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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



# THESIS

ANALYSIS OF OVERPRICING OF MAINTENANCE  
SERVICE CONTRACTS AWARDED VIA THE 8(a) PROGRAM  
AND BY FORMAL ADVERTISING

by

Eric John Benson

December 1986

Thesis Advisor:

Shu S. Liao

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T230094

## REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b RESTRICTIVE MARKINGS			
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.			
2b DECLASSIFICATION / DOWNGRADING SCHEDULE			5 MONITORING ORGANIZATION REPORT NUMBER(S)			
4 PERFORMING ORGANIZATION REPORT NUMBER(S)			7a NAME OF MONITORING ORGANIZATION Naval Postgraduate School			
6a NAME OF PERFORMING ORGANIZATION Naval Postgraduate School		6b OFFICE SYMBOL (If applicable) 54		7b. ADDRESS (City, State, and ZIP Code) Monterey, California 93943-5000		
6c ADDRESS (City, State, and ZIP Code) Monterey, California 93943-5000			9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER			
8a NAME OF FUNDING / SPONSORING ORGANIZATION		8b OFFICE SYMBOL (If applicable)		10 SOURCE OF FUNDING NUMBERS		
8c ADDRESS (City, State, and ZIP Code)			PROGRAM ELEMENT NO	PROJECT NO	TASK NO	WORK UNIT ACCESSION NO
11 TITLE (Include Security Classification) ANALYSIS OF OVERPRICING OF MAINTENANCE SERVICE CONTRACTS AWARDED VIA THE 8(a) PROGRAM AND BY FORMAL ADVERTISING						
12 PERSONAL AUTHOR(S) Benson, Eric J.						
13a TYPE OF REPORT Master's Thesis		13b TIME COVERED FROM _____ TO _____		14 DATE OF REPORT (Year, Month, Day) 1986 December		15 PAGE COUNT 42
16 SUPPLEMENTARY NOTATION						
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)			
FIELD	GROUP	SUB-GROUP	8(a) Contract Overpricing Review			
19 ABSTRACT (Continue on reverse if necessary and identify by block number) Section 8(a) of the Small Business Act, as amended, authorizes the Small Business Administration (SBA) to enter into contracts with other government procuring agencies for goods and services. The SBA subcontracts the work on a sole source basis to small businesses that are owned and controlled by socially and economically disadvantaged individuals. Overpricing of 8(a) contracts occurs when an award is made above the current fair market value and the SBA does not provide business development expense funds for the price differential. Both General Accounting Office and United States Army Audit Agency audits cite cases of overpricing. This thesis examines overpricing from a total change order rate perspective for 8(a) and formally advertised maintenance service. From the data accumulated for this study, it was determined that the change order rates were comparable.						
20 DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS				21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a NAME OF RESPONSIBLE INDIVIDUAL Shu S. Liao				22b TELEPHONE (Include Area Code) 408-646-2505		22c OFFICE SYMBOL 54Lc

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Analysis of Overpricing of Maintenance  
Service Contracts Awarded via the 8(a) Program  
and by Formal Advertising

by

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Submitted in partial fulfillment of the  
requirements for degree of

MASTERS OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL  
December 1986

## ABSTRACT

Section 8(a) of the Small Business Act, as amended, authorizes the Small Business Administration (SBA) to enter into contracts with other government procuring agencies for goods and services. The SBA subcontracts the work on a sole source basis to small businesses that are owned and controlled by socially and economically disadvantaged individuals. Overpricing of 8(a) contracts occurs when an award is made above the current fair market value and the SBA does not provide business development expense funds for the price differential. Both General Accounting Office and United States Army Audit Agency audits cite cases of overpricing. This thesis examines overpricing from a total change order rate perspective for 8(a) and formally advertised maintenance service. From the data accumulated for this study, it was determined that the change order rates were comparable.

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## I. INTRODUCTION

### A. BACKGROUND

Section 8(a) of the Small Business Act, as amended, authorizes the Small Business Administration (SBA) to serve as prime contractor and enter into contracts with federal government procuring agencies to furnish articles, equipment, supplies or materials to the federal government. The SBA then subcontracts the actual performance of the work, on a sole source basis, to small businesses that are owned and controlled by socially and economically disadvantaged individuals. As stated in the Federal Register:

The purpose of the Section 8(a) Program is to: (i) Foster business ownership by individuals who are both socially and economically disadvantaged; (ii) promote the competitive viability of such firms by providing such available contract, financial, technical and management assistance as may be necessary; and (iii) clarify and expand the program for the procurement by the United States of articles, equipment, supplies, services, materials and construction work from small business concerns owned by socially and economically disadvantaged individuals. [Ref. 1:p. 56690]

Contracts awarded under the 8(a) Program utilize sole source negotiations with economically disadvantaged contractors. The use of sole source negotiations precludes competition from being a factor in price determination, while the economically disadvantaged contractors typically lack contract experience. This combination of no

competition and an inexperienced contractor can result in a contract price which is higher than a price that would be obtained under normal competitive conditions.

