

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

**ENVIRONMENTAL CONSEQUENCE ANALYSES FOR THE
M1A2 ABRAMS TANK PROGRAM**

Report No. 93-130

June 25, 1993

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

Department of Defense

20000425 094

DTIC QUALITY INSPECTED 3

AGI00-07-1809

Acronyms

CARD	Cost Analysis Requirements Description
EA	Environmental Assessment
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
IPS	Integrated Program Summary
NEPA	National Environmental Policy Act
OSD	Office of the Secretary of Defense
PEA	Programmatic Environmental Analysis
ROD	Record of Decision



**INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884**



June 25, 1993

**MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION
AND TECHNOLOGY**

**SUBJECT: Audit Report on the Environmental Consequence Analyses for the M1A2
Abrams Tank Program (Report No. 93-130)**

We are providing this report for your information and use. This report resulted from our audit of the Effectiveness of DoD Environmental Consequence Analyses of Major Defense Acquisition Programs. Comments on a draft of this report were required by May 31, 1993; however, as of June 21, 1993, comments had not been received. The DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, you must provide final comments on the recommendations by August 25, 1993. See the "Response Requirements for Recommendations" section at the end of the finding for the specific requirements for your comments. The recommendations are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment. We also ask that your comments indicate concurrence or nonconcurrence with the material internal control weakness highlighted in Part I.

We appreciate the courtesies extended to the audit staff. If you have any questions on this report, please contact Mr. Russell A. Rau, Program Director, at (703) 693-0186 (DSN 223-0186) or Mr. Jack D. Snider, Project Manager, at (703) 693-0402 (DSN 223-0402). Appendix E lists the distribution of this report.

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

Office of the Inspector General, DoD

Report No. 93-130
(Project No. 2AE-0048.03)

June 25, 1993

**ENVIRONMENTAL CONSEQUENCE ANALYSES FOR THE M1A2
ABRAMS TANK PROGRAM**

EXECUTIVE SUMMARY

Introduction. The Army's M1A2 tank, part of the Abrams Tank System, is a full-tracked, low-profile, land-combat, assault weapon system with shoot-on-the-move firepower. The Army Acquisition Executive approved the Low-Rate Initial Production for 62 M1A2 tanks on March 23, 1992. The Office of the Under Secretary of Defense for Acquisition approved the upgrade of 998 M1 tanks to the M1A2 configuration on December 18, 1992. A Milestone III, Production Approval, decision is scheduled for third quarter, FY 1994.

Objectives. The audit objectives were to evaluate the effectiveness of DoD environmental consequence analyses of major Defense acquisition programs and to assess compliance with provisions of the National Environmental Policy Act (NEPA) of 1969 and internal controls related to the objectives. The M1A2 was one of nine programs reviewed in the audit of the Effectiveness of DoD Environmental Consequence Analyses of Major Defense Acquisition Programs.

Audit Results. The Army did not assess the environmental consequences of the M1A2 Program throughout its life-cycle or estimate life-cycle environmental costs for the 62 M1A2 tank Low-Rate Initial Production decision. At the time of the audit, no action had been taken to develop a programmatic environmental analysis (PEA) in support of the upcoming Defense Acquisition Board Milestone III decision. As a result, the Army could not be assured that its mission is implemented in a manner consistent with statutory and regulatory environmental policies and procedures or that the M1A2 Program is fully funded, including associated environmental costs.

Internal Controls. The audit identified a material internal control weakness in that controls were not effective to ensure assessment of the environmental consequences of the M1A2 Program. Part I of the report discusses this internal control weaknesses.

Potential Benefits of Audit. Potential benefits were nonmonetary (Appendix C). Implementation of the recommendation will improve the internal management controls relating to the implementation and effectiveness of environmental policies and ensure that the M1A2 Program will not incur costly delays and additional expenditures resulting from noncompliance with environmental policies.

Summary of Recommendation. We recommended that the Under Secretary of Defense for Acquisition and Technology direct the Army to:

- o Conduct and document a PEA and supporting environmental impact statements of the M1A2 Program before the Milestone III, Production Approval, decision;

- o Incorporate the results of the M1A2 PEA into the Integrated Program Summary, program office and independent cost estimates, cost and operational effectiveness analysis, affordability assessment, and other Defense Acquisition Board documentation for review at the M1A2 Defense Acquisition Board Milestone III decision;

- o Publicly release all NEPA documents, including environmental impact statements, associated records of decision, and findings of no significant impact, in accordance with DoD Directive 6050.1, "Environmental Effects in the United States of DoD Actions," July 30, 1979; and DoD Directive 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991; and DoD Manual 5000.4-M, "Cost Analysis Guidance and Procedures," December 11, 1992.

We also recommended that the Under Secretary of Defense for Acquisition and Technology direct the Army Acquisition Executive to review and approve the M1A2 Pollution Prevention Plan contract modification as required for acquisition decision documents in accordance with Army Regulation 200-2, "Environmental Effects of Army Actions," December 23, 1988.

Management Comments. Comments from the Under Secretary of Defense for Acquisition and Technology on a draft of this report were required by May 31, 1993; however, as of June 21, 1993, comments had not been received. We did receive comments to a draft of this report from the Project Manager, Abrams Tank System (the Project Manager). The Project Manager concurred with the recommendations and provided comments concerning the factual content of the draft report. We considered these comments in preparing the final report. The complete text of the Project Manager's comments is in Part IV.

Table of Contents

Executive Summary	i
Part I - Introduction	1
Background	2
Objective	3
Scope	3
Internal Controls	4
Prior Audits and Other Reviews	4
Part II - Finding and Recommendations	5
Environmental Analysis	6
Part III - Additional Information	21
Appendix A. M1A2 Abrams Main Battle Tank Characteristics and Significant Features	22
Appendix B. Army Regulation on Environmental Effects	23
Appendix C. Summary of Potential Benefits Resulting From Audit	25
Appendix D. Activities Visited or Contacted	26
Appendix E. Report Distribution	27
Part IV - Management Comments	29
Office of the Project Manager, Abrams Tank System, Comments	30
Detailed Audit Response to Project Manager, Abrams Tank System, Comments	41

The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, prepared this report. Copies of the report can be obtained from the Secondary Reports Distribution Unit, Audit Planning and Technical Support Directorate, (703) 614-6303 (DSN 224-6303).

Part I - Introduction

Background

This report discusses the Army's assessment of the environmental consequences of the M1A2 Abrams Tank Program.

National Environmental Policy Act. The DoD must ensure, to the maximum extent possible, that it is accomplishing its mission in a manner consistent with national environmental laws and DoD policies. The National Environmental Policy Act (NEPA) of 1969 is the national charter for protection of the environment. It establishes policy, sets goals, provides a means for carrying out the policy, and contains provisions to make sure that Federal Agencies comply. The NEPA requires DoD to integrate the NEPA process with other planning as early as possible to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to prevent potential conflicts. The DoD shall review its policies, procedures, and regulations and revise them as necessary to ensure full compliance with the purposes and provisions of the NEPA. The NEPA created the Council on Environmental Quality. The Council's authority is derived from the Environmental Quality Improvement Act of 1970 and Executive Order 11514, "Protection and Enhancement of Environmental Quality," March 5, 1970. The Council reviews and evaluates the programs and activities of the Federal Government to determine how they are contributing to the attainment of the national environmental policy, develops and recommends to the President policies to improve the environmental quality of the Nation, and issues environmental policies and procedures. The DoD Directive 6050.1, "Environmental Effects in the United States of DoD Actions," July 30, 1979, implements the Council on Environmental Quality regulations and provides policy and procedures for DoD officials to consider environmental consequences before approving major DoD actions.

M1A2 Abrams Tank. The Army's M1A2 tank, part of the Abrams Tank System, is a full-tracked, low-profile, land-combat, assault weapon system with shoot-on-the-move firepower. The M1A2 Abrams Tank Program (the Program) consists of 62 new-construction Low-Rate Initial Production tanks and 998 upgraded M1 configuration tanks. The Program was approved for Low-Rate Initial Production on March 23, 1992, and received authority to proceed with the upgrade of M1 to M1A2 tanks on December 18, 1992. A Milestone III, Production Approval, Decision is scheduled for the third quarter, FY 1994. The total acquisition cost of the Program is \$5.56 billion in then-year dollars.

Objective

The overall audit objective was to evaluate the effectiveness of DoD environmental consequence analyses of major Defense acquisition programs. The audit also assessed compliance with provisions of the NEPA and internal controls related to the objective. The M1A2 Abrams tank was one of nine programs reviewed during this audit. During the audit survey, we determined that on December 18, 1992, the Office of the Under Secretary of Defense for Acquisition¹ approved the Army's plan to upgrade the M1 tank to the M1A2 configuration and to hold a Defense Acquisition Board Milestone III, Production Approval, review in the third quarter, FY 1994. However, the Army had not adequately evaluated the environmental impact of the Program or estimated life-cycle environmental costs. We are reporting the absence of an adequate environmental plan for the M1A2 Program separately because action is needed concerning the environmental impact of the Program before the conclusion of our overall audit work.

Scope

We conducted this program audit of the M1A2 Program from November 1992 through March 1993 and reviewed records dated from August 1986 through February 1993 relative to the M1A2 Program. We also discussed the issues relating to environmental policy and acquisition strategy with Government and contractor personnel involved in the acquisition of the M1A2 Abrams Tank Program. The audit was made 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 deemed necessary. Appendix D lists the activities visited or contacted.

