Weapon System Environmental, Safety and Health Evaluation

Development Guide for Single Managers

November 1996

AFMC

Quality Systems for America's Air Force

Executive Summary

DoD 5000.2-R requires that all programs, regardless of acquisition category, perform and maintain an Environmental, Safety and Health (ESH) evaluation. The evaluation consists of the following five analyses:

- National Environmental Policy Act
- Environmental Compliance
- System Safety and Health
- Hazardous Materials
- Pollution Prevention

The DoD 5000.2-R defines what must be included in the evaluation, but the method of implementation is left to the discretion of the Single Manager. As such, there is a need for guidance to Single Managers. This Guide provides one approach and illustrates the risks, using actual program examples, of not focusing management attention on this critical issue.

The ESH evaluation is not just a piece of paper, it is the implementation of ESH considerations in day-to-day decisions within a program office. The ESH thought process must be fully integrated into all program office documents, e.g., the Single Acquisition Management Plan, Request for Proposal and Test and Evaluation Master Plan.

The ESH evaluation is the program's way of assessing the environmental, health and safety impacts of the weapon system on the environment and evaluating the impact of ESH requirements on the mission readiness. The ESH evaluation ensures potential "show stoppers" are identified and resolved as early in the acquisition process as possible.

TABLE OF CONTENTS

LIST OF FIGURES

FIGURE **PAGE**

LIST OF TABLES

TABLE **PAGE**

SECTION 1

INTRODUCTION

Each weapon system's acquisition strategy shall include a programmatic environmental, safety and health (ESH) evaluation per Department of Defense (DoD) 5000.2-R, paragraph 3.3.6. This evaluation (hereby referred to as ESH evaluation) shall also be updated and maintained throughout the life cycle of the system (DoD 5000.2-R, paragraph 3.3.6). This guide was developed to assist Single Managers (SM) with respect to meeting this requirement. The guide describes both the philosophy involved with institutionalizing the ESH evaluation thought process and the "nuts and bolts" which could be used to structure the evaluation. The word could is used because there is no required format. DoD 5000.2-R, paragraph 4.3.7, identifies the specific analyses which must be accomplished for an ESH evaluation—this guide provides but one way to accomplish this requirement.

WHAT IS AN ESH EVALUATION, WHO DOES IT AND WHEN DO THEY DO IT?

The ESH evaluation addresses a program's status concerning The National Environmental Policy Act (NEPA)[1] of 1969, environmental compliance, system safety and health, hazardous materials (HAZMATs) and pollution prevention. The ESH evaluation should be an integral part of program office operations and should be reflected in user, program and contractor documents. Documents impacted include but not limited to the following: the Single Acquisition Management Plan (SAMP), Statement of Objectives (SOO), Specifications, Instruction for Proposal Preparation (IFPP), Cost Analysis Requirements Description (CARD), Life Cycle Cost (LCC) Analyses, Analysis of Alternatives (AOA), Operational Requirements Document (ORD), Test and Evaluation Master Plan (TEMP), NEPA documentation, Hazardous Material Management Program (HMMP), System Safety Plan (SSP), Integrated Master Plan (IMP) and the contract.

Per DoD 5000.2-R the ESH Evaluation is an integral part of the weapon system acquisition process and should be woven into all applicable program documents.

The ESH evaluation begins with senior management for the weapon system. A SM who formally releases a policy identifying the importance of ESH issues to the program contributes significantly to instilling the ESH thought process throughout the SPO. This point cannot be overemphasized. The success of integrating environmental issues into the

[1] Title 42, United States Code, Section 4321-4347, National Environmental Policy Act.

program is questionable without visible SM support. This is illustrated in the following two examples.

1. At the 1995 Air Force Materiel Command (AFMC) Commanders Environmental Leadership Course the then AFMC Commander, General Ronald Yates, emphasized the criticality of direct commander involvement. His observation was that people watch their leadership and if the leader is not involved, neither are they.

2. The "Guru" of total quality management, Dr. Edward Demming, emphasized that changes in philosophy such as this are doomed to failure without top management involvement.

Senior System Program Office (SPO) management must take a proactive, visible role to instill an ESH ethic throughout the staff, without this the probability of success is low.

The ESH evaluation should be coordinated by every organization associated with the program. This includes the contractor whose responsibility should include identifying and resolving ESH issues in the fundamental design process. Weapon System designs evolve through a series of decisions and trade-offs of various constraints and criteria. ESH must be considered at the design level and become part of this thought process. The SM is ultimately responsible for all adverse impacts and plays a major role in developing and integrating the ESH thought process throughout the program office.

The user and maintainer are an integral part of the thought process. Life cycle analyses and life cycle cost are a fundamental part of the ESH evaluation. The users and maintainers inherit the weapon system; decisions made early in the program have ramifications for the life of the system. The users and maintainers must contribute their sensitivities to ESH issues as early as possible in the design process.

Fundamental to the ESH evaluation thought process is the consideration of the weapon system disposal issues and problems as early in the design process as feasible. Disposal should be a criterion in the decision making process. Organizations such as Defense Reutilization & Marketing Services (DRMS) and Aerospace Maintenance and Regeneration Center (AMARC) who are responsible for disposal of systems should provide insight into current and expected future problems of disposal.

