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UNITED STATES GENERAL ACCOUNTING OFFICE
REGIONAL OFFICE
ROOM 7054, FEDERAL BUILDING
300 NORTH LOS ANGELES STREET
LOS ANGELES, CALIFORNIA 90012

DEC 17 1970

Rear Admiral T. J. Walker, III
Commander
Naval Air Systems Command
Washington, D. C.

Dear Admiral Walker:

Enclosed is a summary of our observations made in our recent "should cost" review of the AQM-34A target drone being procured under fixed-price contracts awarded by the Naval Air Systems Command to Northrop Corporation, Ventura Division, Newbury Park, California. This summary is being furnished to you for your information and management use, and an acknowledgement is not necessary.

The summary supplements the draft report on "Application of 'Should Cost' Concepts in Reviews of Contractors' Operations" which was sent to the Secretary of Defense for comment on October 14, 1970. The observations included in the summary were discussed with representatives of your command on July 20, 1970.

Our office has assured the contractors participating in this trial review that their names would not be made public, and the attachment to this letter should not be shown or released for purposes other than official review. We would like to point out that Northrop Corporation voluntarily participated in this trial application of a "should cost" review and its management was most cooperative and helpful. You will note that in most instances the contractor has taken action to improve the conditions described in our summary.

We would like to express our appreciation for the interest and cooperation of your representatives. They were most helpful to us. If you desire, we will be pleased to further discuss at your convenience any aspects of the review with you or your representatives.

Sincerely yours,

H. L. Krieger

H. L. KRIEGER
Regional Manager

[Summary of Observations on Cost Review]

Enclosure

bcc: Assistant Director, DD -
J. H. Stolarow
Regional Manager, San Francisco

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FOR OFFICIAL REVIEW ONLY

SUMMARY OF

OBSERVATIONS RELATING TO

COSTS ASSOCIATED WITH

PRODUCTION OF MQM-74A TARGETS

BY

NORTHROP CORPORATION

VENTURA DIVISION

NEWBURY PARK, CALIFORNIA

NOVEMBER 1970

LOS ANGELES REGIONAL OFFICE

UNITED STATES GENERAL ACCOUNTING OFFICE

Contents

CHAPTER 1

INTRODUCTION

The Los Angeles Regional Office of the General Accounting Office made a "should cost" review at the Ventura Division of Northrop Corporation (Northrop Ventura), Newbury Park, California, during the period from February 10 to July 10, 1970. Our review was directed toward evaluation of the procurement process and costs associated with the production of MQM-74A target drones being procured by the Naval Air Systems Command under annual fixed-price type contracts since fiscal year 1967.

Our review included an examination of the contractors' operations, management controls, accounting and estimating practices, production controls and purchasing practices to determine the adequacy of these procedures to assure a reasonably efficient mode of operation. We reviewed the pertinent records and reports relating to performance under the MQM-74A drone contracts; obtained copies of records of negotiations, audit reports, price analyst reports, and contracts; and discussed our finding with representatives of Naval Air Systems Command, the Van Nuys District of Defense Contract Administration Services, the resident Defense Contract Audit Agency auditors, and contractor personnel.

Our review related primarily to the following contracts:

Contract number	Type	Procurement year	Number of targets
N00019-67-C-0456	FFP	FY 1967	217
N00019-68-C-0402	FPI	FY 1968	350
N00019-69-C-0806	FFP	FY 1969	354
N00019-70-C-0424	CC	FY 1970	228
Total			1,141

Our findings are discussed in detail in the following chapters.

CHAPTER 2

PROCUREMENT PROCESS

NEED TO STRENGTHEN PROCUREMENT PRACTICES

Our review of the procurement of the MQM-74A target drone by the Naval Air Systems Command showed the following:

— Selection of the contractor, without effective competition for an estimated 10-year support system program valued at about $74 million.

— Award of a firm fixed-price contract based on Navy performance specifications without performance demonstration of the target drone.

— Inconsistencies in procurement actions, such as paying for tooling, but not obtaining data rights.

— Delay in development of a shipboard tracking and control system to provide a shipboard launch capability for gunnery training purposes.

— Purchase of the right to obtain title to production tooling without any apparent benefits to be gained by the Government.

— Establishment of a tooling and production capacity to produce 70 units a month when requirements totaled 40 a month.

These shortcomings indicate a need for a more systematic, and efficient method of procurement. Certain of the above transactions resulted in less immediate cost to the Government; others may have contributed heavily to additional costs and program disruptions in the long run.

Selection of contractor and award of contract

In October 1964, Northrop Ventura began development work at its expense on a vehicle to meet the Navy's requirements for a 400-knots per hour target drone. The specific performance requirements for the target system had been established in August 1964. In January 1966, Northrop Ventura initiated procurement of long lead-time items for a small number of vehicles in anticipation of a Request for Quotations (RFQ) on a negotiated contract from the Navy. The contractor expected that the delivery schedule would provide limited lead time.

In March 1966, the Navy issued an Invitation for Bid (IFB) on an advertised contract for delivery of a target system that would meet certain performance requirements. Step 1 of a 2-step IFB requested technical proposals for the vehicle. The only response from the IFB, besides Northrop Ventura came from a company which did not have the facilities nor the technical capabilities to produce the target system.

An official of another potential supplier explained that his firm could not respond because the delivery schedule was unrealistic. He stated that in his judgment no contractor could submit a bid " *** unless his development work were substantially completed by the time subject invitation for bid was issued." Despite the fact that Northrop Ventura appeared to have a competitive advantage the Navy selected this single qualified source for a program expected to last about 10 years and cost about $74 million. In retrospect, we noted that the contractor's deliveries were delayed about 6 months while technical difficulties in the system were being corrected.

Navy program management officials advised us that each type of similar target systems purchased by the Navy is procured from separate sole source producers. These officials stated that the Navy used the procedures for an advertised competitive procurement, even though there actually was no competition, to justify a negotiated contract and to conform with the requirements of the Armed Services Procurement Regulation (ASPR).

Because of the failure of competition to materialize, the Navy issued a RFQ on a negotiated contract with the sole source. Northrop Ventura submitted a proposal on November 1, 1966, which provided, in part, for development and demonstration estimated to cost about $3.8 million. The initial contract for the system - letter contract N00019 - to be definitized as a fixed-price incentive contract, but eventually definitized as a firm fixed-price - was awarded on March 30, 1967. The contract provided for production efforts and did not provide for financing the development and demonstration work. The target system was not fully developed; in fact, at the time of the contract award, the contractor considered the target system to be 70 percent developed. The records indicate that the development effort was deleted under the contract because of a shortage of funds.

The contractor's developmental system had two unsuccessful flight tests prior to the award of the letter contract in March 1967. The final flight test of the contractor's developmental system, made about 8 months later, was partially successful but indicated that further

development and tests were necessary. The demonstration tests and earlier development work had been carried out as part of the contractor's independent research and development (IR&D) program, the costs of which will be recovered, at least in part, through overhead. The cost of development is shown in the following table:

Year ending July 31	IR&D cost	Bidding expense	Total
1965	$ -	$ 173,563	$ 173,563
1966	208,409	596,516	804,925
1967	251,500	242,560	494,060
1968	28,513	416,910	445,423
1969	244,667	333,445	578,112
Totals	$733,089	$1,762,994	$2,496,083

Since the contractor did not fully demonstrate its developmental system and the initial contract did not provide for demonstration, the Navy in March 1968 awarded a cost-plus-a-fixed-fee (CPFF) contract to Northrop-Ventura to carry out the demonstration program of a minimum of six flight demonstrations. The MQM-74A targets being produced under the initial contract were to be used in the tests. These demonstrations indicated that further development work was necessary, as well as rework of completed units to meet specifications. This additional work resulted in a 6-month delivery delay of the target systems for their intended use - fleet gunnery exercises. Under the firm fixed-price contract, the Navy did not pay for the cost of additional design and rework costs of about $2.9 million necessary to upgrade the system to meet specifications.

