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The Navy's Proposed Procurement of Oilers. PSAD-78-64; B-133170. January 3, 1978. 5 pp. + 4 enclosures (7 pp.).

Report to Secretary, Department of Defense; by Richard W. Gutmann, Director, Procurement and Systems Acquisition Div.

Issue Area: Federal Procurement of Goods and Services (1900).
Contact: Procurement and Systems Acquisition Div.
Budget Function: National Defense: Department of Defense - Procurement & Contracts (058).
Organization Concerned: Department of the Navy; Avondale Shipyards, Inc.
Congressional Relevance: House Committee on Armed Services; Senate Committee on Armed Services.

In August 1976 the Navy awarded a $153 million contract to Avondale Shipyards, Inc., to construct two auxiliary oilers, and in January 1977 exercised an option for a third oiler at a cost of $63 million. By August 1977, 54 changes to the contract had been proposed, and Avondale had submitted proposals for changes exceeding $5 million. Findings/Conclusions: An examination of six of these changes showed that four resulted from defective specifications, plans, and data provided by the Navy. The other two resulted from basic design changes that the Navy was considering at the time the contract was awarded. According to cognizant Navy personnel, the defects were not identified before contract award because oiler design was not as extensively reviewed as higher priority combat ships. The Navy issued a request for proposal in August 1977 for construction of two additional oilers and since this time has issued four amendments and taken corrective action on design defects. The critical potential risk areas are those where the shipbuilder translates the contract specifications and preliminary drawings into detailed drawings and specifications. As of September 30, 1977, about 60% of basic design drawing work was complete in three areas, but a great deal of design work remains for six other areas. Although the Navy believes that there were no high-risk areas remaining in the major ship systems, GAO questioned whether the overall risk of additional major problems was low enough to warrant proceeding with the proposed procurement. Recommendations: Procurement of the new oilers should be delayed until significant defects in Navy-furnished specifications, plans, and data have been identified and resolved. The Navy should assure that, before awarding any further contracts for construction of ships, such plans and specifications are adequately reviewed. (Author/HTW)

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS ACQUISITION DIVISION

04683

B-133170 JAN 3 1978

The Honorable
The Secretary of Defense

Attention: Assistant Secretary of Defense
(Comptroller)

Dear Mr. Secretary:

As you know, we have maintained an interest in the shipbuilders' claims problem for several years. In a previous report to the Congress 1/ on the reasonableness of the Navy's settlement of four claims, we commented that many contract changes continue on relatively simple auxiliary oilers, which may lead to future claims.

We have further reviewed the procedures the Navy followed in awarding contracts to procure the oilers and noted a matter that warrants your attention. Despite possible deficiencies in the plans and specifications, the Navy is negotiating contracts for two additional oilers. We believe that you should consider deferring this procurement until you are confident significant deficiencies in the plans have been identified and corrected.

In August 1976 the Navy awarded a $153 million fixed-price incentive contract (N00024-76-C-2080) to Avondale Shipyards, Inc., to construct two auxiliary oilers, and in January 1977 exercised an option for a third at the cost of $63 million. However, by August 1977, before the keel for the first ship had been laid, 54 changes to the contract had been proposed. The most current information available shows that Avondale has already submitted proposals for changes exceeding $5 million, of which about one half has been settled.

We examined six of these changes in detail and found that four resulted from defective specifications, plans, and data

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1/"Shipbuilders' Claims--Problems and Solutions," (PSAD-77-135), Aug. 9, 1977.

PSAD-78-64
(950410)

provided by the Navy. The other two resulted from basic design changes that the Navy was considering at the time the contract was awarded.

The four changes relating to defective data were:

--The boilers and certain internal structures required redesign at a proposed cost of $723,000 because the guidance drawings specified boilers that were too large, allowing insufficient clearance for maintenance. (See enc. I.)

--The propeller assembly was redesigned because the propeller hub was too long and the calculated maximum stress exceeded the hub material strength. An initial contractor cost estimate for the redesign and related delay was $18 million. Subsequently, the Navy informed us that the shipbuilder's proposal, which is subject to negotiation, is keyed to the actual resolution required, with no delay, and is for about $84,000 per ship. This proposal does not rule out a later claim that the shipbuilder may make regarding the change. (See enc. II.)

--The type of drinking water fountains required change, at an estimated cost of $30,000, because a means for supplying coolant to chill the water was not provided. (See enc. III.)

--Equipment located near the main condenser had to be relocated at a proposed cost of $414,744 because there was not sufficient room for removal of the condenser tubes. (See enc. IV.)

We discussed these problems with the cognizant Navy organizations to determine why the defects were not identified before the contract was awarded and were told that the oiler design was not as extensively reviewed as higher priority combatant ships.

The Navy plans to award a contract to construct two additional oilers and issued a request for proposal (N00024-77-R-2143(S)) on August 18, 1977. Since August 1[illegible] the Navy has issued four amendments to the request for proposal and, together with changes to the basic specifications, has taken some corrective action on the design defects described above.

Avondale, however, continues to submit specification changes as it develops working drawings under the original contract.