The ESH evaluation is an action that must be initiated at the earliest possible time. The SM must demonstrate that ESH considerations have been fully evaluated. The results of the ESH evaluation are a key component of Milestone Review (for new systems) or Weapon System Program Assessment Review (WSPAR) for fielded systems.

The ESH evaluation is an ongoing process continually updated throughout the system acquisition life cycle. The evaluation of environmental, safety and health concerns should be included as part of the standard systems engineering process. The ESH evaluation should not be viewed as a task with a beginning and an end but more as an essential element of the way we do business. Any documentation of the ESH evaluation should be considered a living document.

WHY DOES MY PROGRAM NEED AN ESH EVALUATION?

First of all, it is required. DoD 5000.2-R stipulates the requirement for all programs (regardless of acquisition category)[2]. In addition the Chief of Staff Air Force (CSAF) and the Secretary of the Air Force (SAF) jointly issued a pollution prevention strategy on 24 July 1995[3]. Objective 2 of the strategy requires pollution prevention to be institutionalized into all phases of the weapon system life cycle by integrating environmental, safety and health concerns in the standard weapon system management process.

Secondly, ESH considerations have become more critical—and they are being checked. The Deputy Under Secretary of Defense for Environmental Security (DUSD(ES)) has been added as a member of the Defense Acquisition Board (DAB) and the AFMC Commander issued a memorandum[4] which provides guidance to include ESH on Acquisition Strategy Panels (ASP). The reason for this increased emphasis is two fold. The first is operational. If HAZMATs required to support the weapon system are not available in the future, it can result in mission impact. Secondly, the cost of HAZMAT use is escalating. For example:

1. For every $1 spent on the purchase of a HAZMAT there are between $10[5] and $123[6] spent to handle, manage, use and dispose of the material.

2. Superfund spending (cleaning up past abandoned toxic waste dumps) is currently $10M a day[7].

---

[2] DoD 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAP) and Major Automated Information System (MAIS) Acquisition Programs*, 15 March 1996; Sections 3.3.6 and 4.3.7 are included in Appendix A.

[3] Pollution Prevention Strategy letter dated 24 July 1995 and is included in Appendix B.

[4] AFMC Memorandum, Environmental, Safety and Health on Acquisition Strategy Panels (ASPs) (AFMC Policy Directive 500-13, Environmental Leadership) dated 24 September, 1996.

[5] Material Developers Guide for Pollution Prevention, 2nd Edition 1994, Army Acquisition Pollution Prevention Support Office, p. 5.

[6] Student Guide, Weapon System Pollution Prevention Application Course, Version 1.1, pp. 5-10.

[7] National Defense, Mega-Dollar Waste Removal Efforts Needs House Cleaning, p. 33, July/August 1996.

ESH issues have impacted the progress of programs (see upcoming example) and the trend indicates reviews will be more in depth in the future.

Acquisition programs are required, by DoD 5000.2-R, to conduct ESH analyses regardless of acquisition category. A good ESH evaluation is smart business. It will save money in the current phase for the contractor and the Government and in future phases for the Government during operations, support and disposal.

Thirdly, performing an ESH evaluation makes good business sense for both the contractor and the Government. Aside from the fact that Government contractors must abide by all Federal, state and local environmental, safety and health laws, addressing ESH considerations has decreased production costs[8]. This was realized through a combination of a reduction in HAZMATs purchase and handling expenses, lowered costs in processing waste streams, ease of meeting compliance requirements and sometimes decreased fabrication process cost. The ESH evaluation will put emphasis on continually reviewing opportunities to reduce the use of HAZMATs. If contractors know and understand how the Government's commitment to ESH concerns contributes to pursuing the goal of reducing overall program ESH risk, then they will have more motivation to recommend ESH changes which reduce costs.

The Government benefits in several ways from performing an aggressive ESH evaluation and implementing the results. The risk associated with show stoppers arising from NEPA or compliance issues is reduced. Also the weapon systems we acquire and support will pose less of an impact to the health and safety of our personnel. An ESH evaluation will result in a cost savings to the Government in out years because the Government inherits the cost of handling HAZMATs for the operation, support and disposal phases of a weapon system. In most cases these phases are much longer than weapon system development and production therefore, the potential savings to the Government can be substantial.

Here are some examples of how ESH issues have impacted a program.

Still not convinced? Do you consider the ESH evaluation just a paperwork exercise? Consider the following examples where programs have properly addressed or disregarded the impact of ESH issues:

- Recently a program was approaching its DAB review when three weeks before the review the following questions were received by the program office:

[8] Porter, Michael E. and Vander Linde, Claas, "Green and Competitive: Ending the Stalemate", *Harvard Business Review*, September-October 1995, Volume 73, No. 5, pp. 122-134.

Have you included the halon for the life of the weapon system in the requirements you forwarded for the reserve?
Have all safety issues on the program been answered?
Is there a Pollution Prevention Plan for the program?
Is the NEPA analysis complete and has it been properly coordinated?
Is the hazardous material management in accordance with Executive Order 12856?
Is the program and all contractors in compliance with the environmental laws?