¹ Title changed to Under Secretary of Defense for Acquisition and Technology, May 1993.

Introduction

Internal Controls

The audit identified material internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987. The management oversight and program controls were not effective to ensure an adequate assessment of the environmental consequences associated with the M1A2 Program. Our recommendations in this report and our summary report on the overall audit, if fully implemented, will correct this situation. Copies of the final report will be provided to the senior officials responsible for internal controls within Office of the Secretary of Defense (OSD) and the Army.

Prior Audits and Other Reviews

Since 1987, the General Accounting Office and the Office of the Inspector General have issued reports that included the M1, M1A1, and M1A2 Programs. However, we did not follow up on those audit reports because they did not contain any findings or recommendations related to our objective.

Part II - Finding and Recommendations

Environmental Analysis

The Army did not adequately assess the environmental consequences of the M1A2 Abrams Tank Program (the Program) throughout its life-cycle or estimate life-cycle environmental costs. The Army had not prepared a programmatic environmental analysis (PEA) in support of upcoming acquisition decisions and allowed environmental agencies and the public the opportunity to participate in the process. The failure to adequately consider the Program's total environmental impact, allow public inspection of environmental documents, and adequately prepare environmental documentation occurred because of the lack of Army implementing guidance pertaining to PEAs and life-cycle cost estimating. As a result, the M1A2 Program Office may not be carrying out its mission in a manner consistent with statutory and regulatory environmental policies and has not made provisions for funding potential environmental costs. Additionally, the Program could be subjected to costly delays in acquisition and fielding as a result of noncompliance with environmental laws.

Background

DoD Directive 6050.1. The DoD Directive 6050.1, "Environmental Effects in the United States of DoD Actions," July 30, 1979, implements the Council on Environmental Quality regulations and provides policy and procedures so DoD officials can consider environmental consequences before authorizing or approving major DoD actions. Enclosure 1 to the Directive discusses planning considerations, environmental assessments (EAs), and preimplementation actions. Additionally, the Directive provides for public participation in the environmental review process.

Planning Considerations. The DoD Components are required to integrate NEPA into the initial planning stages of proposed DoD actions to ensure environmental impact issues are properly addressed and avoid unnecessary costs or delays in the acquisition, fielding, and disposal process. In the planning process, DoD Components will determine, as early as possible, whether to prepare environmental impact statements (EISs) based on the overall PEA required by DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991, part 6, section I, or individual environmental assessments performed in support of the PEA. An EIS provides full disclosure of significant environmental implications of the program, informs decisionmakers and the public of the alternatives considered and mitigating

Environmental Analysis

environmental measures being implemented on the selected alternative, and serves to insure that the policies and goals defined in NEPA are incorporated into the program and the decisionmaking process.

Environmental Assessment. The EA is used to determine whether the preparation of an EIS or a finding of no significant impact (FONSI) is required, to comply with NEPA when an EIS is not necessary, and to facilitate preparation of an EIS when an EIS is required. The DoD Components should prepare an EA as early as possible after the requirement is identified. Based on an EA, if a Component determines that an EIS is not required, the Component shall prepare a FONSI and make the FONSI available to the affected public. If the Component determines that a categorical exclusion² exists, neither type of impact assessment is required.

Preimplementation Actions. The DoD Components shall ensure that NEPA is integrated into the acquisition decisionmaking process and that NEPA requirements coincide with all major program decision points. Relevant environmental documents, comments, and responses should accompany a proposal through Component reviews to ensure consideration by decisionmakers.

Public Involvement. Public involvement is the law. The NEPA states that the public shall participate, to the extent practicable, in the environmental review process. Environmental documents must be made available to the public to ensure that all interested parties have the opportunity to be informed of and comment on proposed actions before decisions are reached. The DoD Directive 6050.1 requires the DoD Components to involve environmental agencies, applicants, and the public, to the extent practicable, in preparing EAs. If, as the result of an EA, a FONSI is prepared, the FONSI must be made available to the affected public. When the Component decides to prepare an EIS, the Component is required to publish a notice of intent in the Federal Register. The notice of intent describes the proposed action and possible alternatives, including the proposed range of actions, alternatives, and impacts to be considered in the EIS. The notice of intent also provides the name and address of the Component's point of contact. Information or status reports on EISs and other elements of the NEPA process will be provided to interested persons upon request. For each EIS, a record of decision (ROD) is required. The ROD is a concise public document that provides a record of the Government decision concerning an EIS; identifies the alternatives considered in making the decision; specifies the environmentally preferable alternatives;

² Action does not have a significant effect on the human environment.

indicates other factors that were considered in the decisionmaking process; and states whether all practicable means were taken to avoid or minimize environmental harm and if not, why not.

DoD Instruction 5000.2. The DoD Instruction 5000.2 states that DoD will design, develop, test, field, and dispose of Defense systems in compliance with applicable environmental protection laws and regulations, treaties, and agreements. Environmental analysis and planning will begin as early as possible in the acquisition process and will examine the entire life-cycle of the program. During the Concept Exploration and Definition phase, the potential environmental effects of each alternative will be assessed. Potential environmental effects noted in this environmental analysis are required to be integrated into the assessment of each alternative. However, since the DoD Instruction 5000.2 does not provide guidance on how environmental effects are to be assessed during Concept Exploration and Definition, we consider the requirements of the PEA applicable even though the DoD Instruction 5000.2 states that a PEA will begin immediately after the Concept Demonstration Approval milestone. We intend to address this inconsistency in policy guidance in our summary report.

The PEA contains a description of the program; alternatives to be studied; potential environmental impacts of each alternative throughout the system's life-cycle; potential mitigation of adverse impacts; and the effect of environmental impacts and proposed mitigation on schedule, siting alternatives, and program cost. The PEA will be coordinated and integrated with other program plans and analyses and will occur regardless of the classification of the program. After each succeeding milestone decision point, the PEA will be updated as necessary. The update, called a tier, focuses on the issues for a particular decision point. The PEA should be the summarization, at the overall program level, of all EAs, EISs, and FONSIIs performed on individual program segments. The PEA results in either an EIS or a FONSI for the entire program and will be summarized in the Integrated Program Summary (IPS), Annex E. The summary will include alternatives considered, potential environmental effects, rationale for concept or design alternative chosen, mitigation measures, and conclusions. The Annex will discuss how environmental impacts and proposed mitigation measures would affect schedules, siting alternatives, and program life-cycle costs.

We consider it highly likely that at least one aspect of a major Defense acquisition program will need an EIS; therefore, we would not expect a FONSI to address the entire program. For those aspects of the program resulting in an EIS, a ROD is required. We consider a ROD necessary at the overall program level if the PEA results in the production of an EIS. Conversely, if a FONSI results, the FONSI would be the public record of the Government's position at the overall program level.

DoD Manual 5000.4-M. The DoD Manual 5000.4-M, "Cost Analysis Guidance and Procedures," December 11, 1992, provides guidance on the preparation of the Cost Analysis Requirements Description (CARD). The CARD is prepared by the program office and approved by the DoD Component's Program Executive Officer. The CARD is provided to the teams preparing the program office estimate and DoD Component cost analysis estimates in support of acquisition milestone reviews and is included as a separate section of the documentation for those estimates.

The CARD is divided into several sections, each focusing on a particular aspect of the program. One section addresses the environmental conditions expected during development, production, transportation, storage, and operation of the subsystems of the Program. The environmental conditions section also identifies any hazardous, toxic, or radiological materials that may be encountered or generated during the subsystem's development, manufacture, transportation, storage, operation, and disposal. The quantities of each hazardous material used or generated over the lifetime of the subsystem should also be estimated. The section describes the evaluation methodology for environmentally acceptable alternatives and the rationale for selection of alternatives and includes the alternatives considered and reasons for rejection.

Army Regulation. Army Regulation 200-2, "Environmental Effects of Army Actions," December 23, 1988, is the Army's implementation of the NEPA. It is more specific than NEPA and discloses responsibilities, policies, and procedures within the Army chain of command that result in the preparation of environmental documents, such as the EA, FONSI, and EIS. Additionally, the regulation provides guidance on life-cycle environmental documents and significant environmental impact. Discussion with Program Office and contractor officials indicated that the M1A2 Program met the criteria in the Army Regulation 200-2 for an EIS; however, they had not fully assessed the impacts of the criteria. While the Army policy in Army Regulation 200-2 is adequate, the policy was not fully considered by M1A2 program management officials and the Army chain of command. See Appendix B concerning the detailed requirements of Army Regulation 200-2.

Assessing Environmental Consequences

The M1A2 Program is scheduled for a Milestone III, Production Approval, decision in the third quarter, FY 1994, but the Army has not yet adequately assessed and documented environmental impact or consequence considerations, integrated environmental considerations, and communicated environmental consequences associated with the Program.