Data rights

The Navy program manager told us that the Navy purchased a system that was to perform according to their specifications; the design of the target system, however, was developed by the contractor, who had proprietary rights. Northrop Ventura retained its proprietary interests in the system in negotiating the initial contract, but did offer in February 1968 to sell unlimited rights to data to the Navy, excluding subcontractors' interests, for $6 million. Navy program officials stated that since the system was within the "state of the art," it could be procured under performance specifications without further expenditures for proprietary rights.

Development of shipboard radar

In carrying out the demonstration flight tests, the target systems were launched from land bases and tracked by and controlled from land-based radar systems. Operationally, the target system is to be launched from ships and tracked and controlled by shipboard radar systems. Of major concern to the Navy in June 1967 was the inadequacy of shipboard radar for tracking and controlling the target system. In meetings with Navy program officials, we were informed that:

1. It was intended that on shipboard launches, tracking would be dependent upon visual tracking and radar systems.

2. The program, as it evolved in 1967, did not provide for concurrent development of shipboard radar sufficient to control and operate the target system.

3. The portable tracking system was not developed during the beginning of the program in 1967 because the radar problem was overlooked until 1969.

4. Another company using its own capital began development of a portable tracking system in 1969 for use with the target system. A contract had not yet been awarded as of July 21, 1970, but we were told the Navy plans to buy a total of 10 of the portable tracking systems. The first three systems are to be subjected to evaluation tests that are expected to be completed by November 1970.

5. As of June 1970, the targets could not be used effectively unless they were tracked and controlled from land-based control stations.

Establishing contractor's production capacity

The initial contract included provisions for delivery of 217 systems at a rate of as many as 40 units per month; design, development, and manufacture of production tooling sufficient to establish the contractor's production capability at a rate of 80 units per month; and design data. The Navy has the right to acquire title to the production tooling upon request and to grant the contractor rent-free use of the tooling on a noninterference basis. The Navy agreed to refrain from removing the tooling from the contractor's plant until 5 years after the last delivery under Government contracts. The price of the production tooling, special test equipment, design, test, and analysis under the contract amounted to $4,291,820, of which about $2.3 million was for the production tooling.

The Navy program manager stated that the 80 units per month production capability was based on a 2-shift, 8-hour day, 5 days a week basis necessary to satisfy Navy requirements, as well as those of other military services and foreign sales. He said the Navy required

development of the 80 units per month capability to protect itself in case of future Government demands; however, at that time, it was anticipated that only a 1-shift manufacturing schedule would be required. The Navy did not have any specific requirements established in setting the 80 units per month capability.

The Navy program officials agreed that the Government did not need and should not have title to the production tooling. Further, they stated that with title, the Government will be responsible for the administrative costs associated with ownership without any apparent benefits accruing to the Government. The Navy program officials stated that competition is not practical or considered economical now because (1) the contractor is the only target system producer of that kind and has proprietary rights on the design data, and (2) a competitor contractor receiving a contract for the same target system would have to make its own tooling to meet its design specifications.

Although the Government has a right to the tooling upon request, the contractor does not have an accurate inventory of the individual pieces of tooling purchased under the initial contract; therefore, the Government does not know exactly what it purchased or what it eventually will have rights to. We noted that 169 tools paid for either partially or completely by the Navy were scrapped in 1968 through 1970 without the approval of the contracting officer, and the proceeds of these scrap sales were retained by the contractor.

Contractor officials advised us that they had planned to sell the target systems to foreign countries from the inception of the program, and that the Navy knew of these plans. However, we did not find any indication that the Navy considered allocating the cost of establishing the contractor's production capabilities on a ratio of total forecasted sales to the beneficiaries: the United States and foreign countries.

Comments

Navy program management officials stated that the support system was within the "state-of-the-art," and accordingly, was acquired under performance specifications. Therefore, unlimited rights to data was not required and, in their opinion, would serve no useful purpose. These Navy representatives stated that since the Navy would eventually pay for the tooling indirectly through overhead, it was decided to include the tooling and production engineering in the first contract as a separate line item. They stated that the Navy has not exercised its rights to acquire title at this time.

The Navy officials did not believe that a better procurement could have been made because the Government acquired a system without paying for its development. They stated that the contractor had to build 10 preproduction models so that demonstration tests could be conducted, and these tests resulted in numerous design and rework changes. The cost of these changes were borne by the contractor.

The contractor advised us that it had anticipated a future Navy need and developed an advanced target system to meet the requirement. Contractor officials further advised us that their management convinced the Navy of a need for the system. The contractor stated that if development contracts had been awarded to potential suppliers to develop and demonstrate prototypes prior to selection and award of the production contract, costs of the program would have been substantially higher. The contractor believes its investment of $2.5 million in the program merits consideration in determining whether the selection of a contractor as a sole source was justified.

Conclusion

In our opinion, the selection of a contractor to furnish a minor weapon support system over an extended period of time should be made under competitive conditions, regardless of whether the award is on a negotiated or advertised basis. Ideally, small developmental contracts should be awarded to potential suppliers to build and demonstrate prototypes. This would be more costly initially, but the competition, in our opinion, would better assure the procurement of a technically acceptable item and a reasonable price in the long run. In any event, we do not believe it is sound procurement practice to select a contractor for a 10-year, $74 million program on a sole source basis.

We recognize that the Navy did not pay for the additional cost of about $2.9 million for design changes and rework required to meet contract performance specifications. These costs were borne by the contractor under its firm fixed-price contract. On the other hand, the Navy purchased the right to acquire title to special tooling at a price of about $2.3 million that was unnecessary. Where unlimited data rights are not vested in the Government, the need for rights to special tooling serves no useful purpose. We believe that the cost for any benefits that could be gained by acquiring title in this instance were excessive.

DELAYS IN NEGOTIATING PRICES

Delays in negotiating prices for the MQM-74A target drone have provided Northrop Ventura opportunities to revise its proposals on several contracts upward by about $958,000 and can result in increased prices being negotiated. We believe that these delays, coupled with the award of letter contracts, substantially reduced the contractor's risks and did not provide the appropriate cost control motivation to stimulate efficiency. Under these circumstances, negotiations of prices representing what it should cost to produce the system is not possible.

The target system has been procured on an annual basis since fiscal year 1967 in quantities of 217, 350, 354, and 223. In three of the 4 years, the Navy awarded letter contracts; the fiscal year 1968 procurement was made using a fixed-price incentive, successive targets type contract. The designs have been firm effectively since production of the eleventh article. Of particular significance in these contracts is that commitments for materials which represent from 40 to 55 percent of the total contract costs, can be made soon after award of letter contracts. As of February 28, 1970, a total of 613 units have been delivered; on March 31, 1970, the Navy awarded a letter contract for the fiscal year 1970 requirements. As of April 30, 1970, final prices had been negotiated only for the fiscal year 1967 contract.