Fortunately the Program Office had had an aggressive ESH program and responded to each of the questions with ample rationale. Would your program have been able to meet this challenge?

- The prime contractor of a high performance radome program selected a material for a radome that required methylene chloride in the fabrication process. Methylene chloride is a chemical targeted for reduction. Just prior to completion of material qualification testing, the vendor notified the prime that they were no longer going to manufacture the material because it was being phased out of their product line as part of their hazardous material reduction effort. The impact of this change imposed a major risk to the program and raised program costs by $5 million (14%) from the baseline **$35M**. The prime contractor was forced to perform another material down-selection and material qualification; the initial qualification testing was invalidated and performance specifications had to be relaxed due to increased RF losses in the new material. **The lesson is that an ESH evaluation can identify risks to ensure program cost, performance and schedule are not affected.**

- In June 1993, the award of an August 1993 contractor logistics support contract for aircraft and support equipment was halted by the contracting officer because applicable technical orders required the use of ozone-depleting substances (ODS). The technical orders had not yet been changed by the single manager, nor had any waiver application for ODS usage been submitted. An emergency waiver was submitted to Secretary of the Air Force/Acquisition (SAF/AQ) to avoid the shutdown of pilot training at Columbus Air Force Base (AFB).

- Recently a program was delayed going through Milestone II. The SAMP on this model program described how ESH issues would be addressed in the program. However a review of Request for Proposal (RFP) documents revealed it was not consistent with the SAMP (i.e., ESH words were used in the SAMP but there was no implementation). The program was delayed to correct the inconsistency. **The ESH thought process must be woven into all program office documents.**

- A missile program consisting of modular ground-to-ground guided missile weapon system and its predecessor was eliminated under the Intermediate Range Nuclear Forces

(INF) Treaty with the Soviet Union. Disposing of these missiles needed to be accomplished quickly to meet the INF deadlines. The disposal costs of the various hazardous materials used in the missile increased the cost of the program by **103.85 Million dollars (FY96$) -- about 8% of the total program costs! Weapon system disposal can be expensive! ESH design and disposal considerations would have alleviated disposal and compliance costs.**

WHAT IS THE PURPOSE OF THIS GUIDE?

The ESH evaluation Development Guide for Single Managers (hereafter referred to as the "Guide") is intended to assist SMs to 1) incorporate the ESH thought process into systems engineering and 2) provide one method of documenting the results. Table 1 summarizes the recommended ESH evaluation development process. The remainder of the Guide addresses each of the steps in Table 1.

Performing the ESH evaluation will assist in developing a thought process in the program office which inherently addresses the environmental, safety and health issues. The Guide will assist in formulating the ESH evaluation.

Table 1. Recommended Steps for Conducting the Environmental, Safety and Health Evaluation

Step	What to Do	What's Involved
1	Understand the need (Section 2) and purpose of the evaluation	The program office team becomes familiar with the requisite information of the ESH evaluation.
2	Assess current environmental, safety and health status (Section 3)	Environmental, safety and health information may be in a previous Programmatic Environmental Analysis (PEA) and Annex E to the Integrated Program Summary (IPS) and may also be included in other program office documents such as the ORD, SAMP, LCC, AOA, CARD, TEMP, RFP, SSP, HMMP, NEPA documentation and in documents from the contractor such as the IMP. Gather and review these sources to ensure applicable ESH considerations have been considered, thought through and documented.
3	Prepare working draft of the ESH evaluation (Section 4)	The working draft is based on knowledge of what analyses are required in the ESH evaluation, as well as the program information gathered so far (which may be severely lacking). Annotate areas where additional information is required. Note: DoD 5000.2-R does not stipulate an ESH evaluation format. The format described in this guide is just one approach. The program office must make its own decision concerning how to document the ESH evaluation.
4	Make list of voids in data, questions	Using the working draft, the ESH evaluation development team should list areas where more information is needed and areas where the ESH thought process needs to be refined. These issues should be listed by category (i.e., logistics, test, cost issues).
5	Meet with experts	Contact the individuals in the program office responsible for listed categories for resolution.
6	Incorporate inputs from the experts	Appropriate information learned from the experts (step 5) should be incorporated into the ESH evaluation, resulting in a finalized ESH evaluation that is ready for SM approval.
7	Updates	The environmental, safety and health evaluation is a continual process throughout the life of a system. Any documentation of the ESH evaluation should be updated on a regular basis.

UPDATES TO THE GUIDE

The Guide is designed to be periodically updated as necessary to keep up with current Air Force policy, as well as to include improvements. Any questions, suggestions, or enhancements to the Guide should be directed to the following address:

ESC/AXEE
5 Eglin Street
Hanscom Air Force Base, MA 01731-2116
(DSN 478-8127)
e-mail langr@hanscom.af.mil

SECTION 2

ENVIRONMENTAL, SAFETY AND HEALTH EVALUATION

This section describes the ESH evaluation process and focuses on the end product: an evaluation of the ESH risks of the program. The program office personnel, with help from ESH specialists, should become familiar with the ESH evaluation concept described in this section. This is the first step in performing the ESH evaluation, "Understand the need and purpose of the evaluation," described in Table 1 in Section 1.

