Audit Report

ACQUISITION OF THE MINUTEMAN III
PROPULSION REPLACEMENT PROGRAM

Report No. D-2000-092 March 1, 2000

Office of the Inspector General
Department of Defense

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Acronyms

NEPA	National Environmental Policy Act
PESHE	Programmatic Environmental, Safety, and Health Evaluation

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March 1, 2000

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

SUBJECT: Audit Report on Acquisition of the *Minuteman III* Propulsion Replacement Program (Report No. D-2000-092)

We are providing this report for review and comment. We considered management comments on a draft of this report when preparing the final report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. Comments from the Department of the Air Force were partially responsive. We request that additional comments on Recommendation C. be provided by April 3, 2000.

We appreciate the courtesies extended to the audit staff. For additional information on this report, please contact Mr. John E. Meling at (703) 604-9091 (DSN 664-9091) (jmeling@dodig.osd.mil) or Mr. Douglas P. Neville at (703) 604-9076 (DSN 664-9076) (dpneville@dodig.osd.mil). See Appendix D for the report distribution. Audit team members are listed on the inside back cover.

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Project No. D-2000-092 **March 1, 2000**
(Project No 9AE-0074)

Acquisition of the *Minuteman III* Propulsion Replacement Program

Executive Summary

Introduction. The *Minuteman III* is a ballistic missile weapon system of intercontinental range. The purpose of the Propulsion Replacement Program (the program) is to extend the service life of the *Minuteman III* weapon system by remanufacturing and replacing the three solid rocket stages of its propulsion system before age-out occurs. The Air Force initiated the program in response to national guidance for strategic deterrence and defense in the DoD Planning Guidance for maintaining a strategic nuclear force. The program also responds to guidance in the 1992 National Military Strategy to continue to maintain a TRIAD to deter the threat of nuclear aggression. The *Minuteman III* weapon system will eventually become the only intercontinental ballistic missile component of the strategic TRIAD. The Intercontinental Ballistic Missile System Program Office (System Program Office) estimates that program research and development will cost about $331 million and that procurement will cost about $1.8 billion.

Objectives. The audit objective was to evaluate the overall management of the Air Force *Minuteman III* Propulsion Replacement Program. Because the program is in the engineering and manufacturing development acquisition phase, our objective was to determine whether management was cost-effectively developing and readying the program for low-rate initial production. In addition, we evaluated the management control program as it related to our audit objective.

Results. Overall, the System Program Office successfully developed and readied the program for low-rate initial production within established cost, schedule, and performance baselines; however, the following three areas warrant additional management attention:

- The System Program Office did not ensure that analyses of the potential environmental consequences of developing and deploying the Propulsion Replacement Program were performed and approved as required. As a result, the System Program Office may not be able to inform the Air Force Acquisition Executive of the environmental effect of the program before the full-rate production decision planned for September 2000 (finding A).

- The System Program Office did not complete its programmatic environmental, safety, and health evaluation (evaluation). As a result, the System Program Office did not receive the benefits of early identification and resolution of potential environmental problems during the system engineering process and cannot be assured that the program's environmental, safety, and health issues, and their associated life-cycle cost impacts are incorporated in future day-to-day decisionmaking processes (finding B).

- The System Program Office did not plan to develop a comprehensive total ownership (life-cycle) cost estimate for the Propulsion Replacement Program. As a result, the System Program Office did not realize the benefits of performing cost and performance tradeoff analyses early in the acquisition process. Moreover, the System Program Office did not have a baseline to measure future mandated reductions in program life-cycle costs (finding C).

The recommendations in this report, if implemented, will improve the management process for the *Minuteman III* Propulsion Replacement Program and will correct the material management control weakness identified in Appendix A.

Summary of Recommendations. We recommend that the Director, Intercontinental Ballistic Missile System Program Office, obtain the required environmental analyses from Hill and Vandenberg Air Force bases and obtain Air Force Acquisition Executive approval of the analyses no later than the program full-rate production decision scheduled for September 2000. We also recommend that the Director, Intercontinental Ballistic Missile System Program Office, update, coordinate, and finalize a programmatic environmental, safety, and health evaluation as well as develop a comprehensive total ownership (life-cycle) cost estimate for the Propulsion Replacement Program no later than September 2000.

Management Comments. The Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management) concurred with all findings and recommendations. Specifically, the System Program Office will obtain required environmental impact analysis from Hill and Vandenberg Air Force bases to support the program full-rate production decision. Also, the System Program Office plans to sign a coordinated programmatic environmental, safety, and health evaluation no later than February 29, 2000. Finally, the System Program Office agreed to develop a comprehensive total ownership (life-cycle) cost estimate before the program's full-rate production decision only if the Air Force Cost Analysis Improvement Group recommended that it do so. A discussion of the management comments is in the Findings section of the report, and the complete text is in the Management comments section.

Audit Response. Air Force comments were not fully responsive on the recommendation to develop a comprehensive total ownership cost estimate for the Propulsion Replacement Program. The Air Force is required to develop a life-cycle cost estimate in support of the program full-rate production decision. Further, the Air Force Cost Analysis Improvement Group does not have authority to waive the requirement. Therefore, we request that the Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management) provide additional comments by April 3, 2000.