We noted delays in submission of proposals and in negotiating firm prices. Because of these delays, the contractor has had the opportunity to submit revised proposals providing for higher prices, as shown below.

Contract	Final price proposal Date	Final price proposal Amount	Revised price proposal Date	Revised price proposal Amount	Increase in proposals
-0462	7/18/69	$ 9,786,275	3/26/70	$ 9,895,325	$109,050
-0306	9/30/69	10,622,400	5/11/70	11,471,000	849,600
				Total	$958,650

The status of the fiscal year 1968, 1969, and 1970 contracts is as follows:

Fiscal year 1968 contract -0462

The RFQ was issued on January 12, 1968; the initial target price of successive targets fixed-price incentive contract N00019-68-C-0462 was negotiated in March 1968 and incorporated in the contract on June 25, 1968. The proposal to set the firm target cost was due 240 days after the date of the contract, or about February 20, 1969.

Northrop Ventura submitted its proposal to establish a firm target cost according to the contract repricing formula on July 18, 1969. The delay in submission according to contractor officials was necessary because sufficient data was not available in February 1969 on which to base a reliable estimate. Contractor officials stated that technical and design deficiencies had been disclosed on the demonstration tests, and production was interrupted while corrections were being made.

The last delivery under the contract was made in January 1970. As more actual cost became known, the contractor resubmitted proposals on February 26 and March 26, 1970, revising its price upward by about $109,050.

Navy procurement officials stated that a final price had been agreed upon in June 1970, but had not yet been incorporated into the contract.

Fiscal year 1969 contract -0306

The RFQ was issued on September 13, 1968, and the contractor submitted its proposal to price firm fixed-price contract N00019-69-C-0306 on October 25, 1968. However, a firm price was not negotiated, and a letter contract was awarded to the contractor on April 14, 1969.

The contractor submitted a proposal to definitize the letter contract on September 30, 1969, and revised it upward by $369,805 on February 26, 1970, on the basis of additional cost data that had become available. A firm fixed-price was agreed upon in May 1970, but not yet incorporated into the contract as of May 31, 1970. During negotiations, a final revised proposal was submitted further increasing the proposed price by $478,762. While increases in the February proposal were attributed primarily to higher overhead expenses, the proposal of May 1970 essentially increased the profit being requested.

The proposals and amounts negotiated are listed below:

Elements	Proposals 9/30/69	Proposals 2/25/70	Proposals 5/11/70	Amounts negotiated
Materials	$ 5,978,024	$ 6,287,228	$ 6,301,388	$ 6,269,945
Material handling	386,247	427,381	428,527	411,055
Engineering labor	198,470	198,470	198,470	182,592
Engineering burden	365,183	482,227	482,227	427,703
Manufacturing labor	614,190	614,190	614,190	596,250
Manufacturing burden	976,686	1,042,638	1,042,638	976,717
Other direct cost	39,490	40,090	39,490	28,473
Totals	7,857,290	8,092,224	8,106,930	7,892,735
Administrative expense	1,272,734	1,355,571	1,358,075	1,272,309
Total cost	9,130,024	9,447,795	9,465,005	9,165,044
Warranty	90,624	94,164	94,164	-
Profit	1,401,788	1,450,282	1,911,834	1,191,456
Price	$10,622,436	$10,992,241	$11,471,003	$10,356,500

As shown in the table above, the cost negotiated was $35,020 higher than the contractor initially proposed. At the time of the negotiations the Navy had little prospect of negotiating reductions in the proposed costs because actual costs had been essentially incurred. For example, we noted that in May 1970 (1) about 97 percent of material cost, representing about 57 percent of the total contract cost, had been incurred and committed, and (2) 84 percent of the proposed engineering costs had been recorded.

Fiscal year 1970 contract

The RFQ was issued on July 30, 1969, and the contractor submitted its proposal to establish a firm fixed-price for contract N00019-70-C-0424 on September 15, 1969. Instead of negotiating a price, a letter contract was issued on March 31, 1970. Navy negotiating officials stated that the letter contract was necessary because priority was being given to negotiating the other contracts with the same contractor, and secondly, there was uncertainty as to the amount of funds that were to become available.

A proposal to definitize the letter contract was submitted on May 7, 1970; as of June 30, 1970, the contract had not been priced. The Navy negotiators stated that the field reports arrived late, but they planned to negotiate this contract in the immediate future.

Contractor officials stated that the delay in submitting repricing proposals on fiscal year 1968 contract final prices was due to production slippage relating to the technical difficulties experienced in the demonstration tests. About 6 months delay occurred and production costs were not readily available until after June 1969. The delay in negotiations occurred because of an overlapping workload: fiscal year 1968 and fiscal year 1969 contracts were both to be negotiated at the same time. The Navy elected to negotiate the fiscal year 1969 contract first.

Procurement officials agreed that the use of letter contracts and delay in negotiating definitive or final prices results in higher prices, despite reduced risks. Their intention is to avoid letter contracts when possible and to negotiate them promptly when letter contracts are used.

Conclusion

In our opinion, action at the beginning of a program is needed to establish an environment of cost control. We believe that the use of letter contracts and/or delays in negotiating final or definitive prices frequently result, as illustrated in these cases, in increased costs and higher prices.

After completion of deliveries under the fiscal year 1967 and 1968 contracts, sufficient cost data should have been available for pricing purposes. Since material costs represent over 40 percent of the total cost under these contracts, the use of letter contracts (1) provides the contractor an opportunity to establish material costs and thereby reduce risks under the contract, and (2) reduces incentive to control costs.

The delay in negotiations of firm prices further reduced risks and, as actual costs became known, the contractor had an opportunity to increase its proposed prices. There appears to be little opportunity to negotiate cost reductions or a price representing what it should cost under these conditions, particularly where actual costs are essentially or already incurred.

CHAPTER 3

DIRECT LABOR

RELIABILITY OF DIRECT LABOR ESTIMATES

The contractor's current estimates of engineering and manufacturing labor hours and costs to produce the MQM-74A targets would have been more reliable if the types of labor costs incurred had been more carefully segregated in the early stages of the initial production contract N00019-C-67-0456. Careful segregation is necessary to develop a sound basis for estimating future follow-on contracts.

We noted that improvements in varying degrees in accounting for certain types of manufacturing and engineering labor costs could be made in:

- Identifying project items and tasks from contract to contract.
- Establishing labor groupings and composite rates for a wide range of skills.
- Segregating recurring and nonrecurring costs of production.
- Recording labor charges.
- Furnishing summary lot and parts cost data to Government representatives.
- Interrelating labor standards used by production with accounting records.

Practices in certain of these areas constituted impediments to estimating costs accurately and made evaluation of such estimates by Department of Defense (DOD) resident personnel difficult. Further,

the data furnished DCD negotiators was not as meaningful and helpful as desirable and reduced the opportunities of having negotiations result in what it should cost to produce a target.

A more detailed description of these practices follows:

Identifying project items and tasks

The contractor maintains a job order cost system of accounting with job orders identified to specific contracts. For cost recording purposes, each contract is divided into items and tasks. The items usually represent line items under the contract, and the tasks represent hardware subassemblies or overall labor functions under these items.

We noted changes in recording costs by item and task. For example, the items and tasks assigned by the contractor for recording cost under the initial contract were changed for the second contract; the assignments for the third and fourth contracts were essentially the same as the second. Further, the accounting breakdowns for the hardware subassemblies on the initial contract were substantially changed, and production support, combined with regular production labor on the initial contract, was made a separate item on subsequent contracts.