ESH EVALUATION—A THOUGHT PROCESS AND PART OF SYSTEMS ENGINEERING

An ESH evaluation is comprised of several analyses which will be performed in separate areas such as NEPA and system safety, but the ESH evaluation provides the means to integrate these analyses so SMs can assess the overall risk of their programs. The ESH evaluation ensures ESH issues are addressed over the entire spectrum of weapon system development, test, production, maintenance, operation and disposal. The ESH evaluation institutionalizes a new thought process specifically incorporated in DoD 5000.2-R. It evaluates issues previously addressed in the Programmatic Environmental Analysis in addition to Safety and Health issues. The ESH evaluation does not replace NEPA documentation but does provide a means to track its status.

A SM may have the following perception: "The ESH evaluation sounds like another hoop for my program to jump through and it does not add any value." This statement is half-right. It ***is*** another requirement, but, if done correctly and linked to cost, schedule and performance criteria, the ESH evaluation ***will*** add value. It provides the SM, the SPO, the User, the Maintainer and the contractor with a program roadmap on ESH issues. These consequences may or may not be "showstoppers." However, if neglected, the resulting consequences could add to the program's overall cost and schedule risk.

Institutionalizing the evaluation of ESH issues in the systems engineering process will ensure program stability with respect to NEPA, compliance, system safety and health, hazardous material management, and pollution prevention in support of the Milestone Reviews and WSPARs. Figure 1 presents the intersection of the analyses as the ESH Evaluation and depicts all of the components as part of the system engineering process.

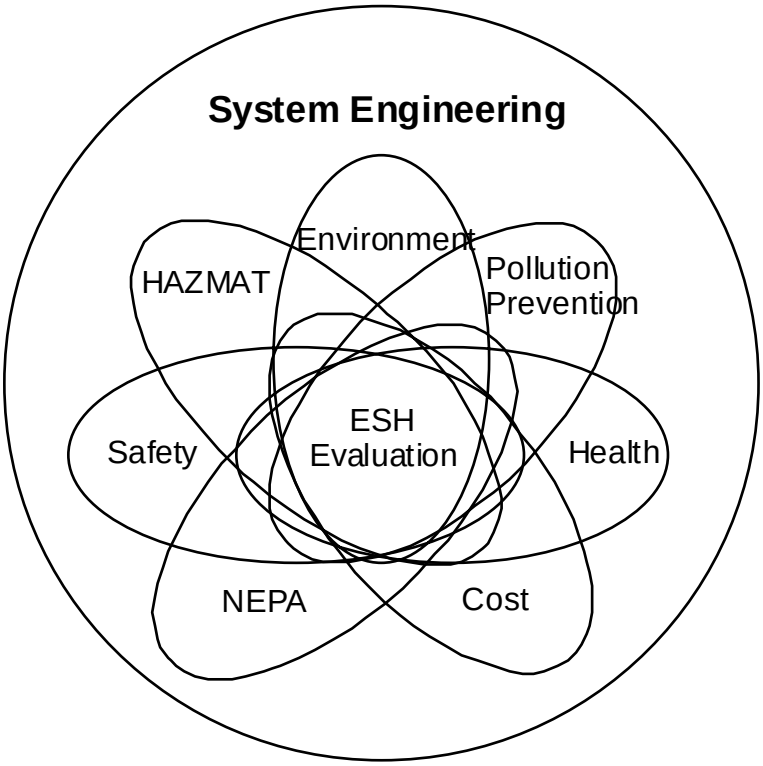


Figure 1. ESH Evaluation: An Integral Part of the Systems Engineering Process

The development of an ESH evaluation requires participation from all IPTs in the program. The ESH evaluation must be an integral part of the systems engineering process and not just a "SPO environmental person's" job! The environmental, health and safety issues and their associated life cycle cost impacts, related to the design, development, test, manufacturing, operation, support and disposal of a system, should be incorporated in the day-to-day decision making process of the program.

You cannot perform an ESH evaluation on your own. Get all Integrated Product Team (IPT) members who have the responsibility to design, manufacture, test, operate, maintain and dispose the weapon system involved in the ESH evaluation activity.

DoD 5000.2-R (paragraph 4.3.7) requires the SM to perform environmental, safety and health analyses in five areas as summarized below:

National Environmental Policy Act. This section identifies and tracks NEPA compliance issues, as defined in AFI 32-7061[9], Example: "What is the status of systems siting criteria and environmental documentation for siting a radar station in Southern Florida? What reasonable siting alternatives have been considered?"

Environmental Compliance. This section identifies regulations and evaluates potential impacts on the program's performance, cost and schedule. Example: How will restricted use of high volatile organic compound (VOC) paints impact the operation and support phase of a program?

System Safety and Health. This section identifies health and safety risks and establishes methods to manage the hazards over the life of the system. Hazards must be managed consistent with mission requirements and decisions to accept risks shall be cost effective and must be formally documented. System safety requirements are described in MIL-STD-882C[10] which is an allowable military standard within acquisition reform[11]. Example: How will exposure to methylene chloride in the de-painting process be addressed? Can it be eliminated by changing the process? How will exposure to laser energy hazards be addressed during the operation and maintenance of Airborne Laser Lab?