The Navy informed us that the critical potential risk areas are those where the shipbuilder translates the contract specifications and preliminary guidance drawings into detailed drawings and specifications. As of September 30, 1977, about 60 percent of the basic design drawing work was complete in three areas where the bulk of the basic design effort occurs--hull, scientific, and mechanical design. On the basis of the above, the Navy estimated that the basic design development effort was to be complete by November 30, 1977. The Navy said experience shows that, during the early phase of the contract period, the detail designer will find most contract specification and drawing deficiencies.

However, we found six other areas for which a great deal of design work remains--outfitting, mechanical development, electrical, ventilation, joiner, and shipyard standards and sketches. In fact, only 17 percent of the total working drawings were complete as of November 1977, and changes will probably continue beyond the contemplated award.

The Navy believes that there are no high-risk areas remaining in the major ship systems and that all the significant problems uncovered to date by Avondale have been resolved with appropriate corrective action incorporated in the proposed contract technical package. Navy officials estimate that a 1-year delay in the proposed contract, to allow for 85-percent completion of working drawings, could result in a cost increase of about $24 million. The Navy also believes that the proposed contract should be awarded by March 31, 1978, as planned. The $24 million estimate is largely based on possible cost of workload disruption at Avondale if the proposed procurement is delayed for a year. There is, however, no assurance that Avondale will be the low bidder or, even if it were, that such costs can be passed on to the Government.

An Avondale representative told us that he believes most of the major dollar-value design problems have been discovered. He also agreed, however, that if more working plans were complete, there would be more confidence that most of the problems had been resolved.

All the significant problems identified to date were incorporated in the proposed technical package or made known to the prospective contractors. However, we question whether the overall risk of additional major problems is low enough to warrant proceeding with the proposed procurement at this time. It appears likely that additional major design problems will be encountered in view of the avoidable design deficiencies already discovered, the fact that this oiler design did not receive as extensive a review as is usually provided for combatant ships, and the fact that only 17 percent of the drawings are complete.

There is general agreement that changes are one of the more important avenues that generated past shipbuilders' claims. Further, Navy officials, in testimony before the Subcommittee on Defense, House Committee on Appropriations, stated that improving the quality of specifications, plans, and data was one of their specific programs designed to reduce future shipbuilders' claims.

In light of the continuing problem of shipbuilders' claims, the Navy should not award contracts until the specifications, plans, and data have been thoroughly reviewed, especially when it is likely that substantial changes and potential claims will result. For this reason, we recommend that you delay the the procurement of the new oilers until you are confident that significant defects in Navy-furnished specifications, plans, and data have been identified and resolved. Additionally, we recommend that the Navy assure that, before awarding any further contracts for construction of ships, such plans and specifications are adequately reviewed.

We are sending copies of this report to the Secretary of the Navy and the Chairmen of the House Committee on Government Operations, Senate Committee on Governmental Affairs, and House and Senate Committees on Appropriations and Armed Services.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate

Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. We would appreciate receiving a copy of these statements.

Sincerely yours,

R. W. Gutmann
Director

Enclosures - 4

ENCLOSURE I

BOILER FIT PROBLEM

The specifications provided that each ship will feature two top-fired, doubled-cased, land-base-tested boilers. During detailed design, Avondale determined that the ship's boilers would not fit into the space shown in the Navy contract guidance drawings. This problem was attributed to defects in Navy-provided drawings and has generated a proposal for a $723,000 increase in the contract target price.

PROBLEM IDENTIFICATION

Upon receipt of the boiler manufacturer's drawings, Avondale compared the drawing with drawings for web frames (outer structural components) it had prepared and with Navy-provided contract guidance drawings. Avondale asserted that the boilers were too large to fit without major redesign of the web frames and that there was insufficient clearance for maintenance. On March 10, 1977, Avondale notified the Navy of the problem, recommending design modifications to both the boilers and the web frames.

RESPONSIBILITY FOR THE PROBLEM

Navy agreed with Avondale's assertions and determined that the problem resulted from defective contract guidance drawings which "* * * posed impossibility of performance." Despite this determination, there is not unanimity within Navy as to the cause of the problem.

Certain Navy engineering personnel agree that the guidance drawings were defective and that the defect could have been easily detected during Navy's review of the drawings. However, Navy personnel of the organization responsible for the preparation and review of the drawings believe that because there are no general requirements for the amount of clearance, the boiler, as shown in the contract guidance drawings, would have been a tight but adequate fit. These officials acknowledge that the superheater access cavity, as shown in the Navy drawings, as obviously and mistakenly much larger than would ever be provided. They believe this superheater access cavity oversight is not relevant to the boiler fit problem.

We found that Avondale's web frame design substantially worsened the boiler fit problem, and that the boiler manufacturer may have increased the size of the boiler. Even so, we found no evidence that Avondale's independent design

ENCLOSURE I

effort or the manufacturer's changes to the boilers were considered by Navy in deciding responsibility for the problem.