Contracting procedures for 8(a) contracts require the procuring agency to determine the fair market value, which is the price that would be obtained under normal competitive conditions. However, overpricing occurs when these contracts are awarded above the fair market value and SBA does not provide business development expense funds for the differential.

Overpricing can and does occur. This fact is supported by audits conducted by the General Accounting Office (GAO) and the United States Army Audit Agency. The audits cited difficulty in determining the fair market value, opposing objectives for the negotiators, and non use of business development expense funds as factors leading to overpricing situations.

## B. THESIS OBJECTIVE

The objective of this thesis is to review potential overpricing of 8(a) contracts from a total change order cost perspective. This perspective will take into account the two different contract processes for 8(a) and formally advertised contracts.

The combination of Graham-Rudman budget cuts and Department of Defense (DOD) emphasis on competitive procurement call for a further review of the cost to federal government agencies participating in the 8(a) Program. If overpricing exists in 8(a) awarded contracts, the matter must be reviewed and corrective

action taken to ensure that the needed service is received at the minimum cost.

Despite the audit finding of overpricing, one might argue that the determination of overpricing between 8(a) versus formally advertised contracts can be difficult. The difficulty occurs because contract specifications and requirements differ as well as the award processes.

Contracts awarded under the 8(a) Program utilize sole source negotiations with economically disadvantaged contractors. Sole source negotiations permit the contract parties to discuss and resolve contract problems prior to contract award, the end result being a better mutual understanding of the contract requirements and costs. This should also result in a better understanding of contract requirements when the price is established and, consequently, minimal change orders to correct specification errors/omissions during the contract period. The initial contract price should then be a good representation of the total contract price.

Formally advertised contracts do not permit the contract parties to discuss and resolve contract problems prior to award. Contractor competition establishes the contract price. Change orders are then used to resolve specification errors/omissions during the contract period. This implies that the initial contract price may not be a good representation of the total contract price.

Theoretically, formally advertised contracts are more likely to experience lower award amounts and a potential for high change order costs, while 8(a) awards are more likely to experience a higher award amount and minimal change orders. Therefore, comparing award prices, as the GAO and Army audits did, may not give a fair representation of the overpricing phenomenon.

An analysis of total change order costs for the two types of contracts should neutralize the different effects associated with the different contract processes. This neutralization should permit a better determination as to whether 8(a) contracts are overpriced.

### C. RESEARCH METHODOLOGY

This thesis presents an analysis of maintenance service contracts awarded by the Western Division, Naval Facilities Engineering Command, San Bruno, California, local Officer-in-Charge of Construction (OICC) field offices. The contracts analyzed are composed of 8(a) awards and formally advertised small business awards. The emphasis was on determining whether overpricing occurs on 8(a) awarded maintenance service contracts. The determination was made by comparing the contract change order rates, for both 8(a) and formally advertised maintenance service contracts.

Research for this thesis included (1) a review of applicable literature, and (2) collection of contract data from officials at the Small Business Association Regional Office in San Francisco, WESTDIV personnel (contract specialists) at various field

offices, and the WESTDIV Small Business Specialist. Contract data were extracted from the WESTDIV Construction Management System Report (CMS) dated 30 April 1986. 8(a) contracts on the CMS were identified by a contract number listing provided by the WESTDIV Small Business Specialist. Contract change order data was obtained from various field offices through telephone interviews.

#### D. THESIS ORGANIZATION

Chapter II provides an overview of the 8(a) Program. The overview covers the Program's history and the steps involved in the contracting process for the procuring agency, SBA, and 8(a) contractor. The purpose and use of business development funds are examined along with the means of determining the fair market value and the negotiation process. The chapter concludes with examples of overpriced 8(a) contracts cited in GAO and United States Army Audit Agency reports.

Chapter III provides an overview of maintenance service contracts, their use, and contract administration procedures. The method of data collection for WESTDIV awarded maintenance service contracts is also presented. The chapter concludes with an overview of the analytical computations used for the data collected.

Chapter IV discusses the results of the analysis. Chapter V summarizes findings of the analysis and presents conclusions of the thesis.

## II. OVERVIEW OF THE 8(a) PROGRAM

### A. HISTORY

SBA has had the 8(a) procurement authority since the passage of the Small Business Act in 1958. But this authority was not used until after the 1967 civil disturbances, when SBA offered noncompetitive contracts to any small business that agreed to locate in depressed areas and hire the unemployed and underemployed in 1968. This test program was not successful because only a few small businesses were willing to relocate. In 1969, SBA changed the Program's focus to channel non-competitive contracts to disadvantaged small businesses. Then in 1978 Public Law 95-507 defined the purpose of section 8(a) as noted in Chapter I. [Ref. 2:pp. 1-5]

### B. THE 8(a) CONTRACTING PROCESS

The following overview describes the 8(a) contracting process, along with the responsibilities of the SBA, procuring agency, and 8(a) contractor. It is provided as background for understanding how the ultimate contract price is achieved.