Establishing labor groupings and rates

Engineering and manufacturing direct labor is segregated into a number of job classification codes. While these codes generally represent similar grouping of various labor tasks, the skill

requirement and labor rate for the particular tasks may vary substantially. For example, about 83 percent of the engineering hours proposed under the four contracts awarded since fiscal year 1967 were included in a single classification. This classification, as set forth in the contractor's financial instruction, included a variety of technical personnel, such as senior engineers and related technical personnel with salary ranges from $300 - $500 per week to cinematographers with a salary range of $170 - $250 per week. Similarly, 45 percent of the manufacturing labor hours proposed were represented by one labor classification which included machinists, sheet metal workers, assemblers, and painters. The salaries for these workers ranged from $108 - $128 per week for assemblers to $166 - $188 per week for machinists.

Proposals for engineering and manufacturing labor included the general labor classification discussed above without a breakdown of the specific types of labor needed. The labor rates proposed were a composite rate based on the actual rate being experienced in the plant for the workers charging these general classifications.

Segregating recurring and nonrecurring hours

Production hours proposed for the contracts reviewed were originally estimated in 1967. These original estimates, updated for changes and adjusted based on an 85 percent industry-average improvement curve, were used in estimating the follow-on contracts. In January 1970, after producing about 567 units under the fiscal year 1967 and

1968 contract, the contractor evaluated actual production data to verify the validity of the improvement curve used. However, contractor officials advised us that they found that the costs accumulated for the first 140 units contained recurring and nonrecurring costs and that these costs were, therefore, eliminated from the improvement curve calculation. We noted that various curves were developed, and the curve developed without the data from the first 140 units was finally proposed during negotiations. During our discussions with Navy representatives, we learned that this curve was basically the one used to determine the rate of learning to be negotiated, since additional production data was not available.

We were informed by a contractor official that proper separation of recurring and nonrecurring costs for the first 140 units was impossible because of the problems and changes experienced in producing these units. However, the contractor should have been aware of the need for segregation of recurring and nonrecurring costs in view of the anticipated follow-on orders. Production effort in the fiscal year 1967 contract, which became effective on March 30, 1967, occurred primarily in fiscal year 1968 and fiscal year 1969, and the last delivery under the contract was made in June 1969. Two follow-on procurements of this item were offered to Northrop-Ventura before the deliveries on the first contract were complete; the contractor received RFQ's on January 12, 1968, for a 417-unit follow-on contract in fiscal year 1968 and on September 13, 1968, for a 354-unit follow-on order in fiscal year 1969.

From our analysis of the production data, various interpretations were possible. Our computations resulted in improvement curves different from those developed by the contractor which if used would have reduced the hours proposed and negotiated. For example, by excluding the cost data for the first 10 units on which production tooling was not used but treating the 11th unit as the number one unit on the curve, we developed an 81 percent improvement curve. The extraordinary cost from the 11th to the 149th unit represents rework cost which would be reduced as learning increases. By using this curve, the labor cost proposed on the fiscal year 1970 contract would have been reduced by about $144,000.

Recording labor charges

Employees assigned to a particular department when on temporary loan to another department are required to change the precoded timecards to show the code of the department for which they are working. We found that, in some cases, this was not done. For example: (1) a labor code assigned to employees working on commercial products also appeared in the accounting records as a labor charge under Government contracts, (2) labor codes assigned to employees working under production support functions or departments show up as charges under the item designated for direct production work only, and (3) labor codes for direct production workers appear in the items designated for production support. The contract estimator stated that, in all cases, the worker is charging the correct contract, but has just failed to change the labor code. He also stated that this practice was not widespread or significant.

Furnishing summary lot and parts cost data

The contractor's original or source cost input for production labor is by part and lot. However, the basic cost record, the cost commitment report, is summarized by contract-line items and by hardware subassembly or labor functions. A contractor representative advised us that, while lot and part data is available, a special computer run is required to accumulate the data in a format for easy use. Another contractor representative stated that, while this data has not been generally used by the contractor or the Defense Contract Audit Agency (DCAA) auditors for estimating or auditing purposes, it would be very valuable in establishing fair and reasonable prices. He also stated that it provides a quick look into the costs being experienced, an important factor on new production items.

Interrelating labor standards with accounting records

Our review disclosed that the contractor uses labor standards to determine the productivity and the efficiency of its production operations. Labor performance reports are prepared and distributed each week for the major programs in process. Labor efficiency is determined by comparing standard hours earned based on equivalent output with actual labor hours incurred. Total hours are then compared with budgeted hours and an estimate to complete the project or contract is made. On major projects, the contractor knows the equivalent units produced each week and the number of labor hours expended in producing the units.

Contractor officials stated that the equivalent unit cost data developed by the production operations department for the contracts under review are not used for estimating or auditing purposes. They stated that the equivalent output data developed by the production operation department cannot be related to costs in the basic cost records at an interim point in the life of the contract. One of these contractor officials agreed that such an interrelationship would be very useful in determining the per-unit cost being experienced during the life of the contract. Presently, unit costs are available in the basic cost records at the end of the contract or from a special computer run when lot cost is requested.

Agency comments

DOD auditing and contract administration personnel stated that they have identified in their pricing reports certain deficiencies in the contractor's accounting and estimating procedures, including the contractor's contention that insufficient data was available for applying learning curve techniques to estimate production labor hours. They found that over a period of years, the contractor has made changes to improve its cost recording and estimating system. After the completion of our review, we were advised by DCAA representatives that Northrop had furnished them a printout of production labor hours incurred by part number and lot for the fiscal year 1969 contract on which deliveries were currently being made.

Navy program and negotiating officials stated that not only identification of weaknesses, but also suggestions for improvements in the contractor's controls and management systems, should be included in pricing reports submitted to them by DCA personnel. They stated that questioning a particular cost because data is not available or adequately segregated - such as attrition expense - does not provide a sound basis for deleting the amount from the price. They stated that the only recourse in such cases is to consider the fact in applying the weighted guidelines to develop a profit rate.

Conclusion

As indicated above, the records maintained by the contractor on labor costs do not provide a clear separation of various labor cost elements in the early stages of the program or consistently from contract to contract. Sufficient visibility was not readily available to contractor management or the DOD auditors for purpose of performing estimating or pricing reviews. This method of recording costs makes it impractical to compare or analyze costs from contract to contract over the life of the program and to develop acceptable improvement curve information and reliable estimates. We believe that improvements in the recording of costs in the early phases of new programs would provide a sounder basis for estimating costs by the contractor for follow-on contracts. We also believe that greater visibility to available data would result in facilitating evaluations of proposals by DOD personnel.

PROPOSED ENGINEERING LABOR RATES NOT REPRESENTATIVE OF [illegible]

The contractor proposed engineering labor costs on follow-on production contracts for HSM-74A targets at average hourly rates which included the rates for highly skilled engineers even though the need for such engineering support on a stabilized production program had significantly diminished from the levels needed during the early production phase of the program. As a result, we believe that the engineering labor and burden costs proposed to price the fiscal year 1968 and 1969 contracts were in excess of what the cost should be by about $245,000. In addition, the amount proposed for engineering labor and burden costs could, in our opinion, be reduced by as much as $99,000 in negotiations for the fiscal year 1970 contract.

