INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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REPORT
NO. 91-042

February 6, 1991

MEMORANDUM FOR ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Report on the Audit of Software Engineering Support Contracts for Intercontinental Ballistic Missiles (Project No. 0FE-0080)

Introduction

We are providing this final report for your information and use. We made the audit from July through October 1990. The overall audit objective was to determine if the Air Force used effective and efficient procedures to manage software engineering support contracts and related technical support for the modernization and maintenance of Intercontinental Ballistic Missiles (ICBM). We also evaluated the use and management oversight of contract advisory and assistance services (CAAS) related to the engineering support contracts, the effectiveness of internal controls, and compliance with applicable laws and regulations.

DoD has experienced increased costs and development problems in acquiring software for weapon systems. Software acquisition and maintenance costs for DoD weapon systems are estimated to have grown from $3 billion in 1980 to $30 billion in 1990. Office of the Assistant Inspector General for Auditing, DoD, Report No. 88-126, "Defense-Wide Audit of Support for Tactical Software," April 7, 1988, reviewed problem areas affecting the supportability of major DoD tactical software. That report noted:

- Computer resource plans were not prepared, were late, or lacked details;

- Software documentation was not acquired or was late;

- Configuration management was not accomplished;

- Software cost data were not identified; and

- Ada (programming language) software was managed with inadequate plans, and nonstandard computer languages were used.

Discussion

In our review of the software acquisitions for strategic systems and related contractor technical support at the Ballistic Missile Organization (BMO), we found that the Peacekeeper Rail Garrison Program Office did not experience the problems noted in our tactical software audit, and that software acquisitions valued at $74 million were generally well-managed. We noted no abuse or illegal acts by BMO personnel. We did note, however, a potential for conflict of interest and a failure to perform the semiannual self-inspection during 1990. Because responsible program officials concurred with our observations and adequate corrective actions were under way, this report contains no recommendations requiring a BMO response.

Potential for Organizational Conflict of Interest. A potential for conflict of interest occurred when a technical support contractor assisted the Peacekeeper Rail Garrison Program Office in determining work requirements and recommending resources to complete tasks, and later performed the work. The contractor provided a broad range of technical support under a Systems Engineering and Technical Assistance (SE&TA) contract. The support included assisting the BMO and various program offices in technical matters, such as determining the work required to provide quality assurance and handle nuclear safety concerns related to weapon system software. The SE&TA contractor prepared work statements used to formulate staffing allocations and work level options for the Nuclear Safety Cross-Check Analysis/Performance Analysis and Technical Evaluation (NSCCA/PATE). The BMO combined this work with other SE&TA tasks several years ago in order to simplify the contracting process. The contractor subsequently performed a software quality assurance and nuclear safety review, in conjunction with other work, under a cost-type contract.

The Peacekeeper Rail Garrison Program Office considered recommendations made by the contractor and made independent program decisions that were in the best interests of the Air Force. Although our review and reviews by both the General Accounting Office and the Air Force Audit Agency found no organizational conflicts in which SE&TA judgment was biased, we believe that contractors can inadvertently be placed in a conflicting role when they determine work requirements and subsequently perform the work. BMO officials recognized that the potential for conflicts of interest can occur when using SE&TA contractors to program work, and informed us that the directors of their program management teams will continue to monitor the contracting process and ensure its integrity.

Annual Assurance. During the period covered by our audit, the BMO had not adequately administered the self-inspection process to support the Annual Statement of Assurance provided to the Secretary of the Air Force. The Federal Managers' Financial Integrity Act (FMFIA) of 1982 and DoD policy require Annual Statements of Assurance. In 1989, the BMO was reorganized, and functional responsibilities were realigned. In 1990, responsibility for management of the Peacekeeper System shifted from the BMO to a newly created program executive officer for strategic systems located in the Pentagon. This change was made in response to DoD Directive 4245.1, "Military Department Acquisition Management Officials," July 8, 1986. The reorganizations resulted in the loss of some administrative continuity and a failure to perform the semiannual self-inspections for January and July 1990. In addition, documentation necessary to perform the self-inspection was not prepared.

The BMO official responsible for the FMFIA program concurred with our observations and was taking corrective actions. We were informed that the BMO would conduct the required self-evaluations and would define the program executive officers's role in preparing the Annual Statements of Assurance.