Hazardous Materials Management. This section describes the program's effort(s) to minimize HAZMATs to the maximum extent feasible. Implementation of the concepts described in National Aerospace Standard (NAS) 411[12] can be used to help identify HAZMATs in the weapon system. The use of HAZMATs impacts the reporting of releases for Toxic Release Inventory (TRI) under the Emergency Planning and Community Right-to-Know Act (EPCRA), which applies to Federal facilities as defined in Executive Order 12856[13]. Example: What are the system level trade-offs between an onboard auxiliary power unit (APU) using hydrazine and an APU that does not require HAZMATs?

Pollution Prevention (P2). The P2 section identifies opportunities to eliminate or reduce pollution at the source, recycle or treat materials and thereby reduce cost of

---

9 AFI 32-7061 Air Force Environmental Impact Analysis Process.

10 MIL-STD-882C, System Safety Program Requirements.

11 Military Specification and Standards Blanket Waiver Evaluation and Summary on MIL-STD-882C, System Safety Program Requirements, dated 10 December 1994. See Appendix C.

12 National Aerospace Standard (NAS) 411 Hazardous Materials Management Program.

13 Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, 14 February 1994.

compliance over the system life cycle. Example: Change a maintenance process such as stripping paint to one that reduces the waste stream or eliminates the need for stripping.

Although the analyses are identified separately in DoD 5000.2-R, they are interrelated and thus the reason to combine them in the ESH evaluation. This interrelationship can be examined by addressing: (1) how the weapon system affects the environment; (2) potential risks and operational impacts on the program associated with compliance with Federal, state and local environmental, safety and health laws and regulations and (3) hazardous material management and pollution prevention activities that minimize the risks of items 1 and 2.

The ESH evaluation is a thought process incorporating environmental, safety and health in the systems engineering process. It addresses the program risks in the areas of NEPA, environmental compliance, system safety and health, hazardous material management and pollution prevention.

Examples where ESH issues impacted programs are presented below:

- There is a requirement to dispose of chemical weapon stockpiles including a rocket with a chemical agent sealed in a canister. The agent could not be withdrawn non-destructively because the munitions had no release valve. Demilitarization was not considered in the design process. As a result the missile casings had to be carefully split in half to remove the chemicals requiring sophisticated safety features to protect workers and the public. Disposal facilities were constructed with 18-inch reinforced-concrete walls to withstand explosions. Transporting the missiles between sites was ruled out due to unacceptable risks, resulting in the construction of nine disposal facilities. Each site was burdened with its own tangle of local regulatory and public relations concerns; for example, each facility must obtain permits from the host state under the Resource Conservation and Recovery Act (RCRA), the Clean Air Act and the Clean Water Act. The General Accounting Office has raised the possibility that it may never be possible to satisfy the requirements of some states. **Including ESH considerations into the design and accounting for possible demilitarization and disposal, could have resulted in less expensive and dangerous means to dispose of unneeded ordnance while still producing a weapon difficult for an enemy to disarm.**

- A major aircraft program planned to run part of its operational test and evaluation (OT&E) at an Army test range. In the early planning stages, it was believed the existing Environmental Impact Statement (EIS) on the test range was sufficient to cover the aircraft test program. Subsequently, for unrelated reasons, there was a public controversy on the EIS resulting in some doubt of the applicability of the EIS covering the aircraft OT&E. During an readiness assessment in support of OT&E

certification, it was determined that a new EIS was required on the test range to support the OT&E. This determination was ascertained 7 months before certification and 9 months out from start of testing. A new EIS would have taken at least one year. The program's OT&E plan was restructured to eliminate the need for that particular test range. This example shows how external forces can affect a weapon system program and that continual attention to ESH issues minimized the adverse impacts on the program.

- A re-engineering program on a vintage aircraft required significant redesign of the nacelle and the local wing area. A program design decision was to continue using Halon 1301 for fire suppression in the nacelle. Halon 1301 is an ozone-depleting chemical (ODC) and is no longer in production. The program office did not consider the dwindling reserves of Halon 1301 in the supportability of the weapon system. The issue was identified by the Overarching Integrated Product Team (OIPT) during the milestone review process because the system was not supportable. The program office is re-evaluating the supportability issues on the program. The point is that the issue is not an environmental problem, but that it is readiness and supportability problem.

WHO SHOULD BE INVOLVED IN PERFORMING THE ESH EVALUATION?

Everyone - All Functional Disciplines and All IPT Members. The ESH evaluation cannot be accomplished if the impacts are unknown. If the ESH evaluation is dumped onto the 'Environmental Person', it is not likely to receive the attention and visibility necessary and is likely doomed to failure. The ESH evaluation development begins at the top where the SM must stress the importance of ESH issues to the program. One possible scenario is the inclusion of ESH trained personnel in all of the SPO IPTs. Part of the ESH thought process is that each functional area may have a role in NEPA, environmental compliance, system safety and health, hazardous material management and pollution prevention, however small the role may be. Figure 2 shows the possible setup of such a SPO IPT. In addition, discussion of ESH issues should be included in program office internal Management Reviews, Program Management Reviews with the contractor, and/or other reviews as appropriate, at the same level as all other functional items.