The contracting process starts when the SBA and the procuring agency match the agencies' contract requirements with the capabilities of an eligible contractor. When a match is made, the SBA will request the procuring agency to support the 8(a) contractor's business plan via a request for commitment letter. The business plan details the business development objectives of

the contractor, and what, how, and where the resources will be obtained to enable the contractor to increase its ability to participate in the open market place. [Ref. 3:p. 50]

The procuring agency then reviews the commitment letter, and when satisfied that the contract requirement can be met the agency notifies the SBA of its intent to contract. The procuring agency then provides the SBA with contract information (e.g., the contract plans, specifications, detailed federal government cost estimate), and any other available information concerning the contract. [Ref. 4:pp. 19-21]

The SBA then forwards the contract information (excluding the federal government cost estimate) to the selected 8(a) contractor via a request for proposal. This document requires the contractor to submit their detailed estimate for performing the contract to SBA.

Upon receipt and review of the contractor's proposal SBA makes a determination as to whether the price proposed is reasonable by comparing it to the estimated current fair market price prepared by the procuring agency. If the contractor's proposal is considered adequate, SBA will forward it to the procuring agency. If the procuring agency accepts the proposal as submitted, a contract would be awarded. If the agency does not accept the proposal, sole source negotiations would be utilized to achieve the contract price.

The sole source negotiations would be between the procuring agency and the SBA (the contractor would be represented by the

SBA, who is the prime contractor). Direct negotiation can be conducted between the 8(a) contractor and the procuring agency if authorized by the SBA. This normally occurs when there is a limited amount of time and when the 8(a) contractor has had previous experience negotiating with the procuring agency.

[Ref. 3:p. 119]

Negotiations would conclude with one of three possible outcomes. The first is an awarded contract based on an agreement of the current fair market price. The second is an awarded contract that utilized SBA business development expense funds. The business development expense funds would pay for a price differential that existed between the procuring agency's determination of the current fair market value for the contract and the price SBA felt was needed to provide the 8(a) contractor a reasonable profit. The third outcome would be no contract award. This would occur when SBA would either not provide business development expense funds, or reduce the contract price to the fair market price as established by the procuring agency during the negotiation process.

### C. BUSINESS DEVELOPMENT EXPENSE FUNDS

As noted in the preceding section, the SBA can use business development expense funds to fund the difference between the price negotiated for the 8(a) contract and the price needed for the 8(a) contractor to earn a reasonable profit. This section will provide amplifying information as to what business

development expense funds are, what they can be used for, and how overpricing can occur if they are not provided.

The 8(a) Program is a business development program. Inherent in a business development program are development related expenses (e.g., the purchasing of capital equipment) and adequate credit and capital. When these expenses are incurred by the 8(a) contractors, it can result in their contract price being higher than other established competitors in the market. The higher price they charge may make them noncompetitive. [Ref. 3:p. 1]

To counter this problem the SBA has a business loan and investment fund, appropriated by Congress, which provides funds to compensate for the development expenses incurred by the 8(a) contractors. Thus the SBA can provide business development expense funds to the procuring agencies to fund the difference between the negotiated fair market value the agency should pay and the amount necessary for the 8(a) contractor to earn a reasonable profit.

Business development expense funds can be used for the following: [Ref. 3:p. 141]

1. Acquisition of special tooling and test equipment.
2. Facility and production engineering.
3. Training costs to counteract low labor productivity.
4. Labor costs.
5. Material wastage costs.
6. General and administrative expense and other indirect costs.

7. Differential due to low order purchasing power and/or material usage in comparison to competitors.

Overpricing occurs when the procuring agency awards a contract above the current fair market value, and the price differential is not funded with SBA business development expense funds. Overpricing is a violation of the Federal Acquisition Regulations (FAR). The FAR does not allow procuring agencies to award an 8(a) contract unless either the total contract price is reduced to the negotiated fair market value or business development expense funds are provided by the SBA for the price differential. [Ref. 4:pp.19-21]

#### D. DETERMINATION OF THE FAIR MARKET VALUE

Determination of the fair market value for 8(a) contracts is a unique process for a procuring agency. Normally the agency estimates the fair and reasonable price for a contract. For 8(a) contracts the agency must determine the current fair market value which represents the price that would be obtained under normal competitive procedures. [Ref. 5:p. 3]

Overpricing of an 8(a) contract can result if a poor estimate of fair market value is prepared, because the ultimate contract price is attained via sole source negotiations. During these negotiations the estimate functions as the base from which the procuring agency determines its ultimate price. The estimate is also reviewed by the SBA at the time they review and assist the

8(a) contractor with his proposal prior to negotiations, so the estimate can also function as a base for the SBA.

The determination of the fair market price for maintenance service contracts is aided by the fact that the work is repetitive and a requirement for most government agencies (i.e., janitorial and trash removal). The repetition and commonality of the requirement provide a good data base for determining the fair market value. A comparable contract could be obtained, and with appropriate adjustments for differences in the contract plans, specifications, quantities, schedules and wage rates, a good estimate of fair market value could be developed.