Scope of Audit

We reviewed the operations of the Air Force BMO as related to acquiring mission critical computer software. The review focused on software management procedures and related contractor support for the software used for targeting, guidance and control, and launch control of the Peacekeeper Rail Garrison missile. We examined contract documentation and status reports from three contractors associated with acquiring and maintaining software: the software developer/maintainer, an independent nuclear surety and quality assurance contractor, and the technical support contractor. The contracts were awarded during FY's 1988 and 1989 and contained software deliverables valued at $74 million. We interviewed key DoD officials responsible for the use of Ada software language and the nuclear safety of mission critical software and the program executive officer responsible for the Peacekeeper Rail Garrison program. Enclosure 1 lists the activities we visited or contacted.

This self-initiated economy and efficiency audit was conducted from July through October 1990 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary.

Background

Recent changes in the BMO's organizational structure have altered its role in acquiring and maintaining ICBM's. Formerly, the BMO was responsible for managing the development and maintenance of ICBM's. The BMO now provides resources to support the weapon system program organizations that carry out these functions. Program execution is conducted within program organizations in the BMO, each dedicated to a missile system: Minuteman, Small ICBM, Peacekeeper Missile in Silo, and Peacekeeper Rail Garrison. Program results for all missile systems are now reported to a program executive officer for strategic systems.

The weapon system program organizations in the BMO are further subdivided into program management teams, and act as prime contractors responsible for integrating various system components into complete, functional missile systems. SE&TA contractors provide technical expertise under staffing support contracts. Typically, one contractor develops both computer hardware and software. A separate contractor independently evaluates nuclear and quality assurance requirements.

The Nuclear Safety Cross-Check Analysis is performed to ensure that the software meets safety standards for nuclear weapons. The same contractor may also perform a Performance Analysis and Technical Evaluation to ensure that software meets quality assurance requirements.

Prior Audit Coverage

Both the General Accounting Office and the Air Force Audit Agency recently audited BMO technical support contracts to determine whether they were for CAAS and were effectively managed. To avoid duplication of audit coverage, we limited our review of CAAS to those issues that directly related to specific Peacekeeper Rail Garrison software.

A General Accounting Office draft report, "Consulting Services: Role and Use in Acquiring Three Weapon Systems," OSD case No. 8026-A; NSIAD-90-119; May 17, 1990, reviewed 15 CAAS and CAAS-like contracts and noted management deficiencies in contract

identification and control. The Air Force nonconcurred with the findings. The Air Force viewed the BMO's role of overall weapon system integrator as unique and not fitting the definition of CAAS in Federal Acquisition Regulation 37.202.

The Air Force Audit Agency report, "Management of Systems Engineering and Technical Assistance (SE&TA) Contracts," Report No. 311-0-12, May 24, 1990, determined that the BMO's administration of the SE&TA contracts was effective in surveillance of contractor costs and performance.

Report Staffing

We provided a draft of this report to the addressee on November 26, 1990. Because there were no recommendations, written comments were not required of management, and none were received. Therefore, we are publishing this report in final form. Any comments on the final report should be provided within 60 days of the date of this report. The courtesies extended to the audit staff are appreciated. If you have any questions about this audit, please contact Mr. Terry L. McKinney at (703) 693-0430 (AUTOVON 223-0430), or Mr. Richard B. Bird at (703) 693-0476 (AUTOVON 223-0476). A list of audit team members is shown in Enclosure 2. Copies of this report will be distributed as shown in Enclosure 3.

Robert J. Lieberman

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosures

cc:
Secretary of the Air Force

ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Assistant to the Secretary of Defense (Atomic Energy), Washington, DC

Department of the Air Force

U.S. Air Force Program Executive Officer for Strategic Systems, Washington, DC
Ballistic Missile Organization, San Bernardino, CA

Non-Government Activities

Rockwell International, San Bernardino, CA
TRW, Inc., San Bernardino, CA
Logicon, Inc., San Pedro, CA

AUDIT TEAM MEMBERS

Nancy L. Butler, Director, Financial Management Directorate
Terry L. McKinney, Program Director
Richard B. Bird, Project Manager
Bruce K. Shelton, Team Leader
Andrew Katsaros, Auditor
Derrick E. Miller, Auditor

REPORT DISTRIBUTION

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition
Comptroller of the Department of Defense

Department of the Air Force

Assistant Secretary of the Air Force (Acquisition)
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Ballistic Missile Organization
Air Force Program Executive Officer for Strategic Systems

Non-DoD Activities

Office of Management and Budget
U. S. General Accounting Office,
NSIAD Technical Information Center

Congressional Committees:

Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
Senate Ranking Minority Member, Committee on Armed Services
House Ranking Minority Member, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Operations
House Subcommittee on Legislation and National Security, Committee on Government Operations