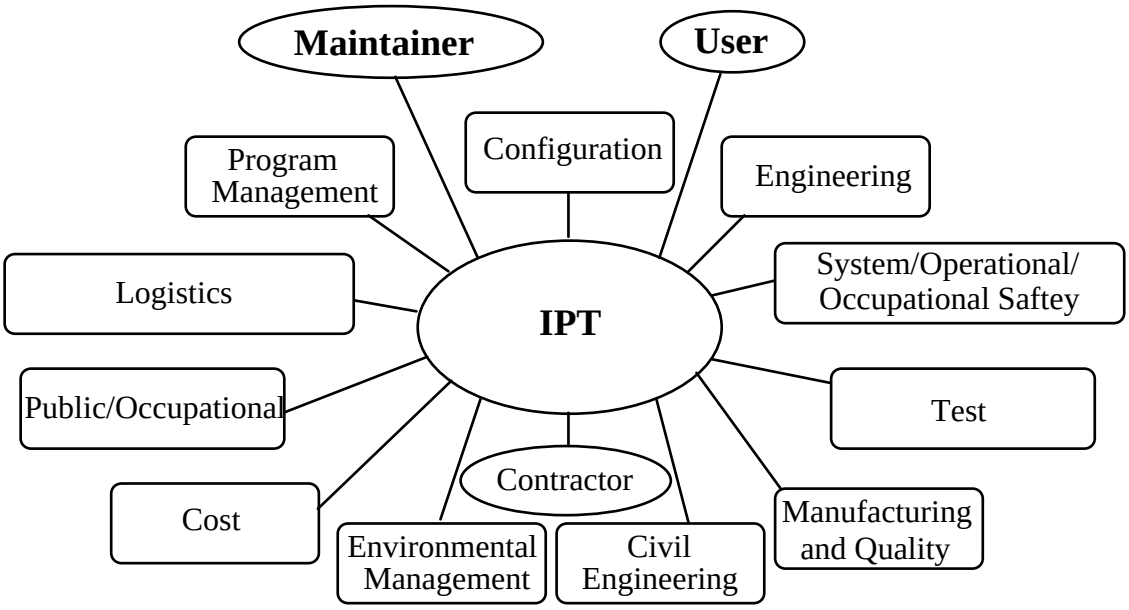


Figure 2. Incorporation of ESH into SPO IPT Organizations

SECTION 3

KNOWLEDGE ACQUISITION AND INCORPORATING ESH INTO SPO DOCUMENTS

Now with an understanding of what constitutes an ESH evaluation, the IPT members should review program documentation, both existing and in process. This review is to ensure ESH considerations have been included in the appropriate documentation. This section describes program documents that should provide ESH information. If the documents do not contain ESH information but should, then they need to be modified to reflect the ongoing ESH thought process in the program office.

WHERE ESH INFORMATION SHOULD BE CONTAINED

Program documents that may contain ESH information include the following:

- Annex E to Integrated Program Summary (IPS) - for background information only, Annex E is no longer required per DoD 5000.2R
- Single Acquisition Management Plan (SAMP) - previously Acquisition Strategy/Plan
- NEPA Documentation
- Cost Analysis Requirements Description (CARD)
- Analysis of Alternatives (AOA) - previously Cost of Operational Effectiveness Analysis (COEA)
- Operational Requirements Document (ORD)
- Test and Evaluation Master Plan (TEMP)
- Request for Proposal (RFP)
- Hazardous Material Management Program (HMMP) - Government and contractor
- System Safety Plan (SSP) - Government and contractor
- Integrated Master Plan (IMP) - contractor

Annex E to the Integrated Program Summary

The IPS was the documentation package that supported the program Milestone Reviews under the pre DoD 5000.2-R era. The Annex E of the IPS included the results of environmental efforts. Of special concern to the IPT members is the assurance that the ESH evaluation is performed and any concerns raised with the previous Annex E are addressed.

Single Acquisition Management Plan (Previously Acquisition Strategy/and Plan)

The old Acquisition Strategy/and Plan might have had some information on pollution prevention and HAZMAT management. However, the amount of ESH information historically has been very little.

The SAMP outlines program execution from program initiation to post-production support. The SAMP documents the background, objectives and plan of action needed to accomplish the next acquisition phase. ESH is a consideration for several aspects of the plan, such as life cycle cost, performance, trade-offs, risks, source selection procedures, budgeting and funding, test and evaluation and logistic considerations. DoD 5000.2-R Section 3.3.6 states that ESH issues must be addressed in the acquisition strategy section of the SAMP. It should be addressed in sufficient detail so it can easily be determined whether ESH issues have been evaluated.

The SAMP must address ESH issues per DoD 5000.2-R.

NEPA Documentation

NEPA compliance requires consideration and documentation of proposed Air Force actions before making a decision to proceed with implementation. Various documents may be required, as described in AFI 32-7061, *The Environmental Impact Analysis Process (EIAP)*, see Figure 3. These documents include:

- AF Form 813. This form is used to document the need for environmental analysis or certain categorical exclusion (CATEX) determinations. CATEXs apply to actions that normally do not require either an Environmental Assessment or an Environmental Impact Statement. Air Force-approved CATEXs are listed in AFI 32-7061, Attachment 2. Not all CATEX determinations require documentation on an AF Form 813.