This issue of repetition and commonality was noted by GAO. GAO found the fewest problems with fair market value price determinations when the contract items were repetitively purchased and also competitively procured from non-8(a) firms. [Ref. 6:p. 10]

#### E. CONTRACT NEGOTIATIONS

The 8(a) Program uses sole source negotiations to determine the contract price when a difference exists between the procuring agency's estimate of the current fair market value and the 8(a) contractor's proposal. As previously noted, the negotiations will be between the SBA and the procuring agency, or direct negotiations may be conducted between the procuring agency and the 8(a) contractor. If the parties pursue negotiations to

determine the contract price, they will enter those negotiations with different objectives.

The procuring agency's ultimate goal is a contract price that is equal to or less than their estimate of the current fair market value. During negotiations they would revise their estimate as necessary, if warranted by additional information obtained during the negotiation process.

The SBA's ultimate goal is to obtain a price that would allow the 8(a) contractor to perform the contract work plus a reasonable profit. If the price proposed by the procuring agency is not considered enough to provide a reasonable profit for the 8(a) contractor, the SBA will attempt to conduct further negotiations to obtain the necessary price. [Ref. 3:p. 119]

These different negotiation objectives can result in two government agencies pursuing a different contract price. The procuring agency pursues the current fair market value or less; the SBA pursues a contract price to perform the contract work plus a reasonable profit.

#### F. OVERPRICING SITUATIONS

Overpriced contracts have been cited in audits of DOD procuring agencies by GAO and the United States Army Audit Agency. Factors contributing to overpricing were poor estimates of the current fair market value, nonuse of SBA business development expense funds when warranted, and opposing negotiation objectives for the procuring agency and the SBA. Specific examples of overpricing cited by these agencies follow.

1. GAO Findings

The Report to the Congress entitled Proposals for Minimizing the Impact of the 8(a) Program on Defense Procurement, dated 12 October 1982, had as one of its objectives the determination of whether DOD procuring agencies acquired goods and services at fair market prices through the 8(a) Program [Ref. 6:p.51]. The report included eight procurement installations (two each from the Army, Navy, Air Force and Defense Logistics Agency) which were considered to be among the most active DOD procuring agencies. These eight installations, which accounted for 50% of total DOD 8(a) contracts (\$466,242,000 out of a total of \$927,898,000), were: [Ref. 6:p. 6]

1. USA Armament Material Readiness Command (ARRCOM)  
Rock Island Arsenal, Illinois.
2. United States Army Missile Command (MICOM)  
Redstone Arsenal, Alabama.
3. United States Navy Ships Parts Control Center  
Mechanicsburg, Pennsylvania.
4. Naval Facilities Engineering Command (Northern and  
Chesapeake Division) Philadelphia, Pennsylvania and  
Washington, D.C.
5. Warner Robins Air Logistics Center  
Robins AFB, Georgia.
6. San Antonio Air Logistics Center and San Antonio  
Contracting Center, Kelly AFB, Texas.
7. Defense Fuel Supply Center  
Alexandria, Virginia.
8. Defense Personnel Support Center  
Philadelphia, Pennsylvania.

A total of 113 8(a) contracts were reviewed. These contracts represent 46% of the total dollar amount of 8(a)

contracts for the eight installations. The specific contracts reviewed for each installation were based on high dollar values within three categories: (1) contracts that contain business development expense funds, (2) those that did not contain the funds, and (3) terminated contracts. [Ref. 6:p. 6]

The report cited the following examples of overpricing that were attributed to the poor estimate of the fair market value, nonuse of business development expense funds, and the difference in the contract price objective during the negotiation process between the procuring agency and the SBA.

ARRCOM awarded an 8(a) contract for spare barrel covers for machine guns for \$41,435 in September 1979. The auditors found a problem with the way ARRCOM developed the fair market value estimate for the contract. ARRCOM computed the estimate by adjusting for inflation the previous year's non-8(a) awarded contract, which had the same specifications and comparable contract terms. Then an additional 10 percent was added to the total estimate for 8(a) contractor inefficiencies. GAO concluded that the 10 percent adjustment, which totalled \$3,762, resulted in ARRCOM subsidizing the 8(a) contractor. The \$3,762 should have been funded with the SBA's business development expense funds. [Ref. 6:pp. 11-12]

MICOM awarded an 8(a) contract for missile system repair parts for \$261,785. This price was \$74,840 higher than MICOM's initial fair market value estimate which was based on recent comparable awards. MICOM adjusted their initial estimate to

compensate for 8(a) contractor minimum buy/dollar requirements for needed items. GAO concluded that the \$74,840 increase should have been funded with the SBA's business development expense funds. [Ref. 6:pp. 12-13]

ARRCOM awarded eight out of the eighteen 8(a) contracts reviewed at prices higher than the fair market value. This occurred because ARRCOM substituted negotiated SBA prices for the fair market value estimates which were based on historical data from non 8(a) contracts. ARRCOM made the substitution because the SBA did not have business development expense funds or refused to pay any price differential. [Ref. 6:p. 14]