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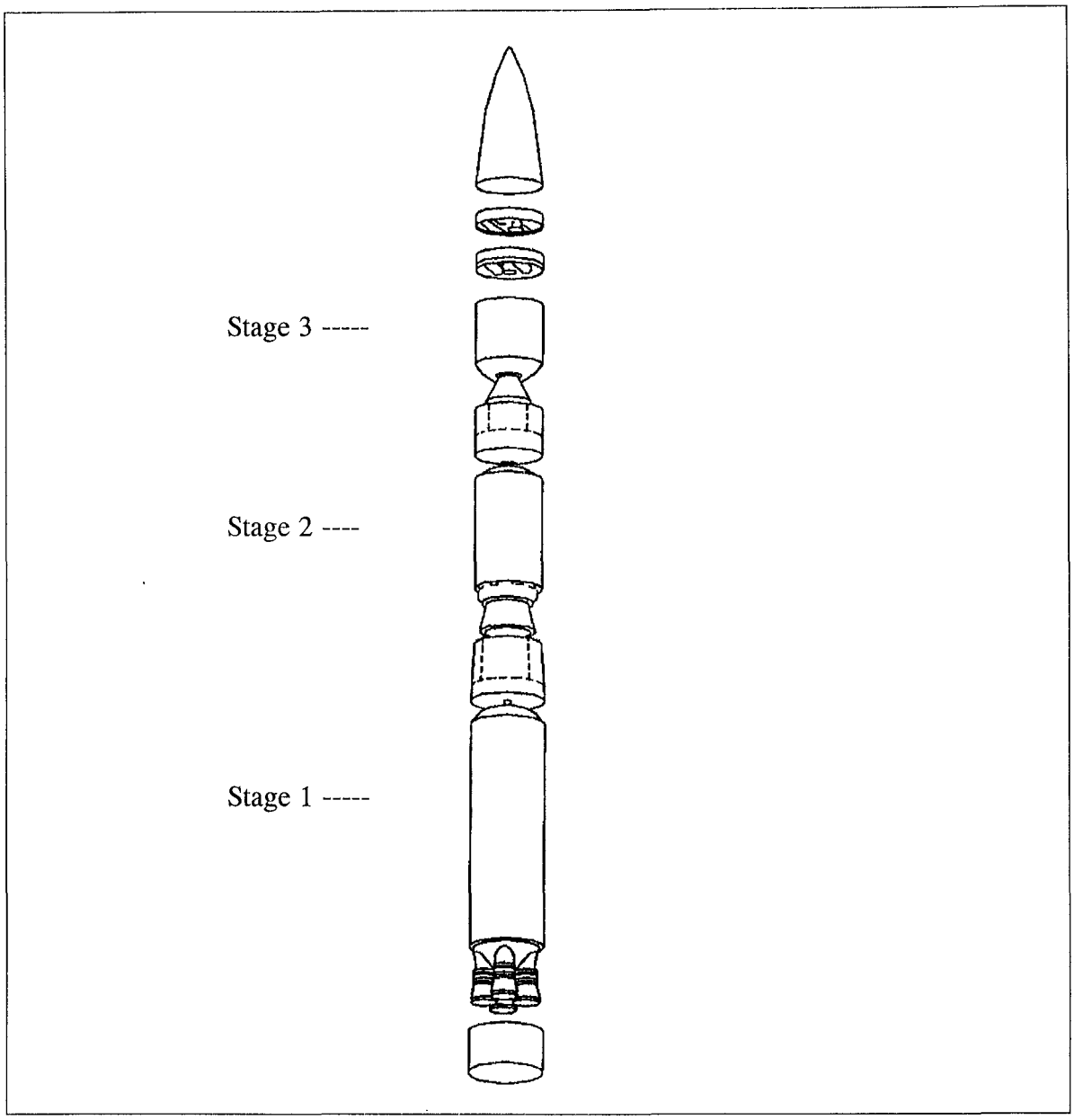

Minuteman III

Background

The *Minuteman III* weapon system will eventually become the only intercontinental ballistic missile component of the Strategic TRIAD; as such, the missile will provide nuclear deterrence well into the next century. The purpose of the Propulsion Replacement Program (the program) is to extend the service life of the *Minuteman III* weapon system by remanufacturing and replacing the three solid rocket stages of its propulsion system before age-out occurs. The Air Force initiated the program in response to national guidance for strategic deterrence and defense in the DoD Planning Guidance for maintaining a strategic nuclear force of sufficient size and capability. The program also responds to guidance in the 1992 National Military Strategy to continue to maintain a TRIAD to deter the threat of nuclear aggression. The program manager, within the Intercontinental Ballistic Missile System Program Office (System Program Office), manages daily program operations.

In January 1992, the Secretary of Defense directed the Secretary of the Air Force to submit a plan to the Under Secretary of Defense for Acquisition[1] to upgrade and extend the service life of the *Minuteman III* missile. The *Minuteman III* missile will perform its deterrent role until at least 2020. Under the direction of the Program Executive Officer for Space Programs, the System Program Office estimates that program research and development will cost about $331 million and that procurement will cost about $1.8 billion.

On June 30, 1994, the Assistant Secretary of the Air Force (Acquisition and Management) approved the entry of the program into the engineering and manufacturing development phase of the acquisition process. The System Program Office exercised the low-rate initial production option clause in the production contract on October 1, 1999. Appendix B provides definitions of technical terms used in this report.

A matter of future interest for the System Program Office will be using total ownership (life-cycle) cost estimates to quantify future liabilities. The Statement of Federal Financial Accounting Standards No. 5, "Accounting for Liabilities of the Federal Government," requires that, beginning in FY 1997, Federal agencies recognize a liability in agency financial statements for any probable and measurable future outflow of resources arising from past transactions. The statement defines "probable" as that which is likely to occur based on current facts and circumstances and also states that a future outflow is measurable if it can be reasonably estimated. The statement recognizes that the estimate may not be precise and, in such cases, it provides for recording the lowest estimate and disclosing the full range of estimated outflows that are likely to occur. The program manager can use the Air Force historical documentation of the operation, maintenance, demilitarization, and disposal costs of the *Minuteman* weapon system for the past 30 years to form the base for life-cycle cost estimates, as well as to report estimates of future program liabilities in Air Force financial statements as required. DoD had not established a policy to

[1] Renamed Under Secretary of Defense for Acquisition, Technology, and Logistics in October 1999.

implement this Federal accounting standard; however, the Air Force is required to report estimated liabilities in accordance with Federal Financial Accounting Standards No. 5 when guidance becomes available.