- Environmental Assessment (EA). An EA is required when a proposed action is one not usually requiring an Environmental Impact Statement and is not categorically excluded. Every EA must lead to either a Finding of No Significant Impact (FONSI), a decision to prepare an EIS, or no decision on the proposal.

- Finding of No Significant Impact. The FONSI briefly describes why an action would not have a significant effect on the environment and thus will not be the subject of an EIS. The FONSI is a summary of the EA. The FONSI must be approved and signed by the proponent prior to implementing the action. In most instances the draft FONSI and EA must be made available for public review prior to Air Force approval.

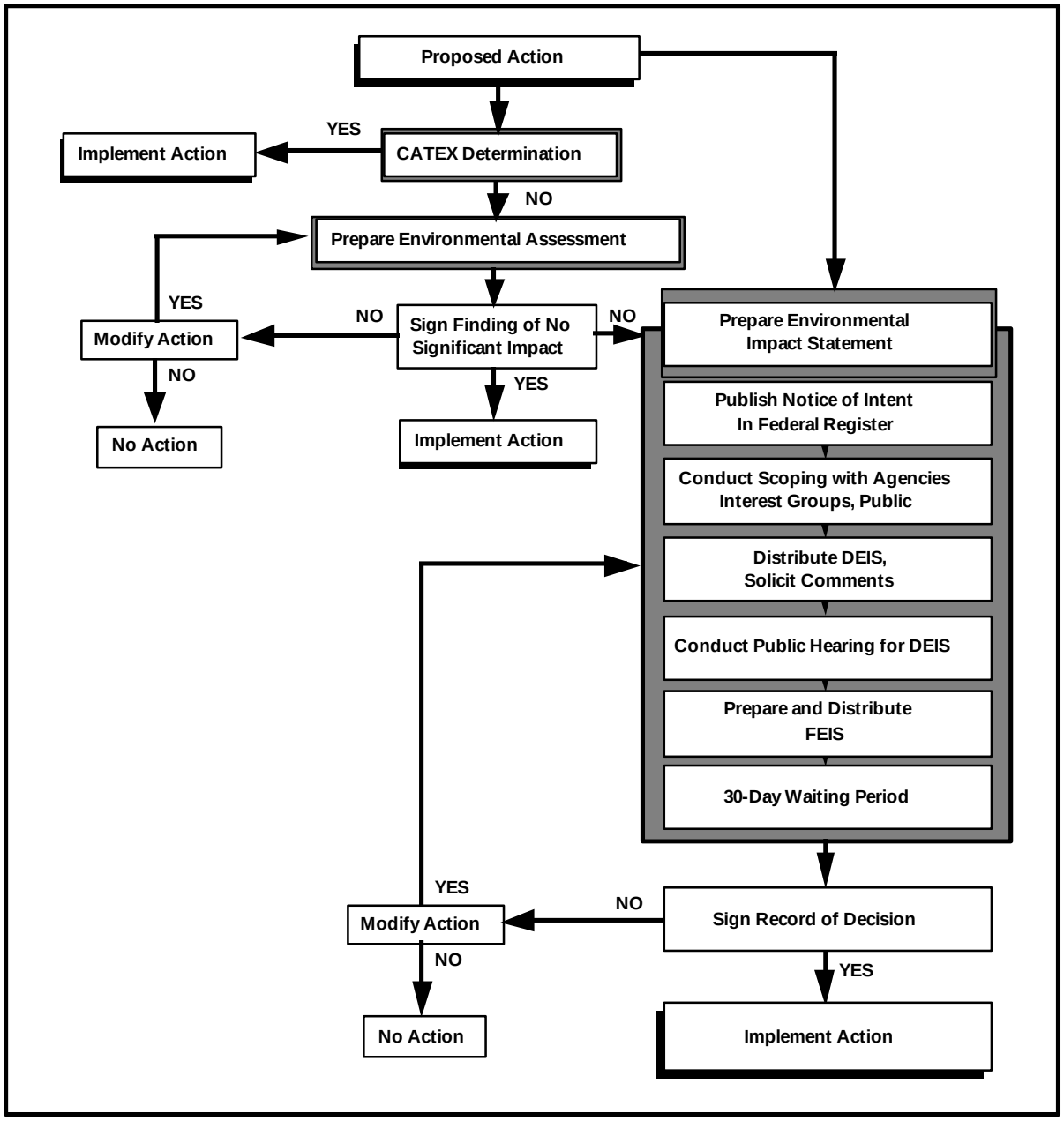


Figure 3. Environmental Impact Analysis Process

- Environmental Impact Statement. An EIS is required when there is the potential for significant environmental degradation, a significant threat or hazard to public health or safety, or substantial public controversy concerning the environmental impact of the proposed action. Preparation of an EIS can be a lengthy and expensive process, beginning with publication of a Notice of Intent in the *Federal Register*. The draft EIS must be circulated for public review and comment. Public comments must be considered in determining the preferred alternative and any appropriate mitigations.