ARRCOM awarded an 8(a) contract for five million tape stiffener assemblies for \$314,000 (unit cost \$0.0628). This cost was \$49,000 higher than the fair market value estimate prepared by ARRCOM which was based on a unit price of \$0.0530, for a total amount of \$265,000. The \$0.0530 unit price, considered to be the current fair market value, was based on recent (the previous month) awards and offers. The auditors attributed the ultimate unit price increase (\$0.0530 to \$0.0628) to pressure from the SBA negotiator. The SBA negotiator's objective was to obtain an award amount that would provide a reasonable profit for the 8(a) contractor rather than the current fair market value. [Ref. 6:pp. 15-16]

## 2. United States Army Audit Agency Findings

An audit of Letterhenny Army Depot, Chambersburg, Pennsylvania found that the 8(a) janitorial contract award

price of \$1,022,557 for FY 80 may have been overpriced. This determination was based on prior contract prices for janitorial work which were \$784,260 for FY 79 (awarded to the same 8(a) contractor) and \$560,771 in FY 78 (awarded via formal advertising). The federal government estimate of the fair market value for FY 80 was approximately \$800,000. Unit costs for twelve of the supply items in the contractor's proposal were also reviewed. Of the twelve items, ten were found to be higher than General Services Administration prices. There were some changes in the services specified, but those changes were not significant and did not justify the price differential. Elements contributing to the overpricing situation were a short time period before the service was needed and the contracting officer's failure to consider the federal government estimate and prior year's prices and negotiations with the 8(a) contractor. [Ref. 7:pp. 14-17]

An audit of United States Army Armament Research and Development Command, Dover, New Jersey found overpricing on three of the six 8(a) contracts reviewed. The contracts were composed of one construction and five janitorial services contracts with a total cost of \$2.8 million. The three contracts totalled \$619,993 which was about \$78,000 higher than the total fair market value for those contracts. The three contracts were awarded at prices based on the contractors' final offers rather than on the fair market values. SBA business development expense funds were not sought to fund the difference between the fair

market price and the contractor's final offer.

[Ref. 8:pp. 15-17]

An audit of the Presidio of San Francisco, California found two 8(a) service contracts totalling about \$883,000 that could have been obtained at a lower price if they had been formally advertised. The auditor's analysis was based on the comparison of one of the 8(a) contracts and a comparable formally advertised contract. The monthly square foot unit cost was 14 cents for the 8(a) contract compared to 4 cents for the formally advertised contract. This represents a total annual price differential of \$158,000 for the one 8(a) contract. The auditors were unable to make a comparison of the second 8(a) contract, but assumed a similar cost reduction could be expected.

[Ref. 9:p. 4]

An audit of the United States Army Training Center, Fort Jackson, South Carolina found overpricing associated with two 8(a) awarded janitorial services contracts. The two contracts were awarded to the same 8(a) contractor for a total of \$924,808. The previous year's contracts were formally advertised and awarded for a total price of \$477,474. There were minor changes in the specifications between the two years, but the changes did not justify the large increase. The overpricing was attributed to a short time requirement and a poor government estimate of the fair market value. [Ref. 9:pp. 7-9]

An audit of the 7th Infantry Division, Fort Ord, California found the 8(a) awarded dining attendant contract to be

overpriced by about \$912,000. The contract was awarded for about \$2.6 million in FY 81. The cost-per-meal price was 69 cents while the cost-per-meal price for a comparable formally advertised contract was 45 cents. The estimated overpricing cost of \$912,000 was computed by taking the cost-per-meal price difference times the estimated number of meals. The auditors concluded the overpricing occurred because the procuring officer did not effectively use the government estimate during negotiations. [Ref. 10:pp. 5-8]

An audit of the United States Army Missile Command, Redstone Arsenal, Alabama concluded that the command did not adequately determine the fair market value for 8(a) awarded contracts or pursue SBA business development expense funds. The auditors estimated the additional contract costs incurred as a result of these inadequacies could exceed \$7 million for 35 of the 38 contract actions (contract award or modification) they reviewed. The 38 contract actions totaled about \$73.2 million and consisted of 13 contract awards and 25 modifications. [Ref. 11:pp. 5-9]

An audit of the III Corps, Fort Hood, Texas concluded that two of the three 8(a) contracts reviewed were overpriced. The contracts' annual costs were about \$6.2 million and were for janitorial, food and landscaping services. The overpricing amounted to about \$168,000. Overpricing occurred because the contracts were awarded at amounts higher than the fair market

values, and business development expense funds were not provided by the SBA for the difference. [Ref. 12:p. 23]

#### G. SUMMARY

Section 8(a) of the Small Business Act authorizes the SBA to contract on a sole source basis with other federal government procuring agencies and then subcontract the work to participating 8(a) contractors. The 8(a) contractors are small businesses owned and controlled by socially and economically disadvantaged individuals. This chapter provided a brief overview of the 8(a) contract award process, and discussed GAO and Army audit findings of overpricing.