Highly skilled engineers required on original contract

The work of designing and developing a fully operational system, along with the capability to produce it in production quantities, requires the efforts of highly skilled engineering and technical personnel. Under the initial production contract the need for these types of individuals was further increased due to the presence of design and development problems.

The contractor has been awarded four contracts since fiscal year 1967 to produce and deliver a support system in quantities of 217, 350, 354, and 223 units, respectively. The original contract also included effort for production design, analysis, and test along with the

development of a tooling capability to produce 80 units a month. Of the 133,125 engineering labor hours proposed under the first contract, 116,940 hours were for nonrecurring work, such as production design, analysis, and test. We were informed by contractor officials that early in the performance of the first contract it became evident that further development work was needed and that the first 10 items were designated as preproduction models to be used for demonstration tests. As a result of these tests, additional design and rework efforts were required. By the time the contract was substantially complete, engineering labor hours had increased to 225,000, or about 70 percent above the original estimate. Nonrecurring costs represented 74 percent of the total hours recorded.

Need for highly skilled engineers diminishes as effort ceases to be nonrecurring

As a program proceeds along in the production phase, the need for highly skilled engineers usually decreases. The major nonrecurring functions of production engineering are reduced and the engineering effort supporting these activities is no longer needed. Also, the close control needed in the early phases of production is reduced as the engineering effort becomes primarily one of maintenance.

Proposed engineering hours for the follow-on contracts under the program reviewed decreased to an average of about 26,500 hours or about 12 percent of what was incurred on the first contract. The nonrecurring portion decreased from 74 percent on the first contract to a proposed average of about 11 percent on the second, third, and fourth. We were

informed by a contractor official that the design and configuration of the target drone had been relatively stable effectively since the eleventh unit of the first contract. He also stated that most of the design and production changes and rework were completed during the first contract by about the 140th unit. We were informed by Navy representatives that the support system was relatively simple and within the state-of-the-art. They also stated that, once the preliminary problems with the design were solved and the production capabilities were developed, production became a relatively routine and straight-forward task. Deliveries under the first contract reached a level of 68, 57, and 67 during the last three months of the schedule, with 106 being delivered the following month under the second contract. The contractor was on schedule in his deliveries through the remainder of the second contract.

Engineering rates on follow-on contracts increased

Engineering rates for follow-on contracts should have decreased to reflect the diminishing skill levels needed to perform the recurring production support function. However, we found that the proposed rates significantly increased on each of the subsequent contracts from the actual rate experienced on the first contract.

Our review showed that proposed engineering rates for the second, third, and fourth contracts increased from the actual rate experienced on the first contract of $5.99 per hour to $7.05, $7.47, and $7.71, respectively. We were informed by the former project engineer that

this was due to the retention of higher priced engineers in order to maintain an acceptable level of capability within the company during a time when the work load and force had been decreasing. However, he stated that by using these engineers the work is performed at a higher efficiency. He further stated that engineering employed had decreased from a high of 600 in 1968 to about 200 in 1970. As pointed out in the report section on composite labor classifications and rates (see page 20), the general engineering rate is proposed based on the experienced rate in the plant.

In order to determine the amount of possible increased cost to the Government stemming from the higher engineering rate, we compared the total cost to the Government based on the first contract base rate of $5.99 with the total cost based on the proposed rate for subsequent contracts. The additional amounts proposed for engineering labor including burden on the subsequent contracts already priced was about $245,000 and an additional $99,000 on the fiscal year 1970 contract to be priced. No attempt was made to adjust the base amount for wage increases, since part or all of these increases were offset by using the first contract with its high skilled engineering requirement as a base.

Conclusion

We believe the engineering labor rates proposed by the contractor were at a higher level than necessary for the kinds of engineers required to perform the effort. This increased the proposed cost to the Government by about $465,000. In effect the Government was requested to pay higher engineering rates in order to maintain a certain level of capability by the contractor, in a time when their work load and staff levels are decreasing. We believe it would be more equitable and meaningful if the estimate of engineering costs would show (1) the task required, (2) the specific type and hours of engineering or support labor required to complete the tasks, and (3) the hourly rates for each specific type of engineering or support labor. With this type of information, the costs of performing specific tasks could be more realistically negotiated.

CHAPTER 4

MATERIALS

NEED FOR INCREASED PRICE COMPETITION IN SELECTED PROCUREMENT OF MATERIALS

In our review of the procurement practices of Northrop Ventura, we found that effective price competition was not obtained for a substantial portion of the procurements reviewed. We estimated that effective price competition in buying selected materials covered in our review could have reduced the material procurement costs under the first four production contracts by up to $500,000. Contractor officials advised us at the conclusion of our review that they recognized the need and intended to obtain increased price competition on material purchases for the fiscal year 1970 and 1971 production contracts. On the basis of our findings for the first four contracts, the estimated potential savings in obtaining effective price competition for the selected materials under the fifth contract could total about $150,000.

ASPR 1-300.1 states the general policy that all procurements, whether by formal advertising or by negotiation, shall be made on a competitive basis to the maximum practicable extent. A basic principle of contracting cited in ASPR is that where an award is based on effective price competition there is reasonable assurance that the contract price represents a realistic pricing standard, including a fair return on investment to the seller.

To evaluate the contractor's procurement practices we selected 16 items from the bill of materials submitted for the third contract. While we selected less than two percent of the total 1,040 items used on each target drone, the 16 items represented $10,094 or about 73 percent of the $13,765 estimated material costs per target. We identified 74 purchase actions taken on the items under the first four production contracts and determined the basis for award of the purchase orders.

We found that under the first production contract award in fiscal year 1967 effective price competition was obtained on a majority of the orders placed for the 16 items reviewed; subsequently, most of the orders were awarded on noncompatitive bases to the single or sole sources established on the first buy, as shown in the table below

Basis for awards of purchase orders	Fiscal year 1967	1968	1969	1970	Total
Noncompetitive:	BEST DOCUMENT AVAILABLE				
Single or sole source	10	9	13	3	35
Bids solicited but price competition not effective	1	9	3	5	18
Subtotals	11	18	16	8	53
Competitive	15	1	3	2	21
Totals	26	19	19	10	74

The value of the 74 purchases reviewed totaled $11,421,328 including $8,221,296 for engines which were purchased by the contractor for the first three contracts but provided as Government-furnished equipment

starting with the fourth contract. Excluding the costs of the engines (four purchase orders) the competitive and noncompetitive procurements may be compared as follows:

	Purchase orders		
	Number	Amount	Percent
Noncompetitive:			
Single or sole source	31	$1,532,311	47%
Bids solicited but price competition not effective	18	721,510	23
Subtotals	49	2,253,821	70
Competitive	21	946,211	30
Totals	70	$3,200,032	100

It was not possible to determine the amount of savings that would result from increased competition in the subcontract procurements. However, applying the 25 percent average savings factor (referred to in guidelines for reporting under the DOD Cost Reduction Programs) to the approximate $2-1/4 million noncompetitive procurements covered in our review (engines excluded), we can estimate that effective price competition would have reduced these material procurement costs for the first four production contracts by about $560,000.

The predominant justification given for the single source procurements was that only one source was qualified and that funds were not available for developing and qualifying additional suppliers. Most of the instances where quotations were solicited but effective competition was not achieved involved situations where the established supplier had a competitive advantage over the other potential suppliers.

