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

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JUL 2 1971

Dear Senator Humphrey:

In your letter received by us on February 17, 1971, you requested our comments on a letter from Mr. David R. Hammer in which he expressed concern about the increase in cost to the National Aeronautics and Space Administration (NASA) of the lunar-roving vehicles being manufactured by The Boeing Company. Mr. Hammer also inquired why the contractor would not be penalized for the increased costs.

On March 2, 1970, NASA awarded cost-plus-incentive-fee contract NAS8-25145 to The Boeing Company for the design, development, manufacture, and delivery of four lunar-roving vehicles.

We examined contract NAS8-25145 at NASA Headquarters, Washington, D.C.; reviewed NASA's records pertaining to the amount of, and reasons for, the increased costs; and held discussions with cognizant agency officials. We did not make a detailed analysis of the reasons cited by NASA for the increased costs. The results of our examination are discussed below.

CONTRACT COST

The news clipping enclosed with Mr. Hammer's letter did not mention the type of contract that was used for this procurement, and it appears that Mr. Hammer may have been under the impression that Boeing was awarded a firm-fixed-price contract. Under a firm-fixed-price contract, the price is not subject to adjustment because of the contractor's cost experience during the performance of the contract even though unexpectedly high costs may result in a loss to the contractor. A firm-fixed-price contract is normally used where performance has been demonstrated and where technical and cost uncertainties are low.

NASA's contract with Boeing for the lunar-roving vehicles, however, is a cost-reimbursement-type contract. A cost-reimbursement contract is normally used where performance has not been demonstrated and where technical and cost uncertainties make the use of a firm-fixed-price contract inappropriate.

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Under a cost-reimbursement contract, the contractor is reimbursed for the actual cost of performance, subject to certain restrictions and limitations. The contractor may, with the approval of the contracting officer, incur costs in excess of the original cost estimate, since it is recognized that the nature of the contract task makes it impossible to accurately estimate costs in advance of performance under the contract.

The original cost estimate included in contract NAS8-25145 was $18,673,000. As of March 29, 1971, the estimated cost was $37,839,000, an increase of $19,166,000. NASA advised us that about $1,600,000 of this increase was the result of changes in the scope of the contract. Of the remaining cost increase of $17,566,000, NASA attributed about $8,050,000 to Boeing and about $9,450,000 to Boeing's major subcontractor. We did not verify the validity of the classification of the increased costs.

NASA officials informed us that the portion of the increased costs attributable to Boeing resulted largely from the relocation of Boeing's operations from Huntsville, Alabama, to Seattle, Washington, and from problems in the welding of the aluminum chassis, the design and fabrication of the navigation test set, and the design of the deployment system. They informed us also that General Motors Corporation, Boeing's major subcontractor, initially underestimated the cost of its effort to design and develop the mobility portion of the lunar-roving vehicles. For example, the officials stated that problems were encountered in the evolution of the vehicles' wire wheels and in the design of the hand controller and electronic drive control and that these problems led to increases in the estimated costs.

BOEING's FEE

Mr. Hammer inquired why Boeing would not be penalized for the increased costs being experienced. NASA officials have advised us that they expect that Boeing will be penalized under the incentive-fee provisions of the cost-plus-incentive-fee contract.

A cost-plus-incentive-fee contract specifies a target fee and provides for an increase or decrease in the fee in accordance with the degree to which a combination of predetermined cost, schedule, and performance targets are met by the contractor. The target cost and fee are negotiated on the basis of the contracting parties' best estimates of the reasonable cost of performing the work called for by the contract. The Department of Defense and NASA Incentive Contracting Guide states that selection of this type of contract generally indicates that cost and performance uncertainties are such that a wide range of outcomes is possible.

Contract NAS8-25145, as amended as of March 29, 1971, provides for a target fee of $1,570,955, if all four lunar-roving vehicles perform successfully and if the target cost is not underrun or overrun. The contract provides also for a bonus of $50,000 for each lunar-roving vehicle which weighs no more than 380 pounds or 20 pounds less than the specified weight at acceptance, whichever is greater. A maximum fee of $2,612,486 is payable if all the lunar-roving vehicles perform successfully and if there is a target cost underrun of 15 percent or more. A minimum of $188,576 is payable if none of the lunar-roving vehicles perform successfully or if there is a target cost overrun of 25 percent or more. The contract provides further for assessing a penalty against Boeing for failure to meet scheduled delivery dates. In no event, however, is the fee to be reduced below the specified minimum fee.

The estimated costs under the contract, as of March 29, 1971, were more than 25 percent in excess of the target cost and should result in the contractor's receiving the minimum fee.

In regard to the penalties that may be assessed under the contract for late delivery of specified items, we noted that a lunar-roving-vehicle training unit was delivered 53 days after the scheduled delivery date. Under the terms of the contract, this late delivery could result in a fee penalty up to $265,000. This penalty, however, will not be assessed if Boeing is in a minimum-fee position at the time of contract completion. At the time of our review, the first lunar-roving vehicle was the only other item of hardware which had been delivered and which was subject to the penalty provision for late delivery. This vehicle had been delivered 2 weeks ahead of schedule.

Boeing will not be entitled to the $50,000 bonus for weight reduction for the first lunar-roving vehicle because the vehicle weighed about 490 pounds, or about 90 pounds over the specified acceptance weight of 400 pounds. A NASA offical stated that Boeing was not expected to earn a bonus on the remaining vehicles.

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We did not provide NASA with a copy of our draft report for comment, and copies of this report have not been furnished to NASA. As requested, we are returning Mr. Hammer's letter to you.

Sincerely yours,

Elmer B. Staats

Comptroller General
of the United States

Enclosure

The Honorable Hubert H. Humphrey
United States Senate