Overpricing occurs on an 8(a) awarded contract when an award is made above the fair market value (which represents the price that would be obtained under normal competitive procedures) and SBA business development expense funds are not provided for the differential.

Overpricing can and does occur, as demonstrated by audits conducted by GAO and the United States Army Audit Agency of contracts awarded under the 8(a) Program. The overpricing examples noted by auditors were attributed to contract processes inherent to 8(a) contracts, such as the determination of the fair market value, opposing negotiation objectives for the procuring agency and SBA, and the nonuse of SBA business development expense funds.

### III. METHODOLOGY

#### A. MAINTENANCE SERVICE CONTRACTS

Maintenance service contracts were selected for the analysis of this thesis because they are not as complex as other types of contracts, thus making it easier to compare contract prices. The typical maintenance service contract utilizes unskilled labor and requires limited capital investment. The services performed are generally repetitive and a common requirement at most DOD installations. The combination of these characteristics makes an analysis of comparable contracts at different installations possible.

Maintenance service contracts represent all facilities support contracts that do not involve construction. The contract basically requires a contractor's time and effort and involves a service rather than an end product. Examples of this type of contract are janitorial services, automotive and repair services, grounds maintenance, guard service, and food service contracts. The contracts are subject to the Service Contract Act, which requires the contractor to pay the prevailing minimum wage and fringe benefits as determined by the Department of Labor.

[Ref. 13:pp. 9.1-9.2]

The maintenance service contract typically includes a clause that permits the federal government to extend the term of the

contract. The maximum term for the contracts used in the analysis for this thesis is 36 months (a base year and two option years).

When an option extending the contract period is executed, a price adjustment to the base is allowed only for changes that have occurred in the prevailing wage rates. Options are executed by a change order to the contract. A change order is also used to correct specification errors/omissions and customer requests for revisions to existing services that are in the scope of the contract. These change orders are negotiated and become part of the contract when a contract modification is executed.

## B. DATA COLLECTION

### 1. General

The data for the research were collected from WESTDIV and its field activities. The field activities are comprised of approximately 20 geographically remote offices that service commands in nine western states and Alaska. The offices are headed by an Officer-in-Charge of Construction (OICC's). The OICC is a Navy Civil Engineering Corps Officer who is delegated contracting authority from the Commanding Officer of WESTDIV.

The data for the maintenance service contracts used for this thesis were extracted from the WESTDIV Status of Contracts Report (R26), which is a component of the Construction Management System (CMS). The CMS is a subsystem contained in the ANALGAMAN/INTEGRATED Disbursing and Accounting Data Base Master

maintained by the Naval Facilities Support Office. The CMS provides program, project, and construction managers at the Naval Facilities Engineering Command Headquarters, the Engineering Field Division, and OICC field offices with information that enables them to plan, monitor, and control the acquisition process. The WESTDIV R26 Report provides the contract number, type of contract (i.e., construction, demolition, maintenance service), location, and current price. The current price consists of the initial award plus all confirmed change orders.

Telephone interviews were conducted with the cognizant OICC field offices to obtain a subdivision of the current contract price. This subdivision consists of the award amount, total option year change order amount, non-option change order amounts, and the completion amount. As noted in Section A of this chapter, maintenance service contract award periods can total 36 months (a base year and two option years). Options extensions are consummated via change orders. The subdivision of current price into award amount, option year amount, and change order amounts permitted an analysis of total change order amounts exclusive of option extension change order amounts.

The WESTDIV Small Business Representative provided a listing of the contract numbers for 8(a) awarded contracts for FY 80 through FY 85. This listing was applied to the selected contracts to identify the ones awarded under the 8(a) Program.

## 2. Data Set Definition

Maintenance service contracts cover a wide range of base support functions. To improve contract comparability only janitorial, grounds maintenance, refuse disposal, and guard service contracts were included in this study. These types of contracts are considered to be representative of repetitive services required by most commands.

All selected contracts were "closed out", or were to be completed, by 30 September 1986. This ensured that the reflected change order total cost was a final static figure as opposed to that of an active contract whose total cost would be dynamic.

The change order total figure represents all executed changes exclusive of option extensions for each contract in the data base. No attempt was made to differentiate between types of change orders (i.e., error or omission/customer request).

The WESTDIV R26 Report dated 30 April 1986 was utilized to obtain the analyzed contracts. A total of 147 contracts were initially selected for the data base. Of those selected, 54 were 8(a) awards and 93 were awarded via formal advertising. This initial sample of 147 was reduced as a result of additional information obtained during the telephone interviews with the cognizant field offices. This information indicated that: (1) some contracts were extended beyond the 30 September 1986 contract completion date; (2) some contracts remained active because of contractor claims; (3) older contracts which had been completed for more than one year had been forwarded to central

storage facilities, making the retrieval of data cost prohibitive; and (4) other contracts were completed early via a deductive change order because of contractor poor performance.

The revised contract data base totaled 52 contracts. This base was composed of 20 8(a) awards and 32 awarded via formal advertising. Appendix A provides a summary of contract award, option, change order, and completion amounts along with the total contracts in each category.