The advantage occurs because the supplier did not have to include in his quotation the costs for qualifying his product, acquiring special tooling, engineering, or other startup costs. In our review we noted that qualification testing was required for four of the 16 items included in our sample. The qualification costs for the four items totaled $32,648, about 8 percent of the total $407,267 purchase costs for the items.

A contractor official stated that quotations received from "qualifiable" sources were considered as providing competition. He said that qualification costs are segregated and analyzed separately and that if the remaining cost is to the benefit of the Government an analysis is then made to determine the reasonableness of the qualification costs and the quantities that will have to be bought to provide for a return of investment. It is precisely because of the process described above that effective price competition usually is not achieved after the initial selection and qualification of a single supplier.

At the conclusion of our review contractor officials told us that they recognized the potential benefits of increased competition and that they intended to take action to obtain improved price competition on the material purchases for the fiscal year 1971 (fifth) contract. Using the 25 percent savings factor mentioned earlier, we estimated that potential savings of about $150,000 could result under the fifth contract from obtaining effective price competition in purchasing the selected materials included in our review.

Conclusions

We believe that the costs of materials purchased by Northrop Ventura can be reduced substantially by obtaining increased competition. The major obstacle to achieving such competition in the past has been the additional costs associated with developing and qualifying new suppliers. The information developed in this review shows that the start of a program such as this a maximum effort should be made to establish multiple qualified suppliers, particularly for major cost items, as a base for future competition on follow-on orders. If the costs of developing additional sources are significant they might be set out as a separate line item on proposals for consideration by the buying agency.

COST OF MAKING INSTEAD OF BUYING CERTAIN ITEMS

Northrop Ventura had been manufacturing two major components of the MQM-74A target in-house since fiscal year 1967 without obtaining competitive price quotations from other potential suppliers. Requirements and orders for the components totaled about $1,750,000 through fiscal year 1970. One of the items was not included in the make or buy program submitted by the contractor to the Navy because spare parts requirements had not been considered in identifying items subject to formal make or buy determinations. Without competitive price quotations we could not determine whether making those items in-house was the most economical manner of acquisition.

The omissions raise doubts as to the adequacy of the contractor's program in meeting the objectives of ASPR 3-902, Make or Buy Programs, which states, in part, that the responsibilities of a prime contractor include placing and administering subcontracts as necessary to assure performance at the lowest overall cost to the Government. The provisions of ASPR 3-902.2 define a make or buy program as "*** that part of a contractor's written plan which identified the major subsystems, assemblies, subassemblies, and components to be manufactured, developed, or assembled in his own facilities, and those which will be obtained elsewhere by subcontract ***." It provides, generally, that the make or buy program will include items or work efforts costing 1 percent of the total estimated contract price, or $500,000, whichever is less. Raw materials and off-the-shelf items are not to be included.

Use of cost analyses

In our review of the make or buy determinations for the KQM-74A target drones being produced we found only two instances where documented cost analyses were available in support of the make or buy decisions made. Such limited use of comparative cost studies appears inconsistent with the requirements of ASPR 3-902.3 which provides that when submitting a proposed make or buy program a prospective contractor shall state the reasons for his recommendations in sufficient detail for the contracting officer to determine that sound business and technical judgment has been applied. It further provides that proposed "make" items normally will not be agreed to, even if regularly manufactured or provided by the contractor, if the items are available (quality, quantity, delivery, and other essential factors considered) from any other firm at lower prices.

One contractor official involved in the make or buy analyses told us that the primary consideration in determining whether to make or buy an item is whether or not they have the technical know-how and existing facilities to produce the item. Other contractor officials stated that the primary consideration is to obtain the lowest overall cost to the Government and that informal cost estimates or analyses are sometimes made by individual members of the Make or Buy Committee. However, as noted earlier we found only two instances where cost analyses were documented.

An example of the foregoing type of decision is the decoder assembly which is a subcomponent of the guidance mechanism for the target. At the inception of the program this assembly was identified as a "can make or buy" item with an estimated unit price of $310. The assembly was then formally designated as a "make" item because the contractor manufactured a similar decoder assembly for another target drone and had the available capacity to also produce the assembly for the MQM-74A target. We found no evidence of a comparative cost study in support of the make or buy determinations for the decoder assembly for either of the target systems.

Contractor officials advised us that under the earlier program the Navy in buying spare parts had asked for competitive quotations on the decoder assembly from several vendors, including Northrop Ventura which submitted the lowest price. On this basis, they decided it would be cheaper to keep the work in-house on the follow-on program. We do not believe that such competition, which occurred in about 1964 or 1965, satisfied the need for a current comparative cost analysis in establishing the make or buy program for the latest target system.

Identifying items requiring
[illegible]

The make or buy programs submitted by the contractor for each of the first four contracts were said to include evaluations of all the major subsystems, assemblies, subassemblies, and components currently estimated as costing 1 percent or more of the total estimated contract

amount. However, our review indicated that spare parts requirements were not adequately considered in determining which items required make or buy analysis in accordance with ASPR requirements.

We noted that the JATO carrier assembly was not included in the latest make or buy program even though substantial spares quantities of the item apparently will be required. As of March 1970 it was estimated that 7,544 JATO carrier assemblies were to be fabricated. The contractor's estimated unit price for these assemblies is $184.63; the spares orders for these units would total $1,392,849. The estimated prices of the first four contracts ranged from $11,036,911 for the first to $4,768,984 for the latest proposal on the fourth contract. The estimated costs of spares requirements for the JATO carrier assembly exceeds substantially the 1 percent contract price criteria applied to any or all of the first four buys.

Contractor officials said that the decision to retain this assembly as a make item was due to initial problems associated with the JATO launch. Since they had total system responsibilities, it was decided to make the item in-house; however, they intend to conduct a make or buy analysis to assure future procurement at the lowest cost to the Government.

Conclusion

The contractor's practices in performing and documenting make or buy evaluations for the contracts do not provide assurance of performance at the lowest overall cost to the Government. It was not feasible in our trial "should cost" review to determine whether excess contract costs have resulted from these practices and, if so, the amount of such costs. However, improvements are needed in performing and documenting make or buy evaluations so that contracting officers can effectively review and evaluate proposed make or buy programs on other contract work with the contractor.

CHAPTER 5

OVERHEAD

PROPOSED PRICES INCLUDE AMOUNTS
FOR UNUSED PLANT CAPACITY

We found that projected overhead expenses were being proposed on sole source firm fixed-price follow-on contracts at higher than normal rates. The proposal to reprice fiscal year 1968 contract -0462 and the proposed prices for fiscal year 1969 and 1970 contracts -0306 and -0264, respectively, providing for delivery of a total of 927 vehicles, included increased allocations of about $1,166,400. These increases are, in part, attributed to changes in the level of the direct cost bases on which overhead costs are distributed. In addition, these proposals apparently include amounts for the available but unused production capabilities and capacity of the contractor.