Objectives

The audit objective was to evaluate the overall management of the Air Force *Minuteman III* Propulsion Replacement Program. Because the program is in the engineering and manufacturing development acquisition phase, we determined whether the System Program Office was cost-effectively developing and readying the program for low-rate initial production. In addition, we evaluated the management control program as it related to our audit objective. In Appendix A, we discuss the scope and methodology used to accomplish the audit objective as well as management controls.

Program Generally Well Managed

Overall, the System Program Office successfully developed and readied the program for low-rate initial production within established cost, schedule, and performance baselines. Specifically:

- The baseline established at Milestone II for research and development costs was about $367 million and $2.2 billion for procurement costs. As of February 2000, the System Program Office estimated program research and development costs at about $331 million and procurement costs at about $1.8 billion.

- The System Program Office resolved all critical deficiencies received from Government and contractor operations, and successfully fired all three stages of the *Minuteman III*. Further, the System Program Office satisfactorily completed all system ground testing at Hill and Vandenberg Air Force bases. Accordingly, the System Program Office successfully met the established October 1999 baseline schedule for exercising the low-rate initial production option clause.

- In 1997, the System Program Office awarded an Intercontinental Ballistic Missile prime integration contract to TRW Strategic Systems Division, TRW, Incorporated. The service contract replaced approximately 40 Air Force contracts covering various aspects of the *Minuteman III* and *Peacekeeper* weapon systems. The System Program Office projected cost savings of approximately $1.5 billion beginning with the production phase. The Air Force comptroller already reduced the program procurement budget by $336 million.

- In June 1994, the System Program Office published an options analysis that evaluated three alternatives for dealing with the age-related deterioration of the *Minuteman III* weapon system. Alternative 1 was to retain the existing solid rocket motors and allow them to "age-out," but this would result in an unsatisfactory force capability after 2002. Alternative 2 was to remanufacture existing rocket motors to maintain

the existing force capability through at least 2020. Alternative 3 was to manufacture new solid rocket motors, which would also maintain the existing force capability through at least 2020. The System Program Office concluded in the options analysis that Alternative 2 was the most cost-effective and satisfied all operational requirements through at least 2020.

However, three conditions warranted additional management attention before the program enters full-rate production. A discussion of the associated findings follows.

A. Analyses of Potential Environmental Consequences

The System Program Office did not ensure that analyses of the potential environmental consequences of developing and deploying the *Minuteman III* Propulsion Replacement Program were performed and approved as required. This condition occurred because the System Program Office did not consider that the increase in program activity was significant, was not familiar with Air Force guidance that recommended against granting categorical exclusions for acquisition programs, and was not familiar with DoD guidance that required the milestone decision authority to approve environmental analyses documentation. As a result, the System Program Office may not be able to inform the Air Force Acquisition Executive of the environmental effects of the program at the full-rate production decision that is scheduled for September 2000.

Environmental Analysis Policy and Guidance

Department of Defense Policy. DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," Change 4, May 11, 1999, implements the requirements of the National Environmental Policy Act of 1969 (NEPA). NEPA requires all Federal agencies that fund projects to analyze and make decisions in full consideration of the impact of those projects to the natural and human environments. Federal agencies may make the analysis in the form of an environmental assessment or a more stringent environmental impact statement. NEPA also allows Federal agencies to develop and apply categorical exclusions to exempt proposed actions from the required analysis. DoD Regulation 5000.2-R gives the Air Force Acquisition Executives, as delegated from the Defense Acquisition Executive, the authority to approve all NEPA documents for the program.[2]

Air Force Policy. Before January 1995, Air Force Regulation 19-2, "Environmental Impact Analysis Process," August 10, 1982, implemented NEPA requirements within the Air Force. The Regulation prescribed policies, responsibilities, and procedures for Air Force organizations to implement the NEPA environmental impact analysis for all projects. On January 24, 1995, Air Force Instruction 32-7061, "The Environmental Impact Analysis Process," superceded Air Force Regulation 19-2 and is the current Air Force policy. The Regulation and Instruction listed the Air Force-approved categorical exclusions that exempt an organization from performing the required analysis. The categorical exclusions primarily apply to base civil engineering projects.

To initiate the environmental assessment process, the Instruction requires project officers to notify the Air Force environmental planning function (the interdisciplinary staff, at any level of command, who are responsible for the

[2] DoD initially issued DoD Regulation 5000.2-R on March 15, 1996, which included the requirement.

environmental impact analysis process) of pending actions by completing Section I of Air Force Form 813, "Request for Environmental Impact Analysis." In Section I, project offices describe the proposed action and alternatives and identify key decision points. The environmental planning function assists the project office in describing the proposed action and alternatives. After it receives an Air Force Form 813 from the project office, the environmental planning function evaluates the proposed actions to determine whether an environmental impact analysis is needed or whether a categorical exclusion applies. If a categorical exclusion does not apply, the environmental planning function performs and prepares the required environmental documents or obtains technical assistance through other Air Force channels or from contract support staff. The Instruction requires the project office to submit the completed environmental documents to the milestone decision authority for approval before proceeding with the project.

Air Force Guidance. In 1996, the Systems Engineering Division, Office of the Deputy Assistant Secretary (Science, Technology and Engineering), within the Office of the Secretary of the Air Force (Acquisition), issued guidance on "National Environmental Policy Act Implementation within the Acquisition Management Process." For making decisions, the Instruction states that the information in the appropriate NEPA document should almost never be a categorical exclusion from and an environmental impact analysis.

