DOCUMENT RESUME

06646 - [B1926953]

[Alleged Contractor Deficiencies in Modifying Minuteman Missile System]. PSAD-78-124; B-146876. July 7, 1978. Released July 14, 1978. 5 pp. + enclosure (12 pp.).

Report to Rep. Ron Marlenee; by Elmer B. Staats, Comptroller General.

Issue Area: Federal Procurement of Goods and Services: Notifying the Congress of Status of Important Procurement Programs (1905).
Contact: Procurement and Systems Acquisition Div.
Budget Function: National Defense: Department of Defense - Procurement & Contracts (058).
Organization Concerned: Department of Defense; Department of the Air Force: Malmstrom AFB, MT; Boeing Co.; H. C. Smith Construction.
Congressional Relevance: Rep. Ron Marlenee.
Authority: Air Force Contract Management Division Regulation 74-1.

Quality assurance deficiencies were alleged in the Air Force program to modify Minuteman silos at Malmstrom Air Force Base. The principal Air Force contract is with the Boeing Company. The allegations relate mainly to work performed by the subcontractor, H.C. Smith Construction, and involve substandard welds, routine acceptance of work not meeting specifications, inadequate testing and use of test results, lack of qualified inspectors, nonperformance of required visual inspections, and the implications of these problems on national security. Boeing encountered quality problems in the welding processes that H.C. Smith Construction used in the modification process. The Air Force accepted 50 silos before it discovered the weld problem, and these silos are now suspected of having substandard welds. There was no evidence that the Air Force routinely accepted work reported as defective by its inspectors. If the Air Force knowingly accepted work not in conformance with contract specifications, acceptance was justified on the basis of economic and technical merits. The contract specified visual weld inspection only, with no routine requirements for physical testing. Both Boeing and the Air Force used noncertified weld inspectors; until recently, the Air Force provided little or no technical training to its weld inspectors. There is no indication that any of these deficiencies will have any significant effect on system effectiveness or national security. (RRS)

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

B-146876 July 7, 1978

The Honorable Ron Marlenee
House of Representatives

Dear Mr. Marlenee:

As requested in your February 23, 1978, letter and subsequent contact with your Great Falls office on March 1 to 3, 1978, we reviewed alleged quality assurance deficiencies in the Air Force program to modify Minuteman silos at Malmstrom Air Force Base, Montana.

We made our review primarily at the Minuteman Site Alteration Task Force office (Wing I) and the Boeing Company site office, Malmstrom Air Force Base, Montana, with limited work at the Minuteman System Program Office, Norton Air Force Base, California, and Headquarters, Air Force Contract Management Division, Albuquerque, New Mexico.

We examined contract files and specifications, quality assurance records, reports, policies, and procedures. We discussed the allegations with five of the principals who brought the alleged problems to your attention. We also discussed pertinent matters with Air Force officials administering the modification program. As discussed with your office, we did not review the allegation of physical threats against Air Force quality inspectors, nor did we request any comments on this report from the Department of Defense or the contractors involved.

INTRODUCTION

When Minuteman sites are in a strike posture, the Strategic Air Command is responsible for their operation. As sites are inactivated for modification, responsibility is transferred to a site alteration task force office, which is responsible to the Air Force System Command.

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The Malmstrom Air Force Base organization responsible for quality assurance, although administratively under the site alteration task force, functionally reports to Headquarters, Air Force Contract Management Division, through its plant representative office at the Boeing Company, Seattle, Washington.

The Air Force is modifying Minuteman sites at Malmstrom Air Force Base, has completed modifications at other locations (Cheyenne, Wyoming, and Minot and Grand Forks, North Dakota), and is beginning site modification at Wing IV, Whiteman Air Force Base, Missouri. The purpose of the modification program is to harden the silos, to reduce Minuteman system vulnerability to nuclear attack. The total program at Malmstrom Air Force Base totals about $505 million.