During the period from February 26 to May 7, 1970, the contractor submitted proposals for a final price on the fiscal year 1968 contract and initial prices on the fiscal year 1969 and 1970 contracts. In the following table the overhead rates included in the proposals are contrasted with the plantwide 3-year average of those rates recorded under the first production contract awarded in fiscal year 1967:

	Plantwide 3-year average a/	Recorded under FY 1967 contract	Overhead rates proposed under FY 1968 contract	FY 1969 contract	FY 1970 contract
Engineering expenses	156%	142%	207%	244%	184%
Manufacturing expenses	146	137	156	170	158
Material handling					
Contractor furnished items	8.8	8.5	8.2	8.1	6.6
Government furnished items					6.2
Administrative	13.3	13.5	15.4	16.8	15.3

a/ Fiscal years ending July 31, 1967, 1968, and 1969

Production of the 217 units under the first contract occurred primarily during the contractor's fiscal years ending July 31, 1968 and 1969. As shown in the graphs (figures 1 and 2) the overhead costs for the year ending July 31, 1968, were substantially higher than prior years - in total amounts and in relation to the base used to allocate the expenses to contracts. Since the year ending July 31, 1968, appears to be an atypical year, we compared the overhead allocations computed by using the 3-year average plantwide rates with those contained in the three proposals as follows:

Contract	Allocation	Percentage of increase over average
FY 1968	$ 459,300	14.6
FY 1969	565,100	18.0
FY 1970	142,000	8.3
	$1,166,400	14.6

Production capacity

During fiscal years 1967 through 1970 there was an upward trend in production and sales volume as illustrated in the following table:

Type of sales	(000's omitted) For the year ending July 31 1967	1968	1969	1970 a/
Government				
Fixed-price contracts	$ 6,979	$10,138	$20,474	$19,337
Cost contracts	9,566	17,766	9,024	1,812
Subtotals	16,545	27,904	29,498	21,149
Commercial		454	5,071	16,000
Interdivisional	3,088	2,103	3,472	1,851
Totals	$19,633	$30,461	$38,041	$39,000

a/ Forecasted as of May 31, 1970

The upward trend in production and sales volume for fiscal year 1969 was less than originally anticipated by the contractor; furthermore, there has been a downward prediction in total forecasted sales since June 1969. Cost of sales is shown in figure 3.

Despite the comparative increased sales volume since fiscal year 1968, there has been a substantial reduction in the number of employees at this plant: 1,822 as of June 30, 1968, to 1,178 as of March 31, 1970. We were advised by contractor officials that the primary reasons for the reduction included the discontinuance of a major program and a decrease in requirements for engineering effort on the MQM-74A target as the designs became stable. As shown in figure 1, the direct

engineering labor cost has been on the decline since fiscal year 1968. We were advised that the contractor employed about 600 engineers in 1968 and about 200 had been retained as of April 30, 1970. The contractor's sales backlog and forecasted sales do not indicate any significant change for the immediate future, since a decline in sales to $38 million in fiscal year 1971 has been forecasted. Further, a decrease in direct manufacturing labor hours and costs occurred in fiscal year 1970 and is forecasted for fiscal year 1971. In anticipation of the decline, the contractor has reduced its budgeted overhead costs for fiscal year 1970 from $16.1 million established at the beginning of the fiscal year to $15.1 million established in May 1970. However, the action to reduce these costs was not taken at the same time as the reduction in direct labor output occurred. See figures 1 and 2. Thus, as the base on which overhead costs are allocated decreased, the overhead expenses did not.

Overhead expenses

We found that the increase in overhead expense in the year ending July 31, 1968, was due not only to inflation and an increase in production but also a substantial increase in expenditures of a discretionary nature. Through the use of linear regression analysis we were able to readily identify those areas of overhead expenditures which differed from established trends and consequently warranted further review. These expenditures included repairs and maintenance; independent research and development; bidding and proposal costs; electronic data processing; purchase of low value equipment; and supplies. The growth in these expenditures from fiscal years 1967 through 1969 is shown in the following table:

	Expenses incurred in		
	FY 1967	FY 1968	FY 1969
Repairs and maintenance	$141,561	$ 391,910	$ 217,675
Purchase of low value equipment	18,578	183,325	30,046
Bidding costs and independent research and development	891,242	1,391,836	1,831,971
Electronic data processing	430,783	697,422	823,959
Supplies	481,200	921,106	714,389

As previously noted, sales increased from about $19,633,000 in fiscal year 1967 to $30,461,000 in fiscal year 1968 and to $38,041,000 in fiscal year 1969. However, the percentage increase in the above expenses was in excess of the percentage increase in sales for fiscal years 1967 and 1968.

Contractor officials did not agree that the increased overhead allocations were the result of only excess or unused capacity. They stated that the direct cost mix, which represents the basis for distribution, has changed from labor costs to material costs. Since the fixed indirect expenses continue to be incurred despite the change, the labor burden rates have gone up. Cost statistics confirm that the direct labor costs have been decreasing while material costs have increased.

For several months in 1969, targets had been produced at the rate of about 80 units per month and currently are produced at about 40 units per month. We noted that the monthly delivery schedule of the Navy's fiscal year 1970 contract for the targets decreased to 22 units

per month; consequently, the labor base could further decrease in future years. The reductions in the labor base and monthly production requirements, in our opinion, add to the available unused production and engineering capacity of the contractor.

Agency comments

Navy negotiating personnel stated that in May 1970 they negotiated lower overhead rates than those proposed by the contractor for the fiscal year 1969 contract. The rates proposed and negotiated on this contract were as follows:

Burden	Rates Proposed	Rates Negotiated
Engineering	244.0%	234.0%
Manufacturing	170.0	164.0
Material handling	8.1	7.8
Administrative	16.8	16.1

We found that there were reductions in the amounts negotiated, but these reductions were considered to be the excess of what actual overhead costs should be. The Navy officials felt that the increased rates over that paid in prior years were actually cheaper than those that would be paid if a break in production had occurred.

Conclusion

The contractor's engineering and production overhead rates have increased substantially, and the rates proposed on follow-on contracts for the HSM-744 targets have further increased. The Navy, in our opinion, when negotiating higher overhead rates will absorb a share of overhead costs which can be considered as representing the available but unneeded capacity and capability of the contractor.

The decision to sustain the capabilities of the contractor through increased overhead allocations in the price of the items being procured will be and have been made by agency procurement officials. In our opinion, the matter of retaining and sustaining the excess or unused capacity of contractors is properly the subject of a national policy for the Congress to decide. This matter becomes of paramount importance as the availability of funds for defense purposes decreases and the need to maintain and sustain a military industrial complex develops and increases.

Under present circumstances, there are numerous contracting officers and negotiators independently negotiating amounts for sustaining contractors' excess capacity. We believe that inclusion of such amounts in contract prices should be controlled and a matter of congressional action for administration by the Department of Defense. In the interim we believe the Secretary of Defense should issue guidelines for negotiators and establish limits of allowances.

In negotiating sole source contracts in an economic environment as currently exists, negotiators should have available analytical information that shows composition of proposed overhead costs, including (a) the reasonable share of overhead costs, allocated to its contracts, plus (b) the additional amount the contractor plans to distribute to Government contracts because of the decreasing production requirements. With these types of data being available, Department of Defense guidelines could be applied and the cost and benefits of sustaining the excess capacity of various contractors could be developed and more fully evaluated in terms of the economy and existing national priorities.