### C. ANALYTICAL COMPUTATIONS

A change order rate for each contract was computed by dividing the change order amount by the completion amount and multiplying the result by 100. The mean, variance, and standard deviation of the change order rate was computed for the two categories of contracts (8(a) and formally advertised). The same computations were made for each of the four types of contracts within the two categories (janitorial, grounds maintenance, refuse, guard service). Appendix B provides a summary of the results.

A two sample t test was used to compare the means of change order rates. [Ref. 14:p. 297] Two tests were made. The first test compared the mean change order rate for the two categories of contracts. The second test compared the mean change order rate for the 8(a) and formally advertised janitorial contracts.

#### D. SUMMARY

Maintenance service contracts were selected for the analysis of this thesis because they are not as complex as other types of contracts, thus making it easier to compare contract results. To improve contract comparability only janitorial, grounds maintenance, refuse disposal, and guard service contracts were used in this study. All selected contracts were "closed out", or were completed by 30 September 1986.

The data for the maintenance service contracts were extracted from the WESTDIV Status of Contracts Report. Telephone interviews were conducted with the cognizant OICC field offices to obtain the contract award, option, change order and completion amounts.

A change order rate for each contract was computed. The mean, variance and standard deviation of the change order rate were then computed. A two sample t test was then used to compare the mean change order rates for the 8(a) and formally advertised contracts.

#### IV. DISCUSSION OF RESULTS

The objective of this thesis is to review potential overpricing of 8(a) contracts from a change order cost perspective. This perspective will take into account the two different contract processes for 8(a) and formally advertised contracts.

Theoretically, formally advertised contracts are more likely to experience lower award amounts and a potential for high change order costs, while 8(a) awards are more likely to experience a higher award amount and minimal change orders. Therefore, comparing award prices, as the GAO and Army audits did, may not give a fair representation of the overpricing phenomenon.

An analysis of total change order cost rates for the two types of contracts should neutralize the different effects associated with the different contract processes. This neutralization should permit a better determination as to whether 8(a) contracts are overpriced since it compares completed contract costs.

The two sample t test was employed to make an inference about the population mean change order rates for 8(a) and formally advertised contracts. The null hypothesis was that the difference between the two population means equaled zero. The research hypothesis was that the difference between the population means for the formally advertised contracts and the

8(a) awarded contracts was less than zero. The rejection region was  $t$  less than  $t$  alpha with alpha equalling .10.

To perform the two sample  $t$  test the sample mean, standard deviation, and variance were computed. The computations were made for the respective contract totals in the 8(a) and formally advertised categories. These computations were also made for the individual contract types within the two contract categories. Appendix B summarizes the results.

Due to the reduction in the number of contracts analyzed (147 to 52 and the dispersion of the data collected), two separate  $t$  tests were computed vice five as originally planned. The first compared the mean change order rate for 8(a) and formally advertised janitorial contracts. The second compared the mean change order rates for the respective totals in the 8(a) and formally advertised contract categories.

The mean change order rate for the formally advertised janitorial contracts was greater than the mean change order rate for 8(a) janitorial contracts, 15.96% versus 13.90%. The total mean change order rate for all contracts in the formally advertised contract category was also greater than the total mean change order rate for all contracts in the 8(a) contract category, 16.13% versus 11.43%. Although the rates differed, the difference was not great enough to reject the null hypothesis for either  $t$  test.

The first test resulted in acceptance of the null hypothesis. The  $t$  value was -0.2951 and the  $t$  alpha value for .10 was -1.315.

The rejection region was  $t$  less than negative  $t$  alpha. This indicates conclusively that the difference between the two population mean change order rates is zero for the janitorial contracts.

The second test also resulted in the acceptance of the null hypothesis. The  $t$  value was  $-0.9955$  and the  $t$  alpha value for  $.10$  was  $-1.2995$ . The rejection region was  $t$  less than negative  $t$  alpha. This too indicates conclusively that the difference between the respective population mean change order rates is zero for total 8 (a) and formally advertised contracts.

## V. SUMMARY

Overpricing of 8(a) contracts was cited by GAO and United States Army Audit Agency audit reports. Overpricing occurs when these contracts are awarded above the fair market value and SBA does not provide business development expense funds.

This thesis reviewed overpricing of 8(a) contracts from a change order cost perspective. An analysis of total change order costs for 8(a) and formally advertised contracts should neutralize the different effects associated with the different contract processes (8(a) contracts utilize sole source negotiations while formally advertised contracts utilize open competition).

The analysis was conducted by using two sample t tests to make inferences about the population mean change order rates. Two tests were performed. Both test results concluded that the mean change order rates for 8(a) and formally advertised contracts are equal. This infers that, on the average, 8(a) and formally advertised contracts experience comparable change order rates.

Comparable change order rates conflict with the theoretical contract results for 8(a) versus formally advertised contracts. The competition inherent with formally advertised contracts should result in lower award amounts and a higher change order rate. The higher change order rate occurs because the contract parties are not permitted to discuss and resolve

contract requirements prior to award. Opposite results should occur for 8(a) contracts. For 8(a) contracts the lack of competition should result in a higher award. The sole source negotiations should result in a better mutual understanding of contract requirements and thus minimal change orders.