Granting of Categorical Exclusions

In 1993 and 1997, the System Program Office submitted copies of Air Force Form 813 to Hill Air Force Base, Utah, and Vandenberg Air Force Base, California. Based on the information provided, the environmental planning functions at the two Air Force bases granted the program categorical exclusions. As a result, the System Program Office believed that it was exempted from performing the NEPA-required environmental impact analyses before the program's full-rate production decision in September 2000.

Planned Program Actions at Hill Air Force Base. To accomplish the remanufacture of the three solid rocket stages for the 607 *Minuteman III* missiles, the System Program Office plans to transport the missiles from their assigned bases to Hill Air Force Base for disassembly and ship the individual stages to contractor facilities for remanufacture and propellant replacement. On completion, the System Program Office plans to transport the remanufactured stages back to Hill Air Force Base where they would be reassembled and returned to the field.

Accordingly, a substantial increase in the missile workload at Hill Air Force Base will result. The System Program Office, on average, transports one *Minuteman III* missile a month to the base from the field for routine repair and maintenance. The System Program Office will transport additional nine missiles during low-rate initial production in FY 2001, and as the program enters full-rate production, will ramp up and transport as many as eight additional missiles per month from the field, disassemble them, and transport the individual stages to the contractors. Simultaneously, the System Program Office will transport the remanufactured rocket stages for as many as eight missiles per month from

the contractors, reassemble them, and return them to the field. The production and deployment schedule is shown in Appendix C. Any negative environmental impact associated with these planned activities, however unlikely, could cause significant program delays, additional costs, and increased risk of injury.

Request for Environmental Assessment at Hill Air Force Base. Before March 1993, the System Program Office had not requested an environmental assessment of the *Minuteman III* at Hill Air Force Base. On March 17, 1993, the System Program Office submitted an Air Force Form 813 to the environmental planning function; however, the System Program Office did not describe the activity planned for Hill Air Force Base because the System Program Office did not consider that the increase in activity was significant. In addition, the System Program Office was not familiar with Air Force guidance on categorical exclusions for acquisition programs. Therefore, the System Program Office described program activities scheduled to take place at the remote contractor facilities. Based on the information on the Air Force Form 813, the environmental planning function determined that the proposed program actions did not require an environmental impact analysis and, on March 23, 1993, granted the System Program Office a categorical exclusion. As a result, the System Program Office did not perform the required analysis of the potential environmental impacts of planned program actions scheduled to take place at the Hill Air Force Base.

Request for Environmental Assessment at Vandenberg Air Force Base. On July 1, 1997, the System Program Office submitted an Air Force Form 813 to the environmental planning function at Vandenberg Air Force Base. The Form stated that, as part of the *Minuteman III* Propulsion Replacement Program, two missile test launches would be made from Vandenberg test facilities and that the System Program Office did not anticipate any new or additional issues or effects as a result. Based on this information, the environmental planning function at Vandenberg Air Force Base granted the System Program Office the following categorical exclusion from performing an additional environmental impact analysis:

> Continuation or resumption of pre-existing actions, where there is no substantial change in existing conditions, or land uses, and where the actions were originally evaluated in accordance with applicable law and regulations, and surrounding circumstances have not changed.

The environmental planning function referenced an April 1976 environmental assessment that Vandenberg Air Force Base performed for earlier *Minuteman III* launches. The 1997 categorical exclusion was granted because both the System Program Office and the environmental planning function at Vandenberg were unfamiliar with the 1996 Air Force guidance, which stated that it is inappropriate to grant a categorical exclusion for acquisition programs. Numerous changes to the NEPA, as well as the implementation of DoD and Air Force guidance since April 1976, make it essential for the System Program Office to evaluate the effects of those changes on the program. DoD guidance incorporates revised statutory and Environmental Protection Agency requirements that the System Program Office must compare with current programmatic requirements to ensure that the weapon system is environmentally compliant.

Air Force Acquisition Executive Approval of NEPA Documentation. The System Program Office did not submit NEPA documentation to the Air Force Acquisition Executive for approval. This condition occurred because the System Program Office was not aware of the requirement for the Air Force Acquisition Executive, as delegated, to approve all NEPA documentation for the program. System Program Office submission of the NEPA documents for the required approval may have averted the conditions identified above.

Conclusion

The System Program Office and Hill and Vandenberg Air Force bases were unfamiliar with DoD and Air Force guidance and policy for processing environmental impact analysis requests. As a result, the System Program Office did not plan to thoroughly analyze the potential environmental consequences associated with the program before the decision to proceed with full-rate production in September 2000. Without such analyses, the System Program Office cannot take actions necessary to reduce program cost and schedule risks in case there are unforeseen environmental consequences. As a result, the System Program Office will not be able to inform the Air Force Acquisition Executive of the environmental impact of the program before the full-rate production decision planned for September 2000. Accordingly, the System Program Office needs to obtain the required environmental impact analyses from Hill and Vandenberg Air Force bases and obtain Air Force Acquisition Executive approval of the NEPA documentation before September 2000 to mitigate any identified program cost and schedule risks.

Recommendations and Management Comments

A. We recommend that the Director, Intercontinental Ballistic Missile System Program Office, update and resubmit Requests for Environmental Impact Analysis (Air Force Forms 813) to Hill and Vandenberg Air Force bases for completion before the full-rate production decision for the Propulsion Replacement Program that is scheduled for September 2000. At a minimum, the Director should ensure that:

- **the requests contain a complete description of planned program activities scheduled to take place at the respective bases;**
- **Hill and Vandenberg Air Force bases perform an environmental impact analysis for planned program activities; and**
- **National Environmental Policy Act documentation is completed and submitted to the Air Force Acquisition Executive for approval as required.**

Management Comments. The Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management) concurred, stating that the Intercontinental Ballistic Missile System Program Office will update and resubmit requests for Environmental Impact Analysis to the Hill and Vandenberg Air Force base environmental planning functions. Further, the

Intercontinental Ballistic Missile System Program Office will conduct any and all studies and assessments that the environmental planning functions request. The Principal Deputy Assistant Secretary stated that the System Program Office will complete all needed National Environmental Policy Act documentation in time to support the full-rate production decision planned for October 2000.