The principal Air Force contract is with the Boeing Company ($165 million), to strip out old equipment, tear down and rebuild parts of the silos, and install new Government-furnished equipment. Boeing subcontracted with H. C. Smith Construction to perform site dismantling and demolition, modification and upgrade of structural steel, installation of large assemblies, and installation of grout, a concrete-like material. The subcontract with H. C. Smith Construction totals $55 million.

There are 200 silos at Malmstrom Air Force Base which will be modified, with 80 incomplete as of May 4, 1978. The modification program commenced in November 1976 and is scheduled for completion in January 1979.

FINDINGS

The allegations relate mainly to work performed by H. C. Smith Construction and inspections and acceptance of that work by Air Force personnel. The principal allegations we reviewed concerned substandard welds, routine acceptance of work not meeting specifications, inadequate testing and improper use of test results, lack of qualified inspectors, nonperformance of required visual inspections, and the implications of these problems on national security.

Substandard welds

The Boeing Company encountered quality problems in welding processes H. C. Smith Construction used in the modification program. The Air Force accepted 30 silos

before it discovered the weld problem, and these are now suspected to have substandard welds. An additional 40 silos, not accepted by the Air Force, are also suspected to have substandard welds. Total reliance on visual inspections, lack of qualified inspectors, and possible nonperformance of required inspections contributed to the late discovery of weld problems. Based on the Air Force determination of substandard welding, H. C. Smith Construction installed an improved welding process. A group of welding consultants, hired by the Air Force, determined that the new process is producing welds which meet industry standards.

Sites at Malmstrom Air Force Base suspected of having substandard welds will be reentered and corrections will be made, if necessary. Responsibility for these costs, which are unknown at this time, will be determined by the Air Force on the basis of a study of its contract with Boeing and consideration of the warranty provisions in Boeing's subcontract with H. C. Smith Construction.

Acceptance of work not meeting specifications

We found no evidence to indicate that the Air Force routinely accepts work reported as defective by its inspectors. In those cases where the Air Force knowingly accepted work not in conformance with contract specifications, acceptance was justified on the basis of economic and technical merits. Additionally, Air Force engineers determined, independent of the quality function and in conjunction with the architect-engineer, that system integrity would not be impaired by the deviation from specifications. For example, concrete surrounding a personnel access hatch was not properly cured. The Air Force determined that it would not affect system integrity and did not require rework.

Inadequate testing and improper use of test results

The Air Force contract with the Boeing Company, based on recommendations of the architect-engineer in accordance with industry practice, specified visual weld inspection only, with no routine requirements for physical testing. These visual inspections generally were carried out but failed to detect substandard welds. After the Air Force confirmed weld quality problems in July 1977, it directed

Boeing to commence physical testing on welds to verify the adequacy of visual inspections. Such testing then became the basis for acceptance or rejection of completed silos. In all cases physical test results were properly used in determining whether to reject or accept completed silos.

Lack of qualified inspectors and inspections

The Boeing Company and the Air Force used noncertified weld inspectors. We did not review training provided to Boeing inspectors but found that, until recently, the Air Force provided little or no technical training to its weld inspectors. In April 1978 a group of welding consultants, hired by the Air Force, concluded that some required visual inspections had been performed improperly. Other data suggests that a few inspectors may not have performed required visual inspections. The Air Force has begun an investigation of these matters and has promised corrective action.

National security implications

Based on extensive analysis of destructive test results from those sites where some deficient welds exist, the Minuteman System Program Office initially determined that, at Wing I and other Minuteman Wings previously modified, there will be no significant effect on overall system integrity or national security. However, based on data to be collected from additional testing during the planned reentry program, the Air Force will reexamine the effect on overall system effectiveness. System Program Office officials do not expect the additional data to change their current assessment on overall system effectiveness.