CONTRACTOR PROPOSAL STATUS AS OF AUGUST 31, 1977

The Navy and Avondale agreed that the problem would be solved by

--making substantial reductions in the size of interfering web frames,

--cutting the boiler corners and making other modifications to facilitate boiler maintenance, and

--compensating for cut web frames with additional supporting structures.

In May 1977 Avondale proposed a $223,000 increase to the total contract target price for this effort and an extension to the ship delivery dates of 17 days. Avondale also proposed further target price increases of about $500,000 for acceleration to avoid the 17-day delay. We were told that negotiations were underway but that no settlement had yet been reached as of August 1977.

ENCLOSURE II

PROPELLER INSTALLATION PROBLEM

The contract specifications and drawings describing the propeller would not permit proper installation on the propeller shaft. This led to a request by Avondale for a contract change. Navy believes this change could result in an increase to the contract target price which may approach $18 million.

PROBLEM IDENTIFICATION

In its propeller shaft design process, Avondale determined that the Navy contract specifications and drawings represented an unworkable situation. Among other things the:

--Propeller hub was too long.

--Propeller nut could not be tightened on the shaft.

--Calculated maximum stress on the hub exceeded the hub material strength.

In April 1977 Avondale reported this problem to the Navy.

RESPONSIBILITY FOR THE PROBLEM

Navy officials told us the problem resulted from defective Navy contract drawings and specifications. The propeller was incompatible with the propeller shaft, but Navy's design review prior to contract award failed to detect this problem.

CONTRACTOR PROPOSAL AND STATUS AS OF AUGUST 31, 1977

Avondale suggested that the hub be shortened and widened. The Navy concurred with this approach and invited the contractor to submit a change proposal.

Avondale proposed to accomplish the change at an increased cost of $52,443, with a 150-day extension to the delivery date for the first ship. Navy officials indicated that the cost associated with the delay could approach $18 million.

ENCLOSURE II

Navy issued a unilateral change order in August 1977. This action gave notice to Avondale that a fully priced proposal must be submitted within 30 days. Our survey was completed before the expiration of the allowed time and before Avondale had submitted its proposal.

ENCLOSURE III

DRINKING FOUNTAINS

Navy contract specifications furnished the contractor did not provide any method for cooling potable water supplied to the drinking water bubblers. Navy estimated the cost to correct this defect at $30,000.

PROBLEM IDENTIFICATION

Navy specifications stated that cold potable water would be provided, in part, through the use of drinking water bubblers. However, Avondale notified the Navy in January 1977 that the specifications were defective as no mode was specified for cooling the potable water supplied to the bubblers.

Avondale suggested that either

--the drinking water bubblers be changed to self-contained refrigeration units or

--design parameters be provided for a method of cooling the potable water supplied to the bubblers.

RESPONSIBILITY FOR THE PROBLEM

The Navy acknowledged that their specifications were defective. They stated this error occurred due to an omission of a paragraph in the contract specifications regarding the potable water cooling system.

In June 1977 Navy informed Avondale that the problem was to be resolved by specifying that all drinking fountains would be self-contained refrigeration units. The Navy opted for this solution as being the least costly because:

--The ship's chilled water system would require expansion if it were used to service the bubblers.

--Numerous drawings would require revision to show the location of chilled water piping.

CONTRACTOR PROPOSAL AND STATUS AS OF AUGUST 31, 1977

As of August 1977 Avondale had not furnished an estimate of the cost for this change because of difficulty in

ENCLOSURE III

finding a vendor to supply the self-contained drinking fountains. Navy estimated that the change to self-contained fountains will cost approximately $30,000.

ENCLOSURE IV

MAIN CONDENSER TUBES

Navy contract guidance drawings provided Avondale for the machinery arrangement scheme in the engine room were defective. Avondale noted this problem and proposed a machinery rearrangement plan that could result in an increased cost of as much as $414,744.

PROBLEM IDENTIFICATION

In January 1977, Avondale notified the Navy of the defective drawings for machinery arrangement. Specifically, the arrangement only allowed for the removal of main condenser tubes having a maximum length of 13 feet. Navy's condenser design required tubes in excess of 14 feet in length. Avondale also pointed out that the main condenser intake and the auxiliary condensers limited access to the forward escape trunk.

RESPONSIBILITY FOR THE PROBLEM

Navy agreed that the original contract guidance drawings posed an impossibility of performance. Navy officials told us that main condenser tubes normally must be removed for servicing at various times during the life of a ship.

CONTRACTOR PROPOSAL AND STATUS AS OF AUGUST 31, 1977

Avondale prepared drawings acceptable to Navy depicting the relocation of selected equipment and requested an increase in the contract price of $116,112, with a 15-day delay in delivery. As an alternative, Avondale agreed to accelerate work to overcome the proposed delay for a total increase in the contract price of $414,744. The contractor's proposal was based on the amount of engineering labor required to modify 87 drawings affected by the rearrangement of equipment in the engine room.

Navy officials reviewed Avondale's proposal and agreed to negotiate a settlement. However, negotiations had not begun by the end of August 1977 when we completed our survey.