B. Programmatic Environmental, Safety, and Health Evaluation

The System Program Office did not complete its programmatic environmental, safety, and health evaluation (PESHE) because the System Program Office staff did not recognize that DoD Regulation 5000.2-R applied to ongoing as well as new acquisition programs. Until the PESHE is completed and implemented, the System Program Office cannot be assured that the program's environmental, safety, and health issues, and their associated life-cycle cost impacts, will be incorporated in the day-to-day decisionmaking process of the program.

Environmental, Safety, and Health Evaluation Policy

DoD Regulation 5000.2-R[3] requires that all programs, regardless of acquisition category, conduct the environmental, safety, and health analyses to integrate environmental, safety, and health issues into the system engineering process. The analyses support the development of the PESHE that the program office includes in the acquisition strategy. The Regulation requires the program manager to initiate the PESHE as early as possible in the program initiation decision (Milestone I) and to maintain an updated evaluation throughout the life cycle of the program. Program managers are to use the PESHE to do the following:

- describe the program manager's strategy for meeting environmental, safety, and health requirements;
- establish program responsibilities; and
- describe how progress will be tracked.

In November 1996, the Air Force Material Command published the "Weapon System Environmental Safety and Health Evaluation Development Guide for Single Managers," which contains valuable suggestions on how to develop a PESHE. The guide suggests that the evaluation should be coordinated with every organization associated with the program, including the contractor(s), the users, and the maintainers. Finally, the guide emphasizes that an aggressive environmental, safety, and health evaluation reduces the risk associated with program delays arising from environmental compliance issues.

Environmental, Safety, and Health Evaluation

The System Program Office did not begin to aggressively complete the PESHE until after the audit began because the System Program Office staff did not

[3] DoD initially issued DoD Regulation 5000.2-R on March 15, 1996. It included the requirement to initiate a PESHE at the earliest possible time.

recognize that the DoD Regulation 5000.2-R evaluation requirement applied to ongoing as well as new acquisition programs. Accordingly, the staff had not prepared the initial analyses early in the acquisition process even though we had presented the same condition to the System Program Office in Inspector General, DoD, Report No. 97-199, "Minuteman III Guidance Replacement Program," July 29, 1997.

During the audit, the System Program Office initially provided us with a draft PESHE dated July 9, 1999, and an updated draft PESHE dated September 15, 1999. Although the updated draft PESHE was significantly improved over the initial draft PESHE, the System Program Office still needed to strengthen the program manager's environmental strategy and establishment of program responsibilities.

Strategy for Meeting PESHE Requirements. The updated draft PESHE stated that an integrated product team would address environmental, safety, and health issues and would consist of Government and contractor personnel. However, the updated draft PESHE did not describe the integrate product team organizational structure. At a minimum, the final PESHE should include a reference to a published charter for the functioning of the integrated product team.

Establish Program Responsibilities. The Air Force Materiel Command's "Weapon System Environmental Safety and Health Evaluation Development Guide for Single Managers" recommends that the PESHE list the appropriate program officials (by office code or name) that have environmental, safety, and health responsibilities. Assigning specific programmatic responsibilities for executing environmental, safety, and health strategy is critical to maintain accountability for the execution of strategic objectives. Although the updated draft PESHE provided a general discussion of the integrate product team approach, it did not identify the System Program Office and contractor personnel with environmental, safety, and health responsibilities.

PESHE Coordination. The System Program Office did not plan to coordinate the draft PESHE document with contractors, users, maintainers, and the Defense Contract Management Command. The System Program Office should coordinate and complete the PESHE before the full-rate production decision milestone review planned for September 2000.

Benefits of Environment, Safety, and Health Evaluation

A PESHE evaluates all aspects of the program from design through disposal and helps the program manager to reduce risk on human health and the environment. When program managers perform the PESHE analyses, they gain timely information on the potential environmental, safety, and health effects of developing, fielding, storing, demilitarizing, and disposing of their weapon system. The information is critical because any unforeseen environmental, safety, or health impact that violates local, state, or Federal law can cause lengthy program delays, additional costs, and increased risk of injury.

A well-prepared PESHE would identify, analyze, and resolve potential program delaying environmental impacts as early as possible; would also help program office personnel handle hazardous materials in the most expedient and cost effective manner possible while staying within program cost, schedule, and performance goals; and realize the benefits of early identification and resolution of environmental impacts. Until the PESHE is completed and implemented, the System Program Office cannot be assured that the program's environmental, safety and health issues and their associated life-cycle cost impacts will be incorporated in future day-to-day decisionmaking processes.

Recommendations and Management Comments

B. We recommend that the Director, Intercontinental Ballistic Missile System Program Office:

1. Update the draft programmatic environmental, safety, and health evaluation to show the organizational structure of the integrated product team for environmental, safety, and health issues, and list the appropriate program officials (by office code or name) who have environmental, safety, and health responsibilities.

2. Coordinate the draft programmatic environmental, safety, and health evaluation with contractors, users, maintainers, and the Defense Contract Management Command before the full-rate production decision milestone review in September 2000.