AIR FORCE ACTIONS

The Air Force has taken positive action to correct the weld quality problem and has recently appointed a management review team to review other problems. Based on recommendations of the management review team, the Commander of the Air Force Contract Management Division is committed to take corrective action on inspector qualifications, training, and performance of required inspections.

The System Program Office has required, by contract, that the Boeing Company certify its weld inspectors at

Whiteman Air Force Base, Missouri, to the standards of the American Welding Society.

CONCLUSIONS

Weld quality deficiencies were experienced in the modification program at Malmstrom Air Force Base. Corrective action has been positive, and currently welds are meeting industry standards. Sites suspected of having substandard welding will be reexamined and corrective action will be taken. There is no indication that these deficiencies will have any significant effect on system effectiveness or national security. The Air Force is taking action for certification, qualifications, and training of its inspectors.

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Details of our investigation of these and other less significant allegations are presented in the enclosure to this report. As arranged with your office, we will provide copies of this report to the Secretary of Defense, agency officials, and other interested parties 7 days after it is delivered to you.

Sincerely yours,

Comptroller General
of the United States

Enclosure

INDEX TO ALLEGATIONS

ENCLOSURE I

SUBSTANDARD WELDS

It was alleged that the subcontractor, H. C. Smith Construction, was producing welds of poor quality and that the Air Force was accepting silos with deficient welds.

Findings

The Boeing Company, under its contract with the Air Force, provides an end product which meets technical specifications. Boeing inspectors are responsible for quality control. The Air Force is required to assure that a quality product has been provided before accepting it. Air Force inspectors are responsible for site acceptance.

Potential welding problems were discovered by the Air Force in February 1977. Tests were performed and in July 1977 some poor quality welds were confirmed. By that time the Air Force had approved and accepted 30 silos. Forty other completed silos are suspected to have substandard welds but have not been accepted by the Air Force. Factors contributing to Air Force's failure to detect substandard welds are included on page 4 of this enclosure. The Air Force has taken positive steps to correct the quality problem. In August 1977 the System Program Office directed the Boeing Company to institute a nondestructive testing program to assure that weld quality was acceptable. Although the testing requirement was withdrawn in March 1978 because Boeing's quality program was recertified, Boeing Company is voluntarily continuing a reduced testing program to assure that visual inspection is detecting weld deficiencies.

The Air Force Contract Management Division's Seattle representative withdrew approval of one part of the Boeing Company's quality program for 8 months (August 1977 through March 1978) until Boeing demonstrated adequate control over the welding process.

H. C. Smith Construction implemented an improved welding process in September 1977. A group of expert welding consultants, hired by the Air Force, concluded that the improved process is producing welds which meet normal industry standards.

In September 1977 the Air Force changed the emphasis of its quality inspectors by focusing its attention on nine specific inspection areas. Prior to this action, Air Force inspectors had no specific guidance regarding which welds were the most important to system integrity.

ENCLOSURE I

Since the weld problem was confirmed, a number of silos were rejected and rework was required to bring them up to industry standards before final Air Force acceptance. A reentry program is planned to determine the significance of the weld program in the first 50 sites modified.

At Wing I and previously completed Minuteman Wings, the Air Force contracted with the Boeing Company under a fixed-price incentive arrangement. At Wings previously modified, the Air Force gained combined financial benefits of about $7 million because work was accomplished at a cost below original estimates. Due to problems experienced at Malmstrom AFB, cost overruns have occurred and the reentry program will add to these overruns. Under terms of the contract, the Air Force pays 75 percent of cost overruns until the total cost reaches $161 million. Contract costs beyond $161 million are absorbed totally by the Boeing Company.

The Procuring Contracting Officer said that any estimate of reentry cost to be absorbed by the Air Force at this time would be speculative, since settlement negotiations are currently in process and many legal issues must be resolved. The Air Force must study provisions of its contract with Boeing and consider warranty provisions in Boeing's subcontract with H. C. Smith Construction before a final settlement is reached.

