines. Our main effort was directed towards analyzing the Air Force's development of the standard material cost, which amounted to about \$839 million, or 90 percent of the total material dollars.

Standard material

We met with FFT members and discussed the rationale used to develop the domestic material standards. They were able to adequately explain their positions which, in some instances, were judgmental. We traced the computations of the standards back to the workpapers and verified their accuracy. In a few instances, the team omitted cost data or made computation errors which caused the material standards to be either overstated or understated in a given year. However, we do not believe the overall difference would have materially changed the Air Force objective.

Initially, the four European companies will buy raw material and furnished parts entirely from P&WAG. An Air Force official said that the EPG standard material could be lower than the domestic standard, because EPG material would have a longer leadtime. Therefore, the material would be purchased sooner and would have less chance to escalate in price.

Air Force officials stated they used similar methodology to develop EPG material standards as they did for domestic material standards. However, FFT could not demonstrate mathematically how they developed the EPG standards because workpapers were not available and they could not recall exactly how it was done. In order to reconstruct the computations, we applied the same rationale that the Air Force used to develop domestic standards and made certain assumptions to come reasonably close to the FFT stated and EPG standard amounts. FFT agreed with our logic, and we were able to satisfy ourselves that the Air Force's methods were consistent for both domestic and EPG standards.

FFT's methodology appeared to be adequate to establish a reasonable Air Force negotiation objective.

We also examined purchase orders at the contractor's plant that represented 14.5 percent of standard material cost. This examination included selecting all 20 purchase orders which had a per engine value of \$1,000 or more but were not based on firm prices at the time of the DCAA audit. We traced these parts to the contractor's purchase order file to determine whether the prices were current, accurate, and complete as of the close of negotiations.

We found a net reduction of 2 percent for the 20 purchase orders. This was comparable to the decrement factor of 2.6 percent which had been applied to the not-to-exceed purchase order amounts included in the contractor's proposal.

LABOR COST

In P&WAG's standard cost system, the total cost for labor is comprised of base standard cost plus labor variance. The Air Force objective for labor cost was \$69,001,709, which included \$34,793,369 for standard labor and \$34,208,340 for variances. These costs included an adjustment of the Air Force F-16 domestic standard labor cost for EPG coproduction efforts.

Standard labor

The contractor's proposal reportedly did not include any improvement in machining and assembly and test labor time standards. In order to determine whether there had been any improvements in the standards, FFT analyzed historical standard labor data obtained from contractor records. Based on this analysis, FFT concluded that there had been little or no improvement in the standards for 60 out of 100 parts that it was able to trace in the contractor's records. Further, FFT concluded that the contractor-proposed standards were acceptable based on this data and their experience with other aerospace companies.

With regard to labor rates, FFT used the contractor-proposed January 1, 1977, average rates as a basis for escalation since DCAA had audited the individual departmental rates and found them to be acceptable. These rates were escalated based on Bureau of Labor Statistics forecasted indices for the category "Aircraft Engine Labor."

We reviewed the FFT workpapers on machining and assembly and test labor standards and selectively verified the accuracy of computations. Although we found mathematical errors and other minor discrepancies, we do not believe they would affect FFT's conclusions. Although there may have been alternative methods that could have been used by the team, the methodology followed appeared adequate to establish a reasonable Air Force objective.

GENERAL AND ADMINISTRATIVE EXPENSES

The contractor's Government Products Division (GPD), General and Administrative Expenses (G&A), is comprised of four categories: basic GPD operations expense, advanced systems and programs, independent research and development and budget proposal preparation, and product support. The G&A rates are negotiated for use in all GPD contracts and established in forward pricing agreements. Thus, the DCAA analysis of G&A is a continuing function and applies to contracts other than the engine contract under this review.

The Air Force's price negotiation memorandum showed a negotiated reduction of \$51.2 million from the contractor's March 21, 1977, proposal of \$212.1 million for general and administrative expenses. While we noted that the memorandum refers to FFT's detailed efforts in establishing the G&A expense negotiation objective, we directed our review to DCAA's analysis of G&A expense because of its continuing effort in this area.

We reviewed DCAA working papers supporting its recommended G&A expense rates and verified that DCAA reviewed cost and pricing data and eliminated a number of contractor-proposed expenses. However, we found that since P&WAG's Government Products Division was only recently organized, many of the cost estimates were based on projected costs for the new organization.

The negotiated composite G&A expense rate was slightly less than the DCAA recommended rate. The contractor's actual experience for fiscal year 1977 and through the first 4 months of fiscal year 1978 shows the rate running somewhat higher than the DCAA recommended rate.