APPENDIXES

FIGURE 1

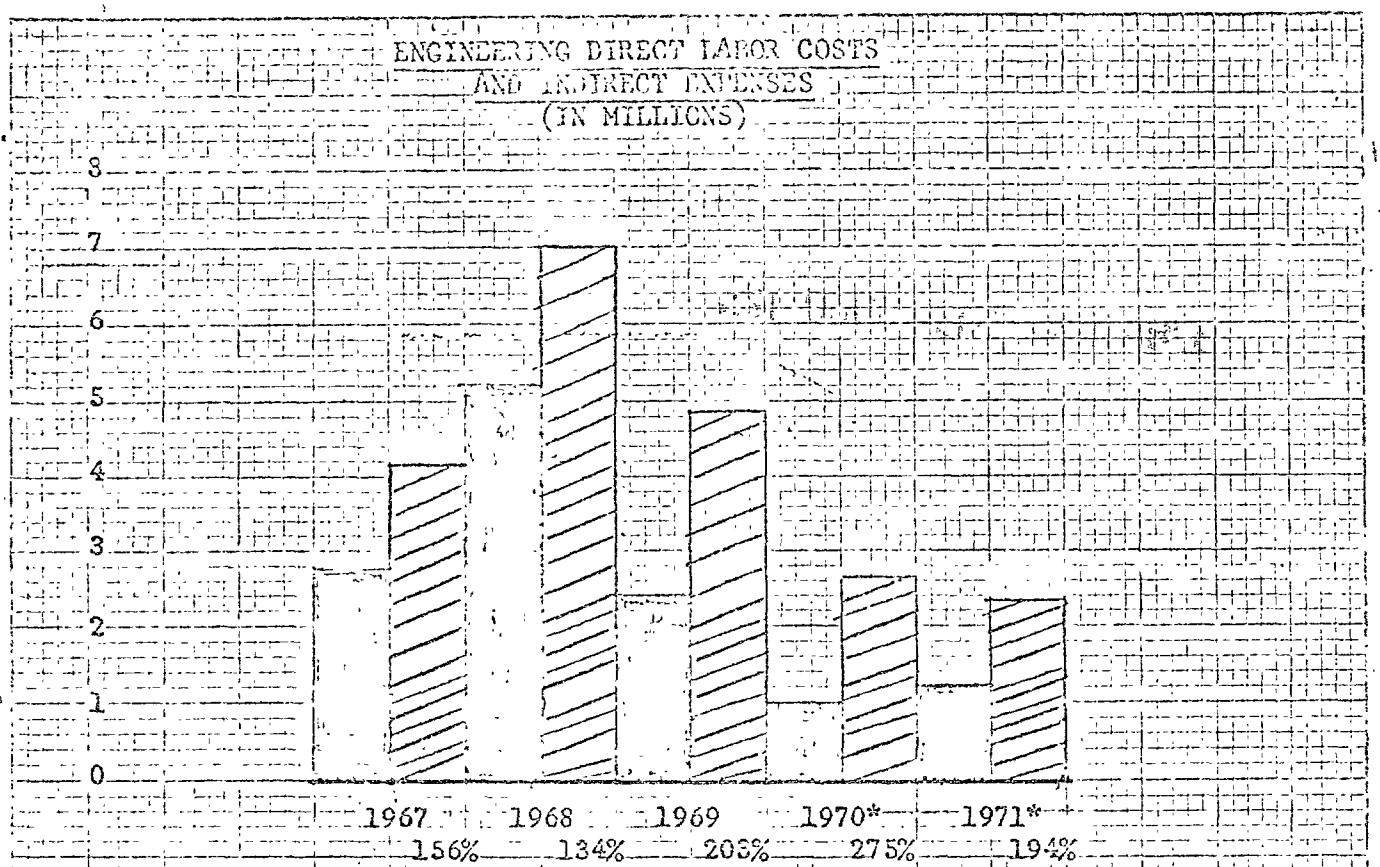

FIGURE 2

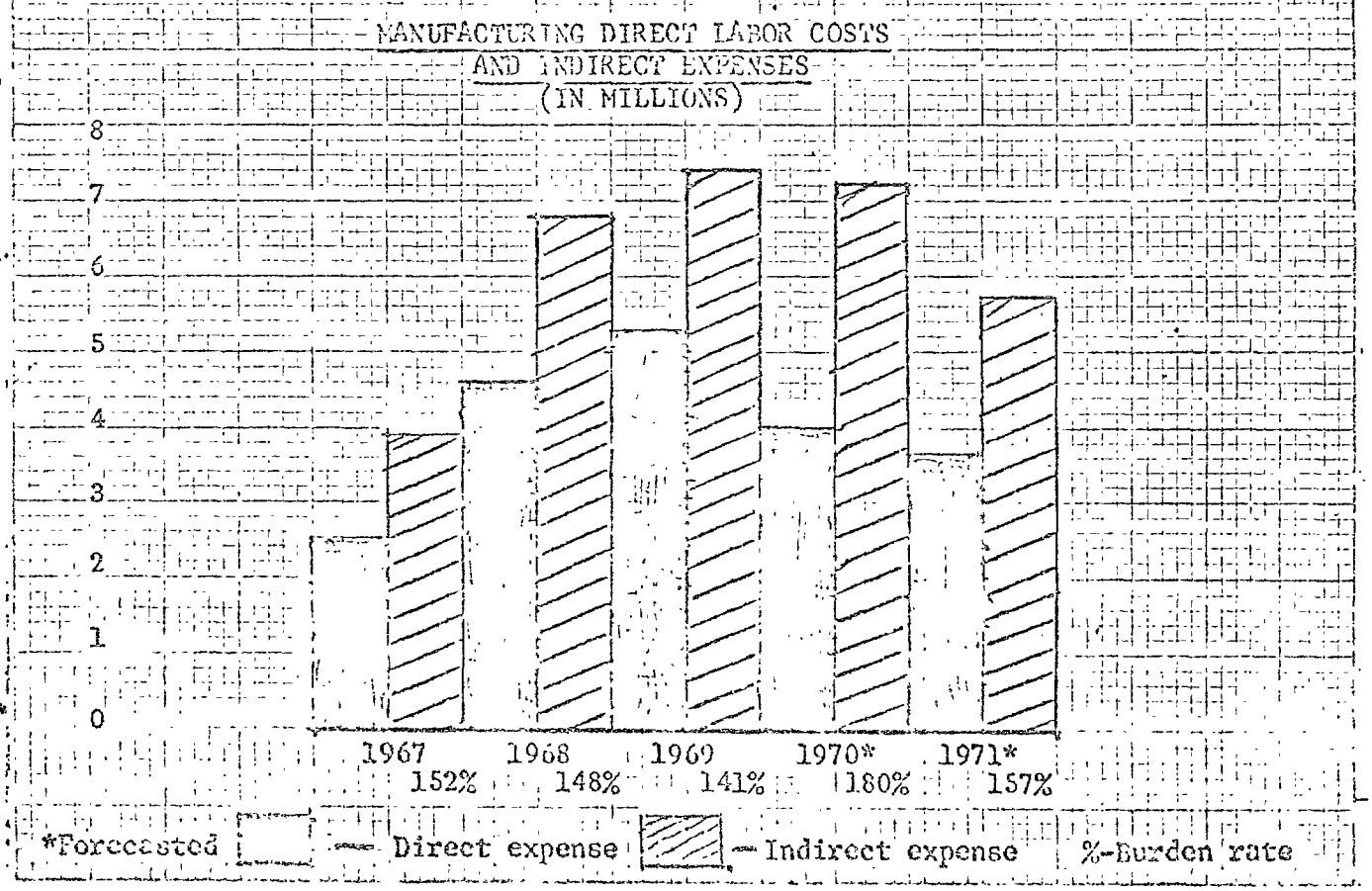

FIGURE 3