Conclusions

The Air Force has taken positive action and the weld problem has been corrected.

ACCEPTANCE OF WORK NOT MEETING SPECIFICATIONS

It was alleged that the Air Force is routinely accepting work not meeting specifications, thus diluting the quality of the end product.

Findings

Work not meeting specifications is reported by Boeing and Air Force quality inspectors on "Unplanned Event Rejection" documents. Since the start of the Wing I modification program, Boeing inspectors reported 11,300 deficiencies (through January 27, 1978), of which 9,600 have undergone final processing. The recommended disposition on 863 (9 percent) deficiencies was to "use as is." Air Force quality inspectors reported an estimated 1,900 deficiencies from program

inception through April 5, 1978. About 7.6 percent were accepted "as is."

When a recommendation is made to accept items not meeting technical specifications without rework, a Material Review Board, consisting of Air Force and Boeing quality and engineering representatives, decides on the final disposition. The Board considers technical and economic merits of the recommendations and a determination is made that overall system performance will not be compromised.

We statistically sampled Boeing-generated deficiencies accepted without rework and all Air Force-generated deficiencies. The results showed that all were properly reviewed and that decisions to accept items without rework had no effect on system performance. In some cases the decision to accept work "as is" was due to preexisting site conditions resulting from original silo construction (early 1960s). In such cases special solutions, which required specification deviation, had to be found.

Conclusions

The Air Force has adequate controls to assure that work not meeting specifications is properly reviewed before acceptance.

IMPROPER USE OF TEST RESULTS

It was alleged that the Air Force is not counting all defects reported from ultrasonic tests and that sites are being accepted which should be rejected.

Findings

While the weld quality problem was being resolved, the Air Force was basing weld acceptance on ultrasonic test results. Tests were performed on a sample basis. The sampling plan specified that any site having 4 or more failures (of a total sample size of 50) would be rejected, reworked, and retested.

We reviewed data for all sites where ultrasonic defects were reported (31 sites). Six sites had four or more weld deficiencies and, therefore, met the sampling plan criteria for rejection. The Air Force rejected five sites; they were subsequently reworked and accepted. The Air Force accepted the other site for two reasons: (1) all four sample failures

occurred in the same weld and (2) due to a design variation, which occurred during original silo construction, a condition existed in that weld location which may have caused erroneous test results. The weld was reworked and the site was accepted.

Conclusions

The Air Force is applying test results consistent with established criteria in determining whether to accept or reject silos.

LACK OF QUALIFIED INSPECTORS

It was alleged that Air Force quality inspectors had not received adequate technical training and are not qualified to inspect welds.

Findings

Before identifying weld quality problems at Wing I, the Air Force had not provided formal technical training to its quality inspectors; little training has been provided since. Site alteration task force officials said that there was a lack of time and funds to accomplish adequate training.

A group of welding experts, hired by the Air Force, concluded that inspector training and qualifications needed improvement. They recommended that contractor inspectors be certified by the American Welding Society, or its equivalent. The Air Force responded to this recommendation by requiring (in its contract with Boeing at Whiteman AFB, Missouri) that contractor weld inspectors be certified by the American Welding Society. Also, the Air Force will contract with the Hobart Welding School to provide training (beginning in June 1978) to Air Force inspectors and will encourage them to become certified.

Conclusions

Proper training has not been provided to Air Force inspectors. The Air Force is taking action to improve qualifications of contractor and Air Force inspectors.

NONPERFORMANCE OF REQUIRED VISUAL INSPECTIONS

It was alleged that some Air Force and contractor inspectors are not performing all required visual inspections.

ENCLOSURE I

Findings

The Air Force hired eight independent welding experts in February 1978 to review the Malmstrom welding program. The group concluded that, in some cases, weld inspections were either (1) not being performed properly or (2) not being performed at all. They recommended that the Air Force initiate its own physical testing program to assure that inspectors are detecting defects.