Environmental Analyses and Documentation. In October 1990, the Abrams Project Office, part of the Armored System Modernization Program Office, prepared an EA to show the environmental effects of the M1A2 prototype tank's testing and use during peacetime. This EA, approved in February 1991, was based on previous EAs of the Abrams Tank System; however, these EAs did not adequately assess the environmental effects of the Abrams Tank System, including the M1A2, over the System's life cycle. The Abrams Project Office, through contract No. DAAE07-89-C-RO45, required General Dynamics, Land Systems Division, the prime contractor, to prepare the October 1990 EA. The Tank-Automotive Command and General Dynamics personnel were not able to determine the cost or staff-hours of the 3-month study. The EA did not address development, manufacturing, and disposal. General Dynamics personnel, who prepared the EA, stated that they had no prior experience in preparing environmental documents and did not fully understand the regulations used to prepare the EA. The Abrams Project Office determined, based on the limited scope of the EA, that the M1A2 tank did not have an environmental impact; however, no FONSI was issued to the public.

The Abrams Project Office prepared an Integrated Program Summary, Annex E, Environmental Analysis, February 18, 1992, for an Army Systems Acquisition Review Council Milestone Decision Review on March 23, 1992, for the Low-Rate Initial Production decision. However, the Annex E was based on the October 1990 EA, which had not been updated. The Army Acquisition Executive, who granted permission to enter Low-Rate Initial Production, did not comment on the disclosures in the Annex E, and did not require the EA as backup. Additionally, Abrams Project Office personnel stated they did not have the experience or environmental training required to prepare the document adequately and, therefore, could not be certain the document satisfied the requirements of DoD Instruction 5000.2. A PEA was not performed to support the Low-Rate Initial Production decision.

No public disclosure of environmental documents was made during the assessment of environmental consequences or thereafter. Project Office personnel assumed that the EA and other environmental documents were the property of the Department of the Army and not to be released. Therefore, DoD decisionmakers and the public were not able to consider environmental consequences adequately as prescribed by laws and regulations.

Integrated Environmental Considerations. The Abrams Project Office did not adequately conduct an EA to consider development, manufacturing, fielding, and disposal of the M1A2 tank. Adequate integration of environmental considerations could avoid potential conflicts with environmental laws later in the acquisition, logistics support, and disposal phases of the Program. The Project Office did not budget resources to mitigate environmental consequences of the Program adequately. However, as a direct

Environmental Analysis

result of our audit, the Tank-Automotive Command and Project Office personnel did state that efforts would be taken to study the integration of environmental considerations in the acquisition process.

Communicating Environmental Consequences. Project Office personnel did not request environmental information related to the development, manufacture, maintenance, and disposal from the activities involved with the M1A2 Program because the current information associated with the Abrams Tank Program was considered to be adequate. Some of the major activities involved with the M1A2 Program include: The Abrams Project Office; Defense Plant Representative Office; General Dynamics, Land Systems Division; and Survivability Systems Program Office. Additionally, major components of the M1A2, such as the engine, track, transmission, and the 120-millimeter main gun, are Government-Furnished Equipment to the contractor and separately managed. The Project Office did not require the activities and suppliers of Government-Furnished Equipment on the M1A2 Program to provide information necessary to document environmental consequences.

Defense Plant Representative Offices. The Defense Plant Representative Offices manage the facilities portion of the M1A2 contract but have no formal agreement to provide environmental information to the Project Office. The Tank-Automotive Command and the Defense Plant Representative Offices have a Memorandum of Agreement through which environmental information is passed to the Project Office via the Tank-Automotive Command. We believe that a formal agreement between the Project Office and the Defense Plant Representative Offices is necessary to preclude the misinterpretation or nondelivery of environmental information.

General Dynamics, Land Systems Division. General Dynamics did not ensure that subcontractors were complying with environmental regulations. For example, General Dynamics did not require subcontractors to provide Material Safety Data Sheets for items received as finished components. General Dynamics cited legal liability for limiting involvement with the environmental practices of subcontractors. In response to Request for Proposal No. COO13-R2, February 17, 1993, on the foreign military sales on the M1A2 Program, the Tank-Automotive Command inserted language saying that the prime contractor shall be responsible for ensuring that the subcontractors comply with environmental regulation. The Command required this work to conform to a pollution prevention plan. The Command and General Dynamics, Land Systems Division, were working on a contractual data item description for pollution prevention that will be incorporated into new contracts to comply with the policy. The current cost estimate is approximately \$7 million, with most of the cost aimed at subcontractor compliance with environmental regulations. As a result of our audit, General Dynamics officials stated that they are providing the Government with a "shopping list" of what pollution prevention services the

Government will get and what each specific effort will cost. Further, General Dynamics officials stated that this is an attempt by their company to definitize the data item description and to ascertain what the Abrams Project Office wants in the data item description. Due to the environmental nature of this contractual data item description, it should be reviewed and approved by the Army Acquisition Executive to ensure that the resulting contracts are consistent with other acquisition decisions, environmental documents, and Army Regulation 200-2.

Survivability Systems Program Office. The Survivability Systems Program Office, which manages the heavy armor program, had environmental information on the cost and risks associated with disposing of depleted uranium. In 1987, the Survivability Systems Program Office, then part of the Abrams Project Office, completed an EA, including a FONSI, of depleted uranium armor. The Abrams Project Office was provided a copy of the Depleted Uranium Armor EA; however, the EA did not include an analysis of the life-cycle costs of depleted uranium armor.

Depleted uranium is a low-level radioactive heavy metal that must only be disposed of at an approved nuclear-material burial site. Survivability Systems Program Office personnel stated that depleted uranium armor will only be disposed of at Government-classified burial sites, at a cost in current dollars of approximately \$4,420 to \$7,300 per depleted uranium armor package or \$4.7 million to \$7.7 million for the Program. However, these costs exclude the Government operation of the burial site. Further, Survivability Systems Program Office personnel stated that because of classification and cost, they would never dispose of depleted uranium armor in commercial radioactive burial sites, which they stated are more expensive. The Army Acquisition Pollution Prevention Support Office personnel stated that these costs do not include the costs of demilitarizing the machinery and machinery lubricants that become contaminated during the construction of the depleted uranium armor package. The Abrams Project Office personnel stated that the Depleted Uranium EA did not cover the environmental consequences associated with the disposal of the depleted uranium armor.

We believe a properly executed programmatic environmental analysis is needed to fully explore the potential environmental impacts and costs of the M1A2 Program.

Cause for Conducting a Limited Environmental Assessment

The failure of the M1A2 Program management to assess environmental consequences adequately, prepare appropriate documentation, and integrate environmental considerations into its decisionmaking process occurred because the Abrams Project Office lacked Army implementing guidance pertaining to PEAs and life-cycle cost estimating. Discussions with Abrams Project Office personnel indicated that they were not aware of current environmental regulations and procedures. Additionally, the Abrams Project Office did not have a dedicated environmental focal point to integrate environmental aspects of the Program. The focal point would be responsible for the coordination of environmental issues among the Abrams Project Office, the Government integrator; the Survivability Systems Program Office, the provider of armor through the Department of Energy; the Defense Plant Representative Offices, administrators of the production contracts; and General Dynamics, Land Systems Division, the prime contractor, as well as the providers of other Government-Furnished Equipment. We believe that compliance with environmental laws and regulations, and specifically the assessment of environmental consequences and costs over the life-cycle of the Program, will provide decisionmakers and the public with adequate information to make informed decisions, prevent costly delays, and avoid program changes.

Management Oversight. Environmental oversight for the M1A2 Program was lacking throughout the Army chain of command, from the Program Office to the Headquarters, Department of the Army. Environmental documents should follow the same chain of command for approval as other decision documents; however, the EA completed and approved in October 1990 and February 1991, respectively, was approved at the Tank-Automotive Command level only. We will further discuss Army oversight and chain of command in our summary report on this subject. Specifically, the lack of centralization of environmental oversight in Army acquisition management is a direct cause of the inadequacies identified in this report.

Decision Documents. The PEA should serve as a natural link between environmental and acquisition decision documents. Careful review of environmental documents can serve as checks for the adequacy of disclosures in decision documents concerning development, production, maintenance, and disposal. Additionally, environmental documents must show associated cost analyses between alternatives, which is an integral part of the Cost and Operational Effectiveness Analysis. The Program is required to present a Cost and Operational Effectiveness Analysis at its Milestone III, Production Approval, decision, which should contain information from an adequate PEA

detailing the alternatives available and the tradeoffs made to arrive at the best alternative. Therefore, appropriate environmental documentation is the law and a useful decision aid for a program.

For the Low-Rate Initial Production decision, no PEA was performed although required by DoD Instruction 5000.2. The Abrams Project Office's October 1990 EA did not fully comply with environmental regulations. Project Office personnel presumed that the IPS, Annex E, and the EA prepared were adequate due to not receiving feedback from Army or OSD officials. The NEPA states that the goal is not better documents but information to make better decisions with environmental considerations. We believe that the Army lacked sufficient environmental information for the Program to proceed into Low-Rate Initial Production. The Army must ensure that the Milestone III decision is made based on complete information and analyses concerning environmental consequences.

Environmental Training. Discussion with Program Office personnel indicated that program managers had attended environmental briefings but that, as a whole, no Program Office officials had training on the correct way to prepare environmental documents for major Defense acquisition programs. The absence of environmental training is reflected in the Program Office personnel's lack of understanding of environmental regulations. We believe that it is essential that all personnel involved in the acquisition process have enough environmental training to make informed decisions that include environmental considerations.