Management Comments. The Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management) concurred, stating that the System Program Office completed the draft programmatic environmental, safety, and health evaluation in July 1999 and coordinated it with the contractors, users, maintainers, and the Defense Contract Management Command. In this regard, the System Program Office reviewed all recommendations and suggestions and incorporated them, as appropriate. The Director, Intercontinental Ballistic Missile System Program Office plans to sign the final programmatic environmental, safety, and health evaluation not later than February 29, 2000.

C. Total Ownership Cost Estimates

The System Program Office did not plan to develop a comprehensive total ownership (life-cycle) cost estimate for the Propulsion Replacement Program. This condition existed because the requirement to prepare the cost estimate was not in effect when the system began in the late 1950s and because the program manager did not foresee the advantages of developing such an estimate. As a result, the System Program Office lost the opportunity to realize the benefits of performing cost and performance tradeoff analyses early in the acquisition process. Moreover, the System Program Office did not have a baseline to measure future mandated reductions in program life-cycle costs.

Definition of Total Ownership Cost

In a memorandum dated November 13, 1998, the Under Secretary of Defense for Acquisition and Technology defined total ownership cost as the sum of all financial resources necessary to organize, equip, train, sustain, and operate military forces sufficient to meet national goals in compliance with all laws; all policies applicable to DoD; all standards in effect for readiness, safety, and quality of life; and all other official measures of performance for DoD and its Components. Total ownership cost comprises costs to research, develop, acquire, own, operate, and dispose of weapon and support systems; other equipment and real property; the costs to recruit, train, retain, separate and otherwise support military and civilian personnel; and all other costs of business operations of the DoD. For consistency with past initiatives, weapon systems' total ownership costs are defined as life-cycle cost.

Estimating Guidance

DoD Regulation 5000.2-R states that, for all major Defense acquisition programs, a life-cycle cost estimate shall be prepared by the program office in support of program initiation and all subsequent milestone reviews.[4] According to DoD Regulation 5000.2-R, a life-cycle cost estimate shall be:

- based on the program objectives, operational requirements, contract specifications for the system, and a program DoD work breakdown structure;
- comprehensive in character, identifying all elements of cost that would be entailed by a decision to proceed with development, production and operation of the system regardless of funding source or management control;

[4] This requirement was originally incorporated into earlier versions of DoD Regulation 5000.2-R, beginning in the 1970's.

- consistent with the cost estimates used in the analysis of alternatives prepared for the program and manpower estimates behind the operation and support costs shall be consistent with the manpower estimate; and

- based on a careful assessment of risks and reflect a realistic appraisal of the level of cost most likely to be realized.

History of *Minuteman* Weapon System

The DoD established and initiated the *Minuteman* weapon system in the late 1950's, deployed it in the early 1960's, and has managed and enhanced the weapon system continually for almost 35 years. On June 30, 1994, the System Program Office began the engineering and manufacturing development phase for the *Minuteman III* Propulsion Replacement Program. The Principal Deputy Under Secretary of Defense for Acquisition and Technology designated the *Minuteman III* Propulsion Replacement Program as a major Defense acquisition program on January 23, 1996, because the program exceeded major Defense acquisition program cost thresholds.

Cost Estimates

Cost Estimate for the *Minuteman III* Weapon System. The System Program Office did not develop a comprehensive total ownership (life-cycle) cost estimate for the *Minuteman III* weapon system because the requirement to prepare the cost estimate did not exist when the *Minuteman* weapon system began in the late 1950's. DoD Regulation 5000.2-R and earlier versions of the document, beginning in the 1970's, requires program managers for acquisition programs to prepare a life-cycle cost estimate for program initiation and all subsequent milestones.

Cost Estimate for the Propulsion Replacement Program. Similarly, the program manager for the Propulsion Replacement Program did not develop a comprehensive total ownership cost estimate in support of the engineering and manufacturing development decision made in June 1994. When queried, the program manager stated that he did not plan to implement the requirement because he did not believe that the program would drastically change the life-cycle costs of the *Minuteman* weapon system; however, this is not a valid reason for not developing a comprehensive total ownership cost estimate for the Propulsion Replacement Program.

Advantages of Cost Estimates. Identifying estimated costs associated with the operation, maintenance, support, transportation, and the eventual demilitarization and disposal of the propulsion system essential because they are integral to efficient program management, and they provide a baseline for the System Program Office's documentation of future reductions in life-cycle costs. Air Force management has mandated that program managers consider technologies that may yield reduced life-cycle costs early in the acquisition process. Without a comprehensive total ownership (life-cycle) cost estimate, the

System Program Office did not realize the benefits of performing cost and performance tradeoff analyses early, and did not have a baseline to measure future mandated reductions.

Recommendation and Management Comments

C. We recommend that the Director, Intercontinental Ballistic Missile System Program Office, develop a comprehensive total ownership (life-cycle) cost estimate for the Propulsion Replacement Program before the full-rate production decision planned for the Propulsion Replacement Program in September 2000. As a minimum, the estimate should include costs for deployment, operations and support, and eventual disposal or demilitarization for the system.

Management Comments. The Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management) concurred, stating that the Director, Intercontinental Ballistic Missile System Program Office, on January 25, 2000, requested that the Air Force Cost Analysis Improvement Group determine whether a life-cycle cost estimate is required for the Propulsion Replacement Program. If the Air Force Cost Analysis Improvement Group recommends a life-cycle cost estimate be performed, the System Program Office will do so not later than September 1, 2000.

Audit Response. The Air Force comments were not fully responsive. DoD Regulation 5000.2-R requires that program offices for all major Defense acquisition programs prepare a life-cycle cost estimate in support of the program full-rate production decision. Further, the milestone decision authority may not approve entry of the program into the production and deployment phase of the acquisition process until an independent estimate of the full life-cycle cost of the program is completed and considered by the milestone decision authority. Accordingly, the development of a life-cycle cost estimate is not optional and the Air Force Cost Analysis Improvement Group does not have the authority to waive this requirement. Therefore, we ask that the Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management) reconsider her position and provide additional comments in response to this report.