We believe DCAA's analysis sufficiently established a reasonable negotiation objective and that the negotiation was consistent with the objective.

DELETION OF EPA CLAUSE

The contractor's March 21 and July 5, 1977, proposals were stated to be based on nominal escalation indices versus present economic trends. The proposals were prepared on the basis that a clause would be included in the contract modification which authorized a flow-through

reimbursement to P&WAG of the cost incurred for escalation above the nominal rate. However, the Air Force concluded that an economic price adjustment (EPA) clause was inappropriate for proposing domestic costs because P&WAG material and labor costs were well defined.

P&WAG's March 1977 proposed target costs were \$446 million higher than the Air Force's using the same nominal indices as the contractor was stated to have used. This difference indicated to the Air Force that P&WAG may not have used nominal indices. Based on rough calculations, the Air Force estimated that including the EPA clause would have resulted in an unnecessary additional cost of between \$250 and \$300 million.

During negotiations, the Air Force requested that P&WAG delete the EPA clause and allow costs to be negotiated within the present economic environment. The EPA clause was eliminated for domestic production but an EPA clause was included in the contract for the European portion of the F-16 program, due to the uncertainty of the economic climate in Europe.

As stated, the Air Force estimated that eliminating the EPA clause saved a minimum of \$250 million, providing some of the P&WAG cost included current economic indices. A comparison of the March 1977 P&WAG proposed costs of \$1,952 million (with the EPA clause) with the negotiated cost settlement of \$1,787 million (without the EPA clause) tends to support the Air Force's belief that some current economic indices were used by the contractor.

According to the Air Force, the EPA clause could have served as a vehicle for allowing the contractor a bonus. Including the EPA clause would not have unjustly rewarded P&WAG if their costs were based solely on nominal indices. The Air Force's position is judgmental, and they did not retain supporting computations for the estimated minimum savings of \$250 million. We believe it would be extremely difficult to accurately estimate the potential savings. However, we believe that deleting the EPA clause probably resulted in significant savings.

AIR FORCE REVIEW OF VARIATION IN
QUANTITY CLAUSE IN FABRIQUE NATIONALE
PURCHASE ORDER

Contract 0377 has a variation-in-quantity (VIQ) clause, which is based on a complex computer pricing model. It

allows the Air Force to unilaterally exercise production options for any quantity of engines within specified ranges without renegotiating their price. Throughout negotiations, Air Force engine quantities were stated to have changed on a day-to-day basis as new requirements were generated. However, negotiations were based on fixed-engine quantities, and the VIQ model was used for pricing purposes when the quantities required varied from those negotiated.

After negotiations were concluded on October 14, 1977, Air Force requirements became fixed for Lots VI, VII, and VIII for the F-16, and Lots VI and VII for the F-15. These required quantities differed from the quantities fixed for negotiation purposes and the prices were determined through the use of the VIQ model.

P&WAG has 11 purchase orders with its four European coproducers. Each purchase order has a VIQ clause. FFT reviewed the VIQ clauses in these purchase orders, and we examined how FFT reviewed the Fabrique Nationale purchase order for core modules and part sets.

One of the FFT's objectives during its review of the coproducer VIQ clauses was to ensure that the Air Force paid P&WAG the same firm-fixed-price that P&WAG paid its coproducer. The VIQ clauses are very complex, using multiple learning curves and other factors.

FFT's approach was to learn how each VIQ clause worked, ensure that it worked correctly, recommend changes to the contract VIQ clause, and establish negotiation positions. Our review showed that FFT extensively analyzed the formulas both manually and through the computer. They also questioned P&WAG on various aspects of the formulas and requested additional data when needed. At the time the VIQ computer model was incorporated into contract 0377, the Air Force and P&WAG reconciled the coproducer purchase order values to within \$1 for the quantities included in the purchase orders.

Although the Air Force review of coproducer VIQ clauses did result in some corrections or changes being made, the VIQ clause in the Fabrique Nationale purchase

order was incorporated into the contract essentially unchanged. FFT's work on the VIQ clause in this purchase order appears to have been adequate to determine that the formula worked properly and developed accurate costs based on the amounts in the purchase order.

CONCLUSION

Our selective analysis of the work performed by the various Defense team members indicated that a comprehensive and thorough analysis of the contractor's proposal(s) had been made. We found no indication that the established negotiation objective and the final negotiated price was other than fair and reasonable. However, there could be conditions not discernable at the time of our review that a postaward audit at the conclusion of contract performance might disclose which could modify this determination.