The Tank-Automotive Command and Program Office personnel stated they will begin exploring options of providing environmental training to personnel and assuring future compliance with environmental regulations. Program Office personnel stated that the main obstacle to complying with environmental regulations was that they did not have the funds for a staff dedicated to environmental issues. Army Regulation 200-2 states that the Major Commands will ensure that adequate resources are available to comply with environmental regulations. Therefore, the Army Materiel Command, the Tank-Automotive Command, and the Program Office must ensure that resources are available to comply with environmental regulations.

Effect of Inadequate Environmental Consideration

The Army's failure to adequately assess environmental consequences of the M1A2 Program does not comply with Federal, DoD, and Army environmental policies and regulations and makes it impossible for the Program Office to ensure that it is carrying out its mission in a manner consistent with national

Environmental Analysis

environmental policies. The Program could experience significant additional cost expenditures, such as fines, for noncompliance with environmental laws in the acquisition and logistics support phases and for not properly cleaning up and disposing of resulting hazardous materials. Additionally, the Program could face costly schedule delays for inadequate compliance with NEPA and other environmental provisions. Survivability Systems Program Office personnel stated that a shutdown of the Program would endanger existing environmental permits, which could potentially not be renewed under present environmental regulations, as well as require a costly restart of the Program. Therefore, it is in the best interest of the Program that Program Office personnel ensure that they are in compliance with environmental laws and regulations.

Unknown and Undocumented Costs. The failure to perform a PEA to adequately assess the environmental impacts of all Program elements can lead to unplanned costs for environmental cleanup of the M1A2 Program. We consider the undocumented disposal and facility costs for clean-up significant information that can affect how decisionmakers proceed with a program. For example, disposal and cleanup costs for the depleted uranium armor package, previously discussed in this report, should be an element of the M1A2 Program life-cycle costs.

Environmental Impact Statement. The Project Office did not issue an EIS or FONSI based on the October 1990 EA. We believe that an EIS should have been performed since the Program involved the production, storage, transportation, use, treatment, and disposal of hazardous or toxic materials that may have a significant environmental impact. Additionally, the Program involved the disposal of nuclear material, munitions, explosives, industrial and military chemicals, and other hazardous or toxic substances that can cause significant environmental impact. Some examples include Chemical Agent Resistant Coating, a nuclear, biological, and chemical protectant that is toxic when exposed to intense heat, such as provided by a blowtorch for welding; and cadmium plating, used as fasteners on the tank, which is recognized as a carcinogen and requires disposal as a hazardous material. Steps were taken to ensure that all workers understood how to work safely with Chemical Agent Resistant Coating, and alternatives are being found for the use of cadmium, except for areas on the tank where it is absolutely necessary.

Conclusion

We believe that the M1A2 Program must complete a PEA and an EIS before entering Milestone III, Production Approval, so that the environmental impact of the Program can be properly considered by OSD and Army decisionmakers

and to ensure that the Program is in compliance with environmental laws and policies. Life-cycle cost estimates should adequately consider all environmental costs of the system before the Production Approval decision is granted, and significant environmental tradeoffs should be addressed in the Cost and Operational Effectiveness Analysis. The Abrams Project Office; other activities, such as the prime contractor; the Defense Plant Representative Offices; and Survivability Systems Program Office; and other providers of Government-Furnished Equipment need to be involved with environmental analyses of the Program to ensure thorough and complete preparation of the PEA and associated documentation, including assessing developmental and production processes and cost impacts. In this regard, timely review and approval by the Army Acquisition Executive of the M1A2 Pollution Prevention Contract is essential. Involvement should extend over the life of the Program to cover future milestones and any significant changes that may occur. Also, if an EIS is determined necessary by the PEA, the EIS must be completed before the Production and Deployment phase of the Program is entered. The EIS must be submitted for decision to the Under Secretary of Defense for Acquisition and Technology.

The procedures in our recommendation for a PEA or EIS before entry into Production Approval are based on the present status of the M1A2 Program and the previous failure to perform a PEA. Environmental planning is an essential component of the acquisition process. This planning must be initiated as early as possible to ensure that adequate consideration is given to environmental analyses. Given the numerous changes in the M1A2 Program, environmental analyses should have been completed no later than the Low-Rate Initial Production decision in March 1992, although it is normally expected that environmental issues be resolved as part of the design review process.

Besides adhering to law, the preparation of appropriate environmental documents is good business sense. With those documents, decisionmakers can fully weigh the environmental impacts of a program over its life cycle so that DoD can reduce environmental restoration costs and other potential environmental liabilities. Acquisition personnel should place greater emphasis on complying with environmental laws and regulations that will reduce the future Defense spending for cleanup and restoration. We intend to address the organization of Army environmental oversight and lack of compliance with environmental requirements for acquisition programs in our summary audit report.

Recommendations, Management Comments, and Audit Response

We recommend that the Under Secretary of Defense for Acquisition and Technology direct the Army to:

1. Conduct and document a programmatic environmental analysis and supporting environmental impact statements of the M1A2 Program before the Milestone III, Production Approval, decision, in accordance with Department of Defense Directive 6050.1, "Environmental Effects in the United States of DoD Actions," July 30, 1979, and Department of Defense Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991.
2. Incorporate the results of the M1A2 programmatic environmental analysis into the Integrated Program Summary, program office and independent cost estimates, cost and operational effectiveness analysis, affordability assessment, and other Defense Acquisition Board documentation for review at the M1A2 Defense Acquisition Board Milestone III decision, in accordance with Department of Defense Directive 6050.1, "Environmental Effects in the United States of DoD Actions," July 30, 1979; and Department of Defense Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991; and Department of Defense Manual 5000.4-M, "Cost Analysis Guidance and Procedures," December 11, 1992.
3. Publicly release all National Environmental Protection Act documents, including environmental impact statements, associated records of decision, and any findings of no significant impact, in accordance with Department of Defense Directive 6050.1, "Environmental Effects in the United States of DoD Actions," July 30 1979.
4. Direct the Army Acquisition Executive to review and approve the M1A2 Pollution Prevention Plan contract modification as required for acquisition decision documents, in accordance with Army Regulation 200-2, "Environmental Effects of Army Actions," December 23, 1988.

Management Comments. As of June 21, 1993, we had not received comments from the Under Secretary of Defense for Acquisition and Technology (the Under Secretary) that were due by May 31, 1993. We did receive comments from the Project Manager, Abrams Tank System (the Project Manager), through the Program Executive Officer, Armored Systems Modernization, Department of the Army. The complete text of the Project Manager's comments is in Part IV.

On May 17 and June 1, 1993, the Project Manager provided memorandums commenting on the draft report. He concurred with the recommendations, indicated exception to specific points in the finding, and provided other general and specific comments.

On May 3, 1993, the Project Manager issued a memorandum to the Deputy Assistant Secretary of the Army (Environmental, Safety, and Occupational Health). On June 1, 1993, the Project Manager readdressed the memorandum to us. In the memorandum, the Project Manager concurred with the recommendations except for Recommendation 4. He noted that the Pollution Prevention Plan will be reviewed by the Army Acquisition Executive's executive agent, the Army Acquisition Pollution Prevention Support Office; and that the Plan is not a contract modification but a contract Data Item Description to be included in a new contract. Once the Data Item Description is formalized and agreed to, the Army Acquisition Pollution Prevention Support Office will recommend inclusion of the Data Item Description in all major Army acquisitions.

On May 11, 1993, we discussed the Project Manager's comments concerning Recommendation 4. with his representative. We indicated that the actions by the Army Acquisition Executive met the intent of our recommendation. As a result of that discussion, the Project Manager issued a memorandum on May 17, 1993, stating that he actually concurred with the recommendation but wanted to emphasize that the action was already being accomplished.

Audit Response. The comments and proposed actions by the Project Manager are responsive to our audit recommendations; however, the Under Secretary should provide comments to this final report. The DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. See the "Response Requirements for Recommendations" section for the recommendations the Under Secretary must comment on and the specific requirements for his comments.

The Project Manager's comments concerning the recommendation meet the intent of our recommendation. With regard to the Project Manager's general and specific comments concerning the draft report, we met with the Project Manager's representative to discuss the Project Manager's comments. Adjustments were made to the final report where appropriate. Our detailed response to the Project Manager's comments is in Part IV.

Environmental Analysis

Response Requirements for Recommendations

<u>Number</u>	<u>Addressee</u>	<u>Response Should Cover:</u>			<u>Related Issues*</u>
		<u>Concur/ Nonconcur</u>	<u>Proposed Action</u>	<u>Completion Date</u>	
1.-4.	Under Secretary of Defense for Acquisition and Technology	X	X	X	IC

* IC equals material internal control weakness.