Appendix A. Audit Process

Scope

We conducted this audit from October 1998 through November 1999, and reviewed documentation dated from March 1993 through October 1999. We suspended the audit from January through June 1999 to conduct a time-sensitive audit. We used criteria in DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," Change 4, May 11, 1999, to perform the audit. To accomplish the audit objectives, we took the following steps:

- determined whether the users had adequately defined the system requirements;
- determined whether the System Program Office had developed and implemented an acquisition plan, a risk management plan, a logistics plan, and a test and evaluation plan;
- evaluated Defense Contract Management Command involvement in monitoring the contractor's earned value management process;
- evaluated the System Program Office's management of the prime contract for the program;
- determined whether the System Program Office had a fully developed programmatic environmental, safety, and health evaluation;
- assessed the System Program Office's implementation of the DoD environmental management process;
- determined whether the System Program Office had prepared a life-cycle cost estimate for the program;
- evaluated System Program Office use of integrated product teams; and
- reviewed management controls related to the audit objective.

DoD-Wide Corporate-Level Government Performance and Results Act Goals. In response to the Government Performance and Results Act, the Secretary of Defense annually establishes DoD-wide corporate level goals, subordinate performance goals, and performance measures. This report pertains to achievement of the following corporate level goal, subordinate performance goal, and performance measurement.

- **FY 2000 DoD Corporate Level Goal 2:** Prepare now for an uncertain future by pursuing a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. Transform the force by exploiting the Revolution in Military Affairs, and reengineer the Department to achieve a 21st century infrastructure. **(00-DoD-2)**

- **FY 2000 Subordinate Performance Goal 2.4:** Meet combat forces' needs smarter and faster, with products and services that work better and cost less, by improving the efficiency of DoD's acquisition processes. **(00-DoD-2.4)**

- **FY 2000 Performance Measure 2.4.1:** Major Defense Acquisition Cost Growth (reduce growth to no greater than by 1 percent annually). **(00-DoD-2.4.1)**

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in DoD. This report provides coverage of the Defense Weapons Systems Acquisition high-risk area.

Methodology

We conducted this program audit in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD, and included such tests of management controls as we deemed necessary. We did not use computer-processed data to perform this audit.

Contacts During the Audit. We visited or contacted individuals and organizations within the DoD and contractor locations. Further details are available upon request.

Management Control Program

The DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD managers to implement a comprehensive system of management controls that provides reasonable assurance that program are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. In accordance with DoD Directive 5000.1, "Defense Acquisition," March 15, 1996, and DoD Regulation 5000.2-R, acquisition managers are to use program cost, schedule, and performance parameters as control objectives to implement the requirements of DoD Directive 5010.38. Accordingly, we limited our review to management controls directly related to the acquisition of the *Minuteman III* Propulsion Replacement Program.

Adequacy of Management Controls. We identified a material management control weakness as defined by DoD Instruction 5010.40, "Management Control (MC) Program Procedures," August 28, 1996, for the Propulsion Replacement Program. Although DoD established management controls for development of a

PESHE and a total ownership (life cycle) cost estimate, the System Program Office did not implement those controls for the Propulsion Replacement Program. Recommendations B.2. and C., if implemented, will improve the management process for the *Minuteman III* Propulsion Replacement Program and correct the identified material management control weaknesses. We will provide a copy of this report to the Assistant Secretary of the Air Force (Financial Management and Comptroller).

Adequacy of Management's Self-Evaluation. The Intercontinental Ballistic Missile System Program Office designated the Propulsion Division as an assessable unit. The Propulsion Replacement Program is one program within the Propulsion Division. The Program Director of the System Program Office conducted an evaluation of the system of internal accounting and administrative control that was in effect during the fiscal year ending September 1999. The evaluation did not identify any material management control weaknesses.

Prior Coverage

During the last 5 years, the Inspector General, DoD, and the Air Force Audit Service have not issued reports specifically addressing the *Minuteman III* Propulsion Replacement Program. However, the Inspector General, DoD, issued Report No. 97-199, "Minuteman III Guidance Replacement Program," July 29, 1997, which identified an environmental finding similar to finding B within the same System Program Office.

Appendix B. Definition of Technical Terms

Acquisition Category. An attribute of an acquisition program that determines the program's level of review, decision authority, and applicable procedures. The acquisition categories consist of I, major Defense acquisition programs; IA, major automated information systems; II, major systems; and III, all other acquisition programs. In addition acquisition category I programs have two subcategories: acquisition category ID are programs where the milestone decision authority is the Under Secretary Defense for Acquisition, Technology, and Logistics, and acquisition category IC are programs where the milestone decision authority is the Component Acquisition Executive.

Demilitarization. Demilitarization is part of the disposal process and is the act of deactivating or rendering a system inoperable by destroying its inherent military offensive or defensive advantage.

Disposal. Disposal is the process of transferring, donating, selling, abandoning, or destroying a system.

Engineering and Manufacturing Development. Engineering and manufacturing development is the third phase of the acquisition process where the program office fully develops, engineers, designs, fabricates, tests, and evaluates the system and the principal items necessary for its support.

Environmental Assessment. An environmental assessment provides sufficient evidence and analysis to determine whether the preparation of an environmental impact statement or a finding of no significant impact is required for an acquisition program to comply with the National Environmental Policy Act.

Environmental Impact Statement. An environmental impact statement provides a detailed description of the effects or consequences associated with designing, manufacturing, testing, operating, maintaining, and disposing of a weapon or automated information system.