We reviewed deficiencies reported by Air Force quality inspectors. These statistics showed that 15 inspectors, who have been with the program a year or more, had reported an average of 9 deficiencies in inspecting the work at Malmstrom, while the overall average is 39. Over 60 percent of the deficiencies were reported by 11 inspectors. Although not conclusive, this data suggests that some Air Force inspectors either (1) are not performing required inspections or (2) are handling detected deficiencies informally.

Air Force officials agreed with the possibilities suggested by the welding experts and the data we developed. The Air Force Contract Management Division appointed a management review team to develop recommendations for correcting this problem. The Air Force plans to initiate a spot physical test program at Whiteman AFB, Missouri, to verify the adequacy of visual inspections.

Conclusions

The Air Force weld inspection program has not assured that inspectors are carrying out inspections properly, and it is questionable whether all required inspections are being performed. Corrective action has been promised by the Air Force.

INFERIOR GROUT

It was alleged that grout, which did not meet specifications, was installed in a few silos.

Findings

Technical specifications require that grout used in silos must have a strength of 7,500 pounds per square inch (psi). Grout is procured from Master Builders, Salt Lake City, Utah, and before it is shipped to Malmstrom, it must be tested by an independent laboratory and certified to meet design strength.

Due to an administrative error, one batch of grout was shipped to Malmstrom and installed in four silos before test results were confirmed. Initial tests showed that the grout strength equaled about 7,000 psi. The Air Force accepted those sites without rework because grout strength exceeded the design strength requirement of existing adjacent concrete (3,750 psi). Subsequently, the grout was retested and demonstrated to meet or exceed design strength requirements.

The Boeing Company improved administrative controls to assure that test results are verified before grout is installed and that there have been no further problems.

Conclusions

Grout installed in Wing I silos meets design strength requirements.

AIR FORCE QUALITY ASSURANCE INSPECTORS ARE PERFORMING QUALITY CONTROL FUNCTIONS

It was alleged that Air Force quality assurance inspectors are engaged mainly in visual product inspection, thus limiting the time available to assess the contractor's overall quality program.

Findings

Between 70 percent and 90 percent of Air Force inspectors' time is spent conducting visual product inspections. Such activity is according to Air Force regulations. Air Force Contract Management Division Regulation #74-1 provides:

> "The Government may elect to determine the quality of specific characteristics on selected product items independent of the contractor's inspection activity. The requirement for this category of Mandatory Product Control originates from three sources:
>
> (1) By Department, Command or Division level directives.
>
> (2) By direction of the System Program Office (SPO)
>
> (3) By a formal quality assurance plan developed jointly by the detachment Quality Assurance Division and the SPO.

"When MPC-A is established, the AFQAR will evaluate each requirement to identify specific characteristics for inspection or test related to the requirement."

Air Force Contract Management Division officials stated that visual product inspection is as important to the quality assurance function as other parts of its program which assess a contractor's overall quality control system.

There is a group at Wing I responsible for auditing the overall contractor quality control system.

As part of an overall quality assurance program, the Minuteman System Program Office has directed mandatory product inspections of welding operations. Air Force inspectors also conduct other operational and product inspections.

Conclusions

Inspections required by the Air Force are in accordance with applicable regulations and are part of an overall quality assurance program.

POTENTIAL CONFLICT OF INTEREST IN SELECTING THE SUBCONTRACTOR

It was alleged that a certain influential individual (not in Boeing) may have financial interests in H. C. Smith Construction and could have influenced that company's selection as subcontractor.

Findings

All stock in H. C. Smith Construction and its parent company, Owl Rock Products Company, Incorporated, is owned by two individuals, neither of whom was the individual named in the allegation. The Boeing Company also certified that it has no financial interest of any kind in H. C. Smith Construction or its parent company.

Conclusions

There is no evidence to support the allegation.