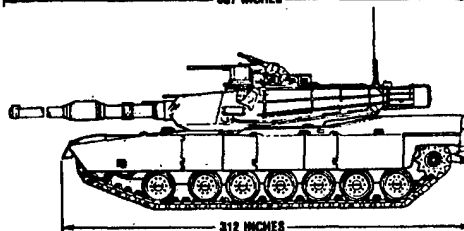
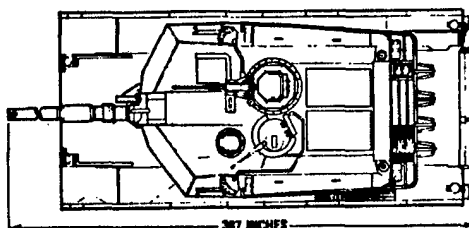
Part III - Additional Information

Appendix A. M1A2 Abrams Main Battle Tank Characteristics and Significant Features

M1A2 ABRAMS . . . MAIN BATTLE TANK

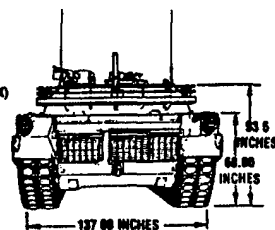
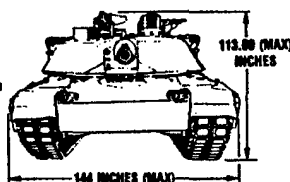
M1A2 ABRAMS CHARACTERISTICS

Weight	69.54 Tons	Main Armament	120mm M256 Smooth Bore Cannon
Length (Dun Forward)	367 inches	Casual Weapon	7.62 M240 Machinegun
Turret Height	93.5 inches	Leader's Weapon	7.62 M240 Machinegun on Slave Mount
Width	144 inches	Commander's Weapon	.50 Cal M2 Machinegun
Ground Clearance	19 inches		
Ground Pressure	15.4 PSI		
Gas Turbine Engine	1500 HP		
Power to Weight Ratio	21.6 hp/ton		
Hydra Kinetic Transmission	4 Speed Forward 2 Speed Reverse		
		Cruising Range	265 Miles
Speed		Obstacle Crossing	42 inches
Maximum	42 mph (Governed)	Vertical Trench	9 Feet
Cross Country	30 mph		
10% Slope	17 mph	NBC System	200 SCFM - Clean Cooled Air
60% Slope	4.1 mph	Crew	4 Men
Acceleration - (0 to 20 mph)	7.2 Seconds		



SIGNIFICANT FEATURES

- Improved Armor
- Compartmented Fuel & Ammunition
- Increased Lethality
- High Agility
- Low Silhouette
- Automatic Fire Detection/Suppression
- Primary and Auxiliary Sight
- Thermal Imaging/Night Sight
- Fully Stabilized Sight
- Day/Night Fire on the Move Capability
- Increased External Storage
- Advanced Suspension - Torsion Bars/Retary Shock Absorbers
- Gas Turbine Engine - Multifuel/High Power to Weight Ratio
- Ease of Maintenance
- Onboard Malfunction Detection System
- Nuclear Biological Chemical (NBC) System
- Fording Depth to Turret Roof with Kit
- Enhanced Position Location Reporting System/Enhanced PLRS User Unit
- Digital Electronic Control Unit
- Driver's Thermal Viewer
- Commander's Independent Thermal Viewer
- Position/Navigation System
- Intervehicular Information System
- Radio Interface Unit
- Digital Communication
- Single Channel Ground/Air Radio System (SINCGARS)
- Improved Commander's Weapon Station
- Commander's Integrated Display
- Driver's Integrated Display
- Gunner's Control and Display Panel
- Improved Slip Ring
- Automatic Shift/Steering Transmission



Appendix B. Army Regulation on Environmental Effects

Army Regulation 200-2, "Environmental Effects of Army Actions," December 23, 1988, is the Army's implementation of the NEPA. It is more specific than NEPA and discloses responsibilities, policies, and procedures within the Army chain of command that result in the preparation of environmental documents, such as the EA, FONSI, and EIS. Additionally, the regulation provides guidance on life-cycle environmental documents and significant environmental impact.

Responsibilities. Primary responsibility for the preparation and dissemination of environmental documents is tasked to the Major Army Command commanders. The M1A2 Program falls under the Army Tank-Automotive Command in Warren, Michigan, a Major Subordinate Command of the Army Materiel Command. The Major Army Command commanders monitor proposed actions, delegate the appropriate Component to prepare EAs and EISs, provide for public involvement, ensure that appropriate environmental documentation is prepared and forwarded to the correct proponent, maintain the personnel and resources to comply with this regulation, and circulate and review environmental documents at the same time with other decisionmaking documents.

Policies. The Army will identify significant environmental effects of proposed actions in adequate detail, and decisionmakers will be responsible for the impact of their decisions on the environment. Environmental effects will be considered concurrently with technical, economic, and other necessary factors in the decisionmaking process. Other Federal, state, and local environmental laws necessary to gain approval to proceed with the proposed action must be obeyed but do not supercede the NEPA.

Procedures. The review and approval of environmental documents follow the same chain of review and approval as the proposed action. Within the Army, Headquarters, Department of the Army, is responsible for the substantive review of the environmental documentation and thorough consideration of that documentation in the decisionmaking process. The Army Acquisition Executive has decision authority for the M1A2 Program.

Life-Cycle Environmental Documents. Life-cycle environmental documents should be updated throughout the life of a program to account for changes in the environmental consequences of the program. The life-cycle environmental documents can be either an EA or EIS. Environmental documents are intended

Appendix B. Army Regulation on Environmental Effects

development, production, use, and disposal. An EA determines the extent of environmental impacts of a project and decides whether those impacts are significant.

Significant Environmental Impact. The determination of the significance of an environmental impact can be subjective. Army Regulation 200-2 provides guidance on conditions requiring an EA or EIS to aid the decisionmaker on the appropriate document to prepare. The decisionmaker can forego the preparation of the EA if an EIS is necessary.

Environmental Assessment Conditions. An EA is required when the proposed action has the potential to impact environmental quality when combined with the effects of other actions. Therefore, an action must not be evaluated on just its own environmental effects but on how the effects of this action combined with current actions impact the environment as a whole.

Environmental Impact Statement Conditions. An EIS is required when the proposed action involves the production, storage, transportation, use, treatment, and disposal of hazardous or toxic materials that may have significant environmental impact. Additionally, actions that normally require an EIS include the disposal of nuclear material, munitions, explosives, industrial and military chemicals, and other hazardous or toxic substances that can cause significant environmental impact. The EIS is performed when the preparer is aware that the proposed action can significantly impact the environment and can reasonably identify the element(s) of the proposed action that cause the impact(s).

Appendix C. Summary of Potential Benefits Resulting From Audit

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
1.-4.	Internal Control. Will improve program oversight and compliance with environmental policies.	Nonmonetary.

Appendix D. Activities Visited or Contacted

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology, Washington, DC
Assistant Secretary of Defense (Production and Logistics), Washington, DC
Director, Acquisition Program Integration, Washington, DC
Director, Tactical Systems, Washington, DC

Department of the Army

Assistant Secretary of the Army (Installations, Logistics, and Environment)
Assistant Secretary of the Army (Research, Development and Acquisition),
Washington, DC
Program Executive Office, Armored Systems Modernization, Warren, MI
Project Manager, Abrams Tank System, Warren, MI
Project Manager, Survivability Systems, Warren, MI
Army Materiel Command, Alexandria, VA
Army Acquisition Pollution Prevention Support Office, Alexandria, VA
Army Armament Research, Development, and Engineering Center, Picatinny
Arsenal, NJ
Army Tank-Automotive Command, Warren, MI

Defense Agency

Defense Plant Representative Office, General Dynamics, Land Systems Division,
Warren, MI

Non-DoD Organizations

U.S. Department of Energy, Idaho Falls, ID

Contractor

General Dynamics, Land Systems Division, Warren, MI

Appendix E. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
Assistant Secretary of Defense (Production and Logistics)
Director, Acquisition Program Integration
Director, Tactical Systems
Deputy Under Secretary of Defense for Environmental Security
Assistant Secretary of Defense (Program Analysis and Evaluation)
Assistant Secretary of Defense (Public Affairs)
Comptroller of the Department of Defense

Department of the Army

Secretary of the Army
Assistant Secretary of the Army (Installations, Logistics, and Environment)
Assistant Secretary of the Army (Research, Development and Acquisition)
Program Executive Office, Armored Systems Modernization
Abrams Tank System Project Office
Survivability Systems Program Office
Inspector General, Department of the Army
Army Materiel Command
Army Tank-Automotive Command

Department of the Navy

Secretary of the Navy
Commandant of the Marine Corps
Headquarters, Naval Audit Service

Department of the Air Force

Air Force Audit Agency

Appendix E. Report Distribution

Defense Agencies

Director, Defense Contract Audit Agency
Director, Defense Intelligence Agency
Director, Defense Logistics Agency
 Commander, Defense Contract Management Command
 Defense Plant Representative Office, General Dynamics, Land Systems Division
Director, Defense Logistics Studies Information Exchange
Inspector General, National Security Agency

Non-DoD Organizations

Office of Management and Budget
U.S. Department of Energy
U.S. Environmental Protection Agency
U.S. General Accounting Office, National Security and International Affairs Division,
 Technical Information Center

Chairman and Ranking Minority Member of the Following Congressional Committees
and Subcommittees:

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 Operations
House Subcommittee on Legislation and National Security, Committee on
 Government Operations

Part IV - Management Comments

**Office of the Project Manager, Abrams
Tank System, Comments**

**Detailed Audit Response to Project
Manager, Abrams Tank
System, Comments**

Office of the Project Manager, Abrams Tank System, Comments



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

PROGRAM EXECUTIVE OFFICE
ARMORED SYSTEMS MODERNIZATION
WARREN, MICHIGAN 48097-5000



17 MAY 1993

SFAE-ASM-AB (70-17a)

MEMORANDUM FOR Director, Acquisition Management Directorate,
Office of the Inspector General, Department of
Defense, ATTN: Mr. Russell Rau, 400 Army Navy
Drive, Arlington, Virginia 22202-2884

SUBJECT: Recommendation 4, DODIG Draft Audit Report, "Review of
the M1A2 Abrams Tank Program Effectiveness of Environmental
Consequence Analyses"

1. References:

a. Memorandum, 3 May 93, subject: Project Manager, Abrams
Tank System, Comments to Draft Audit Report (Project No. 2AE-
0048.03) on the Review of the M1A2 Abrams Tank Program
Environment Consequence Analysis.

b. Conversation between MAJ Mike Cannon and
Mr. Jack Snider, 11 May 93, subject as above.