Since change order rates were found to be comparable, it can be concluded that a comparison of award prices, (as the GAO and Army audits did) provides a fair representation of overpricing for maintenance service contracts.

APPENDIX A  
INDIVIDUAL CONTRACT AMOUNTS

8(a)

	AWARD	OPTION	CHANGE ORDER	COMPLETION
JANITORIAL				
1.	934,723	1,355,718	443,358	2,733,799
2.	1,599,966	2,692,166	363,777	4,655,909
3.	2,137,416	4,501,860	27,949	6,667,225
4.	100,530	272,131	-0-	372,661
5.	61,675	61,235	13,704	136,614
6.	162,243	175,763	91,595	429,601
7.	364,683	-0-	45,412	410,094
8.	691,244	-0-	329,068	1,020,312
9.	121,094	281,697	52,624	392,415
10.	813,444	-0-	94,503	907,947
11.	163,421	370,144	207,699	741,264
12.	703,000	1,596,285	431,457	2,730,742
GROUNDS MAINTENANCE				
1.	1,118,381	2,221,277	405,274	3,744,932
2.	491,481	512,971	34,084	1,038,536
3.	160,436	176,374	72,034	408,844
REFUSE				
1.	98,855	98,855	-0-	197,710
GUARD SERVICE				
1.	585,039	1,291,510	28,848	1,905,397
2.	448,000	255,000	122,019	825,019
3.	352,600	274,450	99,404	726,454
4.	483,321	966,641	1,202	1,451,164
TOTAL CONTRACTS	20			

APPENDIX A (cont.)

FORMALLY ADVERTISED

	AWARD	OPTION	CHANGE ORDER	COMPLETION
JANITORIAL				
1.	1,360,249	3,360,166	120,563	4,840,978
2.	43,908	58,682	8,227	110,817
3.	42,000	86,538	227	128,765
4.	168,820	415,769	110,928	659,517
5.	17,352	55,874	16,323	89,549
6.	154,332	183,383	27,492	365,207
7.	117,600	244,476	-0-	362,076
8.	173,000	322,666	-0-	495,666
9.	369,666	408,938	93,681	872,285
10.	163,729	190,453	5,563	359,745
11.	53,425	-0-	14,343	67,768
12.	317,499	-0-	24,160	351,659
13.	21,627	-0-	158,471	180,098
14.	203,128	253,723	41,137	497,988
15.	317,560	-0-	295,873	613,433
16.	570,402	1,213,711	312,861	2,096,974
GROUNDS MAINTENANCE				
1.	465,000	983,075	75,545	1,523,620
2.	491,499	180,774	122,874	795,147
3.	480,673	250,133	615,112	1,345,918
4.	218,643	-0-	39,555	258,198
5.	437,000	539,555	161,068	1,137,623
6.	224,950	752,533	15,513	992,996
7.	234,000	571,357	358,919	1,164,276
REFUSE				
1.	544,999	727,766	-0-	1,272,765
2.	56,767	116,768	-0-	173,535
3.	150,000	310,096	-0-	460,096
4.	98,928	98,928	-0-	197,856
5.	454,080	908,160	502,077	1,864,317
6.	127,200	127,200	101,200	355,600
7.	215,744	219,008	138,127	572,879
GUARD SERVICE				
1.	26,640	26,640	-0-	53,280
2.	83,299	69,415	173,541	326,255
TOTAL CONTRACTS	32			

APPENDIX B

CONTRACT CHANGE ORDER RATES

32 FORMALLY ADVERTISED

	JANITORIAL	GROUNDS MAINTENANCE	REFUSE	GUARD SERVICE	TOTAL
1.	2.49	4.96	0	0	
2.	7.42	15.45	0	53.19	
3.	0.18	45.70	0		
4.	16.82	15.32	0		
5.	18.23	14.16	26.93		
6.	7.73	1.56	28.46		
7.	0	30.83	24.11		
8.	0				
9.	10.74				
10.	1.55				
11.	21.16				
12.	9.71				
13.	87.99				
14.	48.23				
15.	14.91				
16.	8.26				
MEAN	15.96	18.28	11.36	26.60	16.13
STANDARD DEVIATION	22.62	15.28	14.22	37.61	19.77
VARIANCE	511.66	233.48	202.21	1414.15	390.85

20 8(a)

1.	16.23	10.82	0	1.51	
2.	7.81	3.28		14.79	
3.	0.43	17.62		13.68	
4.	0				
5.	10.03			0.08	
6.	21.32				
7.	11.07				
8.	32.25				
9.	13.41				
10.	10.41				
11.	15.80				
12.	28.02				
MEAN	13.90	10.57	0	7.52	11.43
STANDARD DEVIATION	9.76	7.17	0	7.79	9.18
VARIANCE	92.26	51.41	0	60.68	84.27

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