POTENTIAL EMPLOYEE CONFLICT OF INTEREST

It was alleged that a certain Air Force quality assurance employee may have potential financial and other conflicts of interest.

Findings

We discussed the potential conflict of interest with one of the quality supervisors who was involved in making the allegation. No documentary evidence could be provided, and we were told that the allegation was speculative and based on hearsay.

Conclusions

There is no evidence to support this allegation.

AIR FORCE QUALITY INSPECTORS RECEIVE VERBAL HARASSMENT FROM CONTRACTOR AND SUBCONTRACTOR PERSONNEL

It was alleged that Air Force inspectors are frequently harassed verbally upon submitting quality deficiencies to H. C. Smith and Boeing site personnel.

Findings

Four principals who brought the alleged problems to your attention stated that inspectors are subjected to verbal harassment while attempting to do their job.

Prior to April 17, 1978, a few formal incident reports were filed by Air Force inspectors. The Chief, Malmstrom Minuteman Division, issued a memorandum dated April 17, 1978, encouraging all Air Force inspectors to document and report instances of harassment. Between April 17 and May 4, 1978, one formal incident report was filed. As a result, the site alteration task force office met with about 30 representatives of the Boeing Company, H. C. Smith Construction, and the Air Force inspectors to resolve the problem.

Task force officials said that there are instances of verbal harassment by contractor personnel and also indicated that Air Force inspectors are, in some cases, verbally intimidating contractor personnel.

The Commander, site alteration task force, stated that he will not tolerate abuses from any party toward another, but without formal reports detailing specifics, he is unable to take effective action.

Conclusions

We agree with the task force commander's position regarding the need for specifics before effective action

can be taken. The Air Force has taken a positive first step in requesting formal incident reports. Discussions with the affected parties, as were recently conducted, is a positive way to help direct the program toward a professional level.

INADEQUATE TESTING

It was alleged that nondestructive testing should be required in the contract with Boeing because visual inspection was inadequate to detect deficient welds.

Findings

The American Welding Society Welding Inspector Certification Manual states:

> "* * * visual inspection, conscientiously applied before, during, and after welding, can eliminate 80 to 90% of the discontinuities that would be detected by other inspection methods. In fact, the ability to eliminate many discontinuities before the weld is completed is perhaps the most important feature of visual inspection."

The architectural and engineering firm for the Minuteman modification program determined that visual inspection was adequate in establishing the specifications for Wing I (Malmstrom). The System Program Office, before negotiating the contract for Wing IV (Whiteman), received confirmation from eight welding consultants that in-progress visual inspection is a reasonable and practical method of quality assurance and quality control when performed by qualified inspectors. The welding consultants, in addition to stressing weld inspector qualifications, recommended that nondestructive testing be used on a spot basis to support visual inspection and to check the performance of inspectors.

The Air Force is taking action to implement these recommendations by the welding consultants and has already required the Boeing Company quality inspectors at Wing IV to be certified by the American Welding Society. The Air Force will contract with the Hobart Welding School to provide weld inspection training to its own quality inspectors, with the first class scheduled to start June 19, 1978. The Air Force intends to implement the nondestructive test spot inspection as recommended.

Additionally, the System Program Office will contract with a professional engineering firm to provide full-time professional welding engineers at both Wing I and Wing IV to consult with Air Force quality inspectors as needed.

Conclusions

Visual inspection, when performed by qualified inspectors, is adequate to insure that welds meet the design specifications. The Air Force is taking, or intends to take, actions to improve inspector qualifications. Nondestructive test spot inspection will be implemented to support the visual inspection and to check the performance of inspectors.

NATIONAL SECURITY IMPLICATIONS

It was alleged that the substandard welds were substantially degrading Minuteman's system performance, thereby endangering the national security.

Findings

Minuteman system performance depends to a varying degree on a number of factors, including the integrity of welds in the Minuteman silos. Among other factors which affect Minuteman system performance are type and mix of missiles, sophistication of electronic equipment, and site stability, location, and distribution.