2. Paragraph 5, Recommendations, of reference a., indicates a
nonconcurrency with the DODIG recommendation to have the Under
Secretary of Defense for Acquisition direct the Army Acquisition
Executive (AAE) to review and approve the M1A2 Pollution
Prevention Plan contract modification as required for acquisition
decision documents in accordance with Army Regulation 200-2,
"Environmental Effects of Army Actions," December 23, 1988. PM
Abrams actually concurs with this recommendation, but our intent
was to emphasize that this action was already being accomplished.

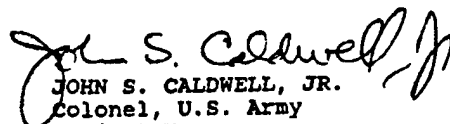
3. The AAE appointed the Army Acquisition Pollution Prevention
Support Office (AAPPSO) as his executive agent (see TAB Q,
reference a.). PM Abrams has been working closely with the
AAPPSO to tailor a Data Item Description for Pollution Prevention
Planning which will be incorporated in all new contracts for
Abrams Tanks, including M1A2 tanks. Enclosure 1 is a copy of
correspondence between PM Abrams and AAPPSO which details this
coordination. As the executive agent for the AAE, the AAPPSO is,
in effect, accomplishing the DODIG recommendation, therefore
there is no need for the Under Secretary of Defense for
Acquisition to direct the AAE to review the Plan.

17 MAY 1993

SFAE-ASM-AB (70-17a)
SUBJECT: Recommendation 4, DODIG Draft Audit Report, "Review of
the M1A2 Abrams Tank Program Effectiveness of Environmental
Consequence Analyses"

4. Point of contact for this information is MAJ Mike Cannon,
DSN 786-6894.

Encl


JOHN S. CALDWELL, JR.
Colonel, U.S. Army
Project Manager,
Abrams Tank System

Office of the Project Manager, Abrams Tank System, Comments

WR-28-83 MON 13:42

AMPSO HQ AMC, AMRD-E

FAX NO. 703 274 5148

P.01

FAX HEADER SHEET

FROM: GEORGE H TERRELL
HQ AMC, AMCRD-E/SARD-ECS-E
5001 RISENBOWER AVE.
ALEXANDRIA, VA 22333-0001

DATE/TIME: 261350APR93
TOTAL PAGES: 8+10

PHONE: (703) 274-9488/0816
DSN 284-
FAX: (703) 274-5146/5417

TO: SACOM
ATTN: TOM LANDY
AMSTA-UDM

PHONE: 313-874-8757
FAX: -8769

TOM -

DON'T REALLY HAVE ANY PROBLEMS WITH THE DID AS YOU HAVE WRITTEN IT EXCEPT AS WE DISCUSSED. MUST GO BEYOND PHASE III TO ENSURE OUR OPERATIONAL AND MAINTENANCE PEOPLE KNOW WHAT THEY'RE GOING TO FACE, AND TO ENSURE THAT WE HAVE A PLAN TO DISPOSE OF THE STUFF (AT LEAST IAW TODAY'S LAWS).

HAVE ATTACHED A CY OF THE PROGRAM PLAN AS IT WILL APPEAR IN THE NEW DA PAMPHLET, "MATERIEL ACQUISITION HANDBOOK", IT HAS CHANGED A LITTLE BASED ON INDUSTRY COMMENTS AND EXPERIENCE.

PLEASE GIVE ME A CALL AND TELL ME HOW THIS BUY IS ASSOCIATED DIRECTLY WITH THE PM'S SHOP.

THANKS.


GEORGE.

Office of the Project Manager, Abrams Tank System, Comments



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

PROGRAM EXECUTIVE OFFICE
ARMORED SYSTEMS MODERNIZATION
WARREN, MICHIGAN 48397 5000



SFAE-ASM-AB (5-10a)

1 JUN 1993

MEMORANDUM THRU Program Executive Officer, Armored Systems
Modernization, ATTN: SFAE-ASM, Warren, MI 48397

FOR Inspector General, Department of Defense, ATTN: Director of
Acquisition Management (Mr. Donald E. Reed), 400 Army Navy
Drive, Arlington, Virginia 22202-2884

SUBJECT: Project Manager, Abrams Tank System, Comments to Draft
Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2
Abrams Tank Program Environmental Consequence Analysis

1. PURPOSE: To provide specific comments regarding the subject
draft audit report to mitigate the findings of the DoD IG.

2. FORMAT: This paper will list findings cited within the body
of the report followed by additional information which was
available, but not presented to the DoD IG, or clarification of
specific points which are inaccurately portrayed. Each finding
subparagraph letter refers to a tab letter on the subject draft
audit report.

3. GENERAL: The DoD IG audit team visited PM Abrams
8-11 Feb 93. During that period, none of the principals were
available. The Project Manager, the Deputy Project Manager, and
the Product Manager for M1A2 were all travelling and were not
able to discuss the Program with the audit team. The Project
Manager arranged a briefing with the DoD IG on 21 Apr 93, after
the draft audit report was published. The purpose of that
briefing was to provide the DoD IG with additional information
which the audit team did not receive during their original visit.

The audit did not identify the M1A2 tank as part of the
Abrams Tank System. This is significant because the M1A2
contains no new materials nor impacts the environment any
differently than its predecessor the M1A1 Heavy Armor.
Environmental assessments were conducted on each improvement to
the Abrams Tank System using the guidance contained in Army
Regulation 200-2, Environmental Effects of Army Actions. Their
impact on the environmental assessment of the M1A2 is significant
due to the close relationship among the Abrams tank variants.

Office of the Project Manager, Abrams Tank System, Comments

Final Report
Reference

SFAE-ASM-AB (510a)

SUBJECT: Project Manager, Abrams Tan System, Comments to Draft Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2 Abrams Tank Program Environmental Consequence Analysis

4. FINDINGS:

a. Page i, Introduction. The Milestone III decision date is incorrectly cited as Oct 94. The correct date is 3d Quarter FY94 (currently planned for Apr 94).

b. Page i, Audit Results. The Army did not assess the environmental consequences of the M1A2 Program throughout its life-cycle or estimate life-cycle environmental costs.

NONCONCUR. The DoD IG audit team assumed that the approval for the Low-Rate-Initial Production for 62 M1A2 tanks in Mar 92, included a follow-on production buy. The actual approval did not extend beyond the 62 tanks. In Mar 92, the decision was that no further U.S. tank production was required after Apr 93. The 62 M1A2 tanks were not to be fielded and therefore, did not represent a major Army action. A formal environmental assessment and FONSI were not prepared for the Milestone IIIA because of this. The Acquisition Decision Memorandum of December 18, 1992, authorized the Army Upgrade Program and released the available funding for the first phase (206 M1A2 tanks) of the program. The environmental consequences of the M1A2 throughout its life-cycle will be determined prior to Milestone III now that money is available to fund the effort.

c. Page i, Internal Controls. The audit identified a material internal control weakness in that controls were not effective to ensure assessment of the environmental consequences of the M1A2 program.

NONCONCUR. The same controls used for all the documentation and requirements for preparation for Milestone III are adequate for ensuring the environmental consequences of the program are assessed. The early planning for Milestone III was ongoing when the audit team visited the M1A2 Program Office. This, coupled with the fact that senior managers were not consulted, resulted in the audit finding.

d. Page 6, Environmental Analysis. The report cites that the M1A2 Program Office is not carrying out its mission in a manner consistent with statutory and regulatory environmental policies and has not made provisions for funding potential environmental costs. It further cites that these failures are a result of a lack of familiarity with environmental laws and DoD environmental policies by responsible officials at all management levels.

-2-

1 JUN 1993

SFAE-ASM-AB (510a)

SUBJECT: Project Manager, Abrams Tan System, Comments to Draft Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2 Abrams Tank Program Environmental Consequence Analysis

NONCONCUR. As stated earlier, the audit team did not interview the M1A2 tank program chain of command. The assessments and analysis necessary to determine potential environmental impacts and costs are ongoing in conjunction with the preparation for a Milestone III production decision.

e. Page 10, Environmental Analysis and Documentation. The audit team reviewed an Environmental Assessment (EA) prepared in Oct 90, by General Dynamics Land Systems and considered this and its cover letters as a formal EA and FONSI.

10

NONCONCUR. This EA was used to prepare Annex E of the Integrated Program Summary for the Mar 92, Milestone IIIA decision to produce the 62 M1A2 tanks. This was not a formal EA because it was not considered a major Army action and was handled as a contract modification to the existing M1A1 production contract. The materials and processes used to produce the M1A2 are virtually the same as those used for the M1A1. Coupled with the fact that the 62 M1A2 tanks would not be fielded, the EA was prepared as an internal management document only.

f. Page 11, Integrated Environmental Considerations. The Program Office stated that it had not planned to design, develop, test, field, and dispose of the M1A2 system in compliance with applicable environmental protection laws and regulations.