Finding of No Significant Impact. A finding of no significant impact is a document that a Federal agency prepares to briefly present the reasons why an action will not have a significant impact on the human environment and why an environmental impact statement is not necessary. Additionally, the document includes the environmental assessment or a summary of the environmental assessment for the acquisition program.

Full-Rate Production. Full-rate production is contracting for economic production quantities following stabilization of the system design and validation of the production process.

Low-Rate Initial Production. Low-rate initial production is the production of a system in limited quantities to provide articles for additional operational test and evaluation, to establish an initial production base, and to permit an orderly increase in the production rate that will lead to full-rate production after successful completion of operational testing.

Programmatic Environmental, Safety, and Health Evaluation. The programmatic environmental, safety, and health evaluation describes the program manager's strategy for meeting programmatic environmental, safety, and health evaluation requirements, establishes responsibilities, and identifies how progress will be tracked. The program manager initiates programmatic environmental, safety, and health evaluation at the earliest possible time in support of a program initiation decision (usually Milestone I), and updates the evaluation throughout the life cycle of the program.

Total Ownership (Life-Cycle) Cost. Total ownership (life-cycle) cost is the sum of all financial resources necessary to organize, equip, train, sustain and operate military forces sufficient to meet national goals in compliance with all laws; all policies applicable to DoD; all standards in effect for readiness, safety, and quality of life; and all other official measures of performance for DoD and its Components.

Appendix C. Production and Deployment Schedule

Propulsion Replacement Program
Production and Deployment Schedule

	Quantities by Fiscal Year								
	2001	2002	2003	2004	2005	2006	2007	2008	Total
Operation	5	27	74	86	86	86	86	50	500
Spares	2	3	9	3	3	2	2	2	26
Operational Testing and Evaluation	2	3	3	4	4	5	5	33	59
Aging and Surveillance	0	0	0	3	3	3	3	10	22
Total	9	33	86	96	96	96	96	95	607

Appendix D. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition, Technology, and Logistics
  Director, Defense Logistics Studies Information Exchange
Under Secretary of Defense (Comptroller)
  Deputy Chief Financial Officer
  Deputy Comptroller (Program/Budget)
Deputy Under Secretary of Defense (Acquisition Reform)
Deputy Under Secretary of Defense (Environmental Security)

Department of the Army

Auditor General, Department of the Army

Department of the Navy

Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Acquisition)
  Deputy Assistant Secretary (Science, Technology, and Engineering)
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Air Force Program Executive Officer for Space Programs
  Director, Intercontinental Ballistic Missile System Program Office
Auditor General, Department of the Air Force

Other Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
  Commander, Defense Contract Management Command
    Commander, Defense Contract Management Command West
Director, National Security Agency
  Inspector General, National Security Agency
Inspector General, Defense Intelligence Agency

Non-Defense Federal Organizations

Office of Management and Budget
General Accounting Office
  National Security and International Affairs Division
    Technical Information Center

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Reform
House Subcommittee on Government Management, Information, and Technology, Committee on Government Reform
House Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform

Department of the Air Force Comments

Final Report Reference

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC 20330-1000

OFFICE OF THE ASSISTANT SECRETARY

FEB 22 2000

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
OFFICE OF THE INSPECTOR GENERAL
DEPARTMENT OF DEFENSE

FROM: SAF/AQ

SUBJECT: Draft Audit Report, "Acquisition of the Minuteman III Propulsion Replacement Program , Project No. 9AE-0074, December 8,1999

This is in reply to your memorandum requesting the Air Force provide comments on the subject report.

Recommendation A, page 7, recommends the Director, Intercontinental Ballistic Missile System Programs Office (ICBM SPO Director) update and resubmit Requests for Environmental Impact Analysis (Air Force Forms 813) to Hill and Vandenberg Air Force Bases. Page 7

The Air Force concurs. The ICBM SPO will update and resubmit AF Form 813, Environmental Impact Analysis, for the Propulsion Replacement Program to the Hill AFB and Vandenberg AFB environmental planning functions. The ICBM SPO will conduct any and all studies/assessments requested. Updated AF Form 813s will be submitted NLT 31 Mar 00. All needed NEPA documentation will be completed in time to support the Full Rate Production decision planned for Oct 00.

Recommendation B, page 10, recommends that the ICBM SPO Director: 1) update the draft Programmatic Environmental, Safety, and Health Evaluation (PESHE); and, 2) coordinate with contractors, users, maintainers, and the Defense Contract Management Command as soon as possible but no later than the full-rate production decision milestone review in September 2000. Page 11

The Air Force concurs. The PRP draft PESHE was completed in Jul 1999 and has been coordinated with the contractors, users, maintainers, the Office of DoD Inspector General, and the Defense Contract Management Command. All recommendations and suggestions were reviewed and incorporated, as appropriate. We expect the ICBM SPO Director will sign the final PESHE NLT 29 Feb 2000.

Recommendation C, page 13, recommends that the ICBM SPO Director develop a comprehensive total ownership (life-cycle) cost estimate for the PRP, as soon as possible, but no later than the full-rate production decision planned for the PRP in September 2000. Page 14

The Air Force concurs with comment. On 25 Jan 00, the ICBM SPO Director requested the Air Force Cost Analysis Improvement Group (AFCAIG) determine whether a Life-

Cycle Cost Estimate (LCCE) is required for the PRP. If the AFCAIG recommends an LCCE be performed, the ICBM SPO will do so NLT 1 Sep 00.

Appendix A, Material Control Weakness Recommendations: See responses to Recommendations B-2 and C.

The SAF/AQSL point of contact is Maj Dennis Krepp, (703) 588-7372.

DARLEEN A. DRUYUN
Principal Deputy Assistant Secretary
(Acquisition & Management)

cc:
SAF/FMPF
SAF/AQXA

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