The Minuteman System Program Office extensively analyzes these and other factors as their condition changes, to assess the effect on overall system performance. Such an analysis was done using the results of the destructive testing of weld samples that confirmed the weld problem. This initial analysis projected the deficient weld quality found in these samples to previously modified wings as well as all of Wing I and determined that there would be no significant effect on overall system performance or national security.

This analysis will be repeated, with refined data from additional weld testing to be performed during the planned reentry program. System Program Office officials do not expect the additional data to change their current assessment of the welding problem effect on overall system performance.

ENCLOSURE I

Conclusions

The weld deficiencies are not expected to have a significant effect on Minuteman system performance and national security.

CHARGES FOR REWORK

It was alleged that the Air Force was paying for the rework of deficient products, primarily welds. Other finance related allegations concerned potential invalid or excessive payments for some work and the preparation of excess numbers of documents to justify a higher price when negotiating follow-on wing contracts.

Findings

The Air Force is not paying for any rework performed by the subcontractor, H. C. Smith Construction. The H. C. Smith Construction subcontract is for a fixed price of $55 million, and welding rework is covered by this subcontract.

The Air Force may pay for a part of the rework performed by the Boeing Company, depending on the final status of the contract. The Boeing Company has a fixed-price incentive contract with the Air Force. In this type of contract, a target cost excluding profit is established. The Air Force and Boeing share any underrun of the target cost on a 60/40 percent basis, respectively. When the contract is in this status, 60 percent of the cost of rework by Boeing is absorbed by the Air Force. Above the target cost, a maximum cost excluding profit is established, called the point of total absorption. Between the target cost and the total absorption point, the Air Force and Boeing share costs of the overrun on a 75/25 percent basis, respectively, including any rework by Boeing. Above the total absorption point, all costs will be absorbed by Boeing.

Among the other related allegations were two pertaining to potential invalid and excessive payments for some work. When either Boeing or Air Force inspectors find work that is not according to specifications, an "Unplanned Event Rejection" form is prepared. This document is used to control the disposition of the nonconforming work. A part of the dispositioning process is the determination of whether the work involved falls within the scope of the contract. The usual reason for the work not being within the scope of the contract is that the site, as originally built, deviates from the plans furnished to the Boeing Company by the Air

Force. This "out-of-scope" work is properly an additional charge to the Air Force and is coded as such on the unplanned event record. Also entered is an estimate of man-hours required to do the work.

The Administrative Contracting Officer at Wing I reviews for validity all unplanned event records submitted for Air Force payment by the Boeing Company. The Administrative Contracting Officer receives technical assistance as needed from Air Force quality assurance and engineering personnel. The System Program Office, in May 1977, reviewed the adequacy of the Administrative Contracting Officer's control of Air Force payments for unplanned event records. They concluded that this control was adequate but recognized that a problem existed as to the inconsistency of man-hour charges. The Air Force is currently attempting to develop a method to achieve consistency of man-hour charges.

The final related allegation pertained to the production of excessive numbers of unplanned event records by the Boeing Company to justify a higher price when negotiating the contract for the next wing. System Program Office officials said that the numbers of documents prepared by the Boeing Company are not a factor in negotiating follow-on contracts. In our opinion, incentive features in the prime contract should discourage the Boeing Company from incurring unnecessary costs, since it shares in cost savings at a percentage higher than its normal profit margin.

Conclusions

The Air Force does not pay for any rework, including welding by H. C. Smith Construction. The Air Force may pay for a part of rework accomplished by the Boeing Company as a result of the incentive features of the contract.

The Air Force has adequate review to verify the validity of rework charges. The Air Force, however, has recognized the need for and is attempting to achieve consistency in the man-hour charges on these documents. It is not in the interest of the Boeing Company to incur unnecessary costs.