10

NONCONCUR. The seriousness of this allegation warrants direct contact with the Project Manager, Abrams Tank System. As stated earlier none of the Abrams chain of command was contacted during the course of the audit or prior to the draft audit report. The Project Manager, Abrams Tank System, intends to comply with all applicable laws and regulations, including those which provide for the protection of our environment.

g. Page 11, Communicating Environmental Consequences. The audit report indicates that Program Office personnel stated they have not requested environmental information related to development, manufacture, maintenance, and disposal from the activities involved with the M1A2 Program.

11

NONCONCUR. As stated earlier, the M1A2 uses many of the same materials and processes in production as the M1A1. Earlier environmental assessments contain the information cited as not

Office of the Project Manager, Abrams Tank System, Comments

Final Report Reference

SFAE-ASM-AB (5-10a)

1 JUN 1993

SUBJECT: Project Manager, Abrams Tank System, Comments to Draft Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2 Abrams Tank Program Environmental Consequence Analysis

being requested. Included among those assessments are reviews of the engine, 120mm cannon, depleted uranium armor, and the test sites. These subsystem assessments were rolled into the Abrams Tank System assessments as shown in enclosure 2.

11

h. Page 11, Defense Plant Representative Office (DPRO). The audit report cited that the DPRO has no agreement to provide environmental information to the Program Office.

NONCONCUR. This statement is inaccurate. Routine environmental management documents/reports, generated from normal plant manufacturing operations, are provided through the Tank and Automotive Command (TACOM) Directorate of Installation and Services to the regulating agency with copies furnished to the TACOM Legal office. This is in accordance with a formal Memorandum of Agreement and Executive Agent Designation between the two DPROs (Detroit Tank Plant and Lima Tank Plant) and the Commander, TACOM. All documentation generated beyond routine reports, normally are compliance type requirements and require Abrams Tank Systems funding to support. These are thoroughly evaluated by the full-time environmental specialist (GS 0028-11) and presented to the Program Office for review and approval.

11

i. Page 12, DPRO. The audit states that contractual adjustments with environmental implications were made between the DPRO and General Dynamics without informing the Program Office.

NONCONCUR. This statement is inaccurate. The examples cited: CARC paint and cadmium, never originated in the DPRO. The technical data package prepared by General Dynamics and approved by the Abrams Program Office specifies the application and repair requirements and precautions for CARC painted surfaces. The environmental impacts of cadmium are well known industry-wide, however, it was a Program Office initiative which generated the elimination of cadmium coatings and fasteners from tank production.

11

j. Page 12, General Dynamics, Land Systems Division. General Dynamics did not ensure that subcontractors were complying with environmental regulations.

NONCONCUR. Although this is an accurate statement, the requirement for prime contractors to ensure subcontractor environmental compliance is new. The Program Office is attempting to incorporate contract clauses which require this level of prime contractor involvement in all new contracts. This

1 JUN 1993

SFAE-ASM-AB (5-10a)

SUBJECT: Project Manager, Abrams Tank System, Comments to Draft Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2 Abrams Tank Program Environmental Consequence Analysis

requirement, in effect, makes the prime contractor an enforcement agency of the government, hence the cost estimate of \$7 million cited in the report. The Data Item Description used in the contract cited by the report was generated by the Army Acquisition Executive's primary environmental office, the Army Acquisition Pollution Prevention Support Office (AAPPSO). Their intention was not to require enforcement but to ensure subcontractors were complying with their local and state environmental compliance laws and regulations. It has yet to be determined how the prime and subcontractor relationship can be worked to ensure this is happening.

k. Page 12, System Survivability Program Office, Army Tank and Automotive Command. Note that the System Survivability Office does not report to TACOM, but reports through Program Executive Officer, Armored Systems Modernization, the same reporting chain as PM Abrams. The audit report states that the Survivability Program Office was not required by the Program Office to provide an environmental analysis of depleted uranium armor for the M1A2 EA, completed in 1991.

NONCONCUR. This information was not asked for because it was already in the possession of PM Abrams.

(1) When depleted uranium armor was developed, it was under the purview of PM Abrams. The Systems Survivability Program Office was not created until 1989, six months after depleted uranium armor was first fielded in an Abrams Tank System. The environmental assessment was conducted in 1987 and 1988 in conjunction with the Department of Energy, the agency responsible for the production facility for depleted uranium armor. That study found that the use of depleted uranium armor in the Abrams tank has no significant impact on the environment and a Finding of No Significant Impact (FONSI) was properly filed. The armor developed and assessed for the Abrams Tank System in 1988 is the same armor used in the M1A2 and in the same configuration and quantities, hence no additional information was required of the Systems Survivability Program Office.

(2) The audit report also states that tungsten should have been studied as a possible alternative to depleted uranium and a life-cycle cost estimate done to determine the best alternative. Tungsten was studied as a possible alternative to depleted uranium. The decision to use depleted uranium was based on one major technical issue: there were no manufacturing

Office of the Project Manager, Abrams Tank System, Comments

Final Report Reference

1 JUN 1993

SFAE-ASM-AB (5-10a)
SUBJECT: Project Manager, Abrams Tank System, Comments to Draft
Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2
Abrams Tank Program Environmental Consequence Analysis

processes available to produce tungsten in the required configuration for the armor packages. Tungsten could not be made into an armor package, hence the decision to use depleted uranium. This issue will be readdressed in the upcoming M1A2 EA.

(3) The audit report states that the EA did not cover other elements of the Program in relation to environmental consequences of development, production, maintenance, and disposal. This is not exactly the case. The EA performed by the Department of Energy covers the development and production of depleted uranium. A maintenance plan for depleted uranium armor was developed by TACOM, AMCCOM, PM Systems Survivability, and PM Abrams in 1990. TACOM Regulation 700-9, Disposition of Contaminated Tank-Automotive Equipment, covers the disposal of vehicles exposed to radioactive contamination. This regulation was developed in conjunction with the same parties who developed the maintenance plan.

12

1. Page 13, Cause for Conducting a Limited Environmental Assessment. The report states that the failure of the M1A2 Program management to assess environmental consequences adequately ... occurred because the Program Office was not familiar with environmental regulations and did not employ appropriate management oversight.

NONCONCUR. This relates back to paragraphs 3, 5, and 7 above. Program Office management did not have the opportunity to discuss this issue with the audit team.

13

m. Page 14, Management Oversight.

NONCONCUR. As stated earlier, the audit team could not make an adequate determination of management oversight without discussing the issue with Program Office management.

13

n. Page 14, Decision Documents. The Programmatic Environmental Assessment is a new term derived in DoDI 5000.2 as revised in Feb 1991.

CONCUR IN PART. PM Abrams has not prepared an environmental document since that instruction was issued. Although Army implementation instructions for Programmatic Environmental Assessments have not been issued to the field, PM Abrams will use the expertise of the Army Acquisition Pollution Prevention Support Office to develop a Programmatic Environmental Assessment. This will serve to validate the Army's instructions for preparing Programmatic Environmental Assessments.

-6-

1 JUN 1993

SFAE-ASM-AB (510a)

SUBJECT: Project Manager, Abrams Tank System, Comments to Draft Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2 Abrams Tank Program Environmental Consequence Analysis

o. Page 16, Environmental Impact Statement (EIS). The audit report states that the Program Office incorrectly issued a FONSI based on the EA performed in Jun 91.

15

NONCONCUR. No FONSI was ever issued by the Program Office based on the Jun 91 EA. See paragraph e, page 3.

(1) The report states that the Jun 91 EA clearly indicates the requirement for an EIS. Subsystem EAs and EIS have been performed in the past. Installation, test sites, and manufacturing facilities and plants (government owned - contractor operated) assessments have also been accomplished. None of the EIS indicate that there is any significant environmental hazard posed by the Abrams tank as a system.

(2) None of the regulations or laws detail how decisions are to be made regarding environmental impact. Based on the finding in the draft audit report and our upcoming Programmatic EA, we will reevaluate the need for an EIS.

p. Page 16, Conclusion. The Project Manager, Abrams Tank System, will conduct a Programmatic Environmental Assessment (PEA). Using the services of the Army Acquisition Pollution Prevention Support Office (AAPPSO), PM Abrams plans to conduct the PEA in time to meet the Milestone III in 3d Quarter FY94. Any decision to proceed with an EIS for the tank system must be tempered by both the cost and the potential benefit derived from a formal EIS. Estimates for the completion of an EIS for a program of this size range from \$5 million to \$7 million. There are nearly 8,000 Abrams tanks fielded, nearly 3,000 of those contain depleted uranium armor. The 998 M1A2 tanks to be produced for the U.S. Army will displace 998 older M1 tanks. The Abrams tanks have been fielded since 1980 and are expected to remain in the field through 2015.

15

5. RECOMMENDATIONS: PM Abrams concurs with all the recommendations offered by the DoD IG draft audit report except recommendation 4: that the Under Secretary of Defense for Acquisition direct the Army Acquisition Executive (AAE) to review and approve the M1A2 Pollution Prevention Plan contract modification as required for acquisition decision documents in accordance with Army Regulation 200-2, "Environmental Effects of Army Actions," December 23, 1988.

17

Office of the Project Manager, Abrams Tank System, Comments

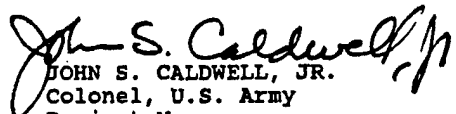
1 JUN 1993

SFAE-ASM-AB (510a)

SUBJECT: Project Manager, Abrams Tan System, Comments to Draft
Audit Report (Project No. 2AE-0048.03) on the Review of the M1A2
Abrams Tank Program Environmental Consequence Analysis

This action was directed by the AAE through the AAPPSO. It is not a modification, but a contract Data Item Description (DID) to be placed in a new contract. Once the language of the DID has been formalized and agreed to, the AAPPSO will recommend its inclusion in all major Army acquisitions. A copy of the DID is contained in the "Materiel Developer's Guide For Pollution Prevention", published by AAPPSO.

6. Points of contact for this report are the undersigned, Mr. David Latson, Deputy Project Manager, or MAJ Mike Cannon, Assistant Project Manager, DSN 786-6882/6894.


JOHN S. CALDWELL, JR.
Colonel, U.S. Army
Project Manager,
Abrams Tank System

Detailed Audit Response to Project Manager, Abrams Tank System, Comments

Our detailed response to the general and specific comments by the Project Manager, Abrams Tank System, concerning the draft report follows and corresponds to the headings and subparagraph letters associated with the Project Manager's comments.

General. The additional information provided at the Project Manager's briefing to us on April 21, 1993, was considered in the preparation of this report. We modified the report to identify the M1A2 tank as a part of the Abrams Tank System. While the M1A2 tank may not effect the environment in a manner significantly different from that of its predecessor, the M1A1 tank, we still believe that no environmental assessment for any of the Abrams series of tanks adequately assessed the environmental impact.

Findings. The Project Office took exception with some specific points in the draft report. In response, we provide the following comments in order of the paragraphs in the Army comments.

a. The Project Manger stated that the Milestone III decision was scheduled for the third quarter of FY 1994. We adjusted the report accordingly.

b. The Project Manager stated that we assumed that the March 1992 approval for the Low-Rate Initial Production for 62 M1A2 tanks included a follow-on production buy. We did not make such an assumption. Whether there was a follow-on buy was irrelevant to our conclusion that life-cycle environmental consequences should have been evaluated. Since the Program was an Acquisition Category IC Program at that time, the environmental consequences of the Program should have been considered for the life cycle of the Program, including an estimate of life-cycle environmental costs, regardless of how many tanks were being considered for the milestone decision. Therefore, we disagree with the Project Manager's comment that the production of 62 M1A2 tanks was not a major Army action. The Program should have conformed with environmental regulations. Action by the Project Office to determine the environmental consequences of the M1A2 throughout its life cycle before Milestone III should correct this condition.

c. The Project Manager did not agree with our statement that the audit identified a material internal control weakness. This audit statement resulted from our finding that detailed the inadequate assessment of

Detailed Audit Response to Project Manager, Abrams Tank System, Comments

environmental consequences for the M1A2 Abrams Tank Program. We identified this as a material internal control weakness in accordance with DoD Directive 5010.38. Internal controls to conduct and monitor environmental assessments existed; however, these controls were not fully effective. Specifically, controls were not effective to ensure proper assessment of the environmental consequences of the M1A2 Abrams Tank Program. We consider this internal control weakness to be material because internal controls were not complied with or did not provide reasonable assurance that environmental assessment procedures were implemented in accordance with applicable laws and policy.

d. The Project Manager addressed the accomplishment of his office's mission and indicated that we did not discuss our findings with him. We briefed the Project Office representatives designated by the Project Manager on our findings and potential recommendations. Due to their schedules, the Project Manager and Deputy Project Manager were unable to attend our exit conference, although the Assistant Program Executive Officer for Systems attended. We revised the statements addressing the M1A2 Program Office's accomplishment of its mission and familiarity with environmental laws and DoD environmental policies.

e. The Project Manager stated that the Abrams Project Office used the October 1990 M1A2 EA to provide the test sites with an updated assessment of the M1A2 tank improvements, never formalized the EA beyond the program executive officer level, and did not submit a FONSI. The Project Manager also noted that the M1A2 tank was not considered a major Army action until December 1992. We modified the paragraph to reflect the Project Manager's comments. However, as an Acquisition Category IC Program, which is a major Defense acquisition program, an EA is required to assess the environmental effects of the M1A2 over the system's life cycle. This EA should have included development, manufacturing, and disposal, and not just testing and use during peacetime, as was the case with the October 1990 EA.

f. According to discussions with the Project Manager's representative, the Project Manager was concerned that decisionmakers would consider the lack of compliance as an intentional disregard for environmental policies, which was not the intent of the report. We modified language in the report to state that the Abrams Project Office did not adequately conduct an EA to consider development, production, fielding, and disposal of the M1A2 tank.

g. The Project Manager's Representative expanded on the Project Manager's comments. He stated that Project Office personnel did not request environmental information related to the development, manufacture, maintenance, and disposal from the activities involved with the M1A2 Program because the current information associated with the Abrams Tank Program was

Detailed Audit Response to Project Manager, Abrams Tank System, Comments

considered to be adequate. We disagree for the reasons cited in this report; however, we modified the statement to reflect the comments by the Project Manager and his representative.

h. and i. The Project Manager's Representative stated that the Defense Plant Representative Offices manage the facilities portion of the M1A2 contract but have no formal agreement to provide environmental information to the Project Office. However, the Tank-Automotive Command and the Defense Plant Representative Offices have a Memorandum of Agreement through which environmental information is passed to the Project Office via the Tank-Automotive Command. We suggested that a direct agreement between the Project and Plant Representative Offices on environmental information would strengthen internal controls and prevent misunderstandings on the origins of environmental direction. We changed the paragraphs to reflect the Project Manager's and his Representative's comments.

j. The Project Manager discussed the prime contractor's oversight of its subcontractors to ensure that they were complying with environmental regulations. We reviewed the Project Manager's comments; however, no changes were considered necessary.

k. The Project Manager stated that:

- o The Survivability Systems Program Office did not report to the Army Tank-Automotive Command,

- o The Abrams Project Office did not ask the Survivability Systems Program Office for an environmental analysis of depleted uranium armor for the M1A2 EA because the analysis was already in the possession of the Abrams Project Office, and

- o Tungsten was studied as a possible alternative to depleted uranium.

We changed the report to reflect these statements; however, we noted that the Depleted Uranium EA was not fully adequate because it did not include an analysis of the life-cycle costs of depleted uranium armor, specifically, disposal of the armor.

l. The Project Manager addressed the cause for conducting only a limited environmental assessment. We discussed this point with the Project Manager's representative. He attributed the lack of compliance to an absence of Army implementing guidance in regard to PEAs and life-cycle cost estimating. We modified the statement accordingly.

Detailed Audit Response to Project Manager, Abrams Tank System, Comments

m. The Project Manager commented on management's environmental oversight. We discussed the Project Manager's concern with his representative; however, we still consider the lack of centralization of environmental oversight in Army acquisition management to be a direct cause of the inadequacies identified in this report.

n. The development of a PEA was addressed by the Project Manager. He indicated that the Abrams Project Office will use the expertise of the Army Acquisition Pollution Prevention Support Office to develop a PEA. We consider this action responsive to the intent of the audit.

o. As noted by the Project Manager in paragraph e., the Abrams Project Office did not issue a FONSI in June 1991, or any other time, as a result of the October 1990 M1A2 EA. We discussed the issuance of the June 1991 FONSI with the Project Manager's representative. He indicated that the FONSI that was provided to us during our visit was never issued. We modified the paragraph accordingly.

The Project Manager commented that prior subsystem EAs and EISs have indicated that the Abrams Tank System did not have a significant environmental impact as a system. However, based on the finding in the draft report and his office's upcoming PEA of the Program, he will reevaluate the need for an EIS. We believe that his analysis will show that an EIS should have been performed since the Program involved the production, storage, transportation, use, treatment, and disposal of hazardous or toxic materials that may have a significant environmental impact.

p. The Project Manager stated that a PEA will be conducted. We consider the Project Manager's statement responsive to the report; however, we suggest that the Project Manager consult other Government organizations who perform PEAs to assure that the prices quoted for an EA or EIS are reasonable. Additionally, the Project Manager should note that the decision to perform an EIS is not tempered by cost or benefit but by regulation. However, the mitigating factors are assessed by relative cost and benefit.

Recommendations. The Project Manager concurred with the recommendations, including Recommendation 4., which he addressed in his memorandum of May 17, 1993.

Audit Team Members

Donald E. Reed

Russell A. Rau

Jack D. Snider

Eric L. Lewis

Scott A. Marx

**Director, Acquisition Management
Directorate**

**Program Director, Systems
Acquisition Division**

Project Manager

Auditor

Auditor

INTERNET DOCUMENT INFORMATION FORM

A . Report Title: Environmental Consequence Analyses for the M1A2 Abrams Tank Program

B. DATE Report Downloaded From the Internet: 04/24/99

C. Report's Point of Contact: (Name, Organization, Address, Office Symbol, & Ph #): OAIG-AUD (ATTN: AFTS Audit Suggestions)
Inspector General, Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-2884

D. Currently Applicable Classification Level: Unclassified

E. Distribution Statement A: Approved for Public Release

F. The foregoing information was compiled and provided by:
DTIC-OCA, Initials: __VM__ Preparation Date 04/24/99

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.