- Record of Decision (ROD). The ROD is a concise public document, written following completion of the EIS, stating what an agency's decision is on a specific action, the reason for the selection and the alternatives considered. An action may have a significant impact and still be implemented, but the ROD must identify the environmentally preferred alternative regardless of whether it is the alternative selected for implementation.

If the NEPA documentation is being developed, the responsible organization should be identified and a schedule for when the documentation will be completed should be included in the ESH evaluation. Also the ESH evaluation should include a list and summary of all documents previously published to meet NEPA or EIAP requirements.

Keeping in mind that the ESH evaluation is designed to address much more than NEPA concerns, the NEPA documentation should be summarized in the appropriate ESH evaluation section.

Cost Analysis Requirements Description

The CARD is specified in DoD 5000.2-R, with guidance on its preparation in DoD 5000.4-M, Cost Analysis Guidance and Procedures. As a basis for cost estimating, the CARD establishes a description of the salient features of the program and of the system being acquired. CARD sections of interest include the following:

- Section 1.1, System Characterization
- Sections 1.2.1.x.2, Environmental Conditions
- Section 7, System Milestone Schedule
- Section 8, Acquisition Plan and/or Strategy
- Section 10, Element Facilities Requirements

If the CARD contains specific pollution prevention information, it will probably be located in Section 1, which is a system overview. Under the technical and physical description of the system, Sections "1.2.1.x.2, Environmental Conditions" are required to

identify any hazardous, toxic, or radiological materials that may be encountered or generated during development, test, manufacture, transportation, storage, operation and disposal. DoD 5000.4-M also states that "the quantities of each hazardous material used or generated over the subsystem's lifetime should be estimated based on the most current operations and maintenance concepts. The discussion should also describe the evaluation methodology for environmentally acceptable alternatives as well as the rationale for selection of alternatives. Finally, the alternatives considered and reasons for rejection, must be identified."

In addition to Section 1 potentially containing desired information, Sections 10.1, Test and Production Facilities and 10.2, Operational Support Facilities, should contain an assessment of the impacts of hazardous, toxic, or radiological materials used or generated during system tests or production. Also, Section 10.4 addresses cost aspects of environmental impact analysis.

The CARD should contain a great deal of ESH information. If this information is present in the CARD, this will be very helpful in formulating the ESH evaluation. Alternately, the team drafting the ESH evaluation may be expected to provide appropriate environmental input to the CARD.

Operational Requirements Document

There may be some operational requirements related to the environment that should appear in the ORD which reflect Air Force policy or the environmental constraints of where the system will be based. For example: "The system shall not require the use of Ozone-Depleting Substances (ODSs) in any phase of its life cycle" could be listed as a "threshold" in the Requirements Correlation Matrix (RCM) to reflect the Air Force ODS policy. Similarly, "Generates less than one half of the hazardous waste per 1000 flying hours as the F-16" could be listed as an "objective" in the RCM for an aircraft replacing the F-16. Any such statements that appear in the ORD must be incorporated in the ESH evaluation.

The ORD requirements and format are contained in DoD 5000.2-R, Appendix 2, Operational Requirements Document Mandatory Procedures and Format, Other Logistics Considerations. The ORD should identify the use of and minimize the need for, hazardous materials.

The ORD should provide some requirements of ESH concerns on the manufacturing, test, operation, support and disposal of the weapon system.

Analysis of Alternatives (Previously the Cost and Operational Effectiveness Analysis)

The AOA assesses the feasibility and defines rough cost estimates of alternative concepts for satisfying the need stated in the user-developed ORD. ESH considerations should be part of the assumptions, variables and constraints, especially for the life cycle cost. The AOA should address the life cycle cost of using various hazardous materials; possible sources of this information can be found in similar analyses for predecessor systems.

The AOA should address environmental considerations when addressing the various programmatic alternatives.

Test and Evaluation Master Plan

The TEMP is a statutory requirement. The mandatory procedures and format for the TEMP are defined in DoD 5000.2-R, Appendix 3. During development test and evaluation, impacts to human health and the environment should be considered. During operational test and evaluation, the effectiveness of procedures and controls to eliminate impacts to human health and the environment should be considered. What about safety?

AFI 99-101, Development Test and Evaluation (DT&E) and AFI 99-102, OT&E, briefly address environmental and pollution prevention considerations in testing. In AFI 99-101, Chapter 1, Section D, DT&E Philosophy, addresses ensuring environmental compliance and pollution prevention during DT&E. Specifically, it requires AFMC to reduce pollution by minimizing the use of hazardous materials, eliminating the need for ODSs, recycling materials and using products that contain recycled materials and releasing as few pollutants into the environment as feasible. AFI-99-102 addresses the handling and disposal of hazardous materials in support agreements.

Request for Proposal

The RFP must track with the SAMP and is the most important document to incorporate technical requirements for the ESH concern in the contract. The documents to be addressed are the SOO, System Requirements Document (SRD), IFPP, Section L - Instructions Conditions and Notices and Section M - Evaluation Factors for Award. NAS 411 is a document which defines the HMMP and can be used in the RFP to obtain information on the HMMP of the contractor prior to contract award.

It is critical that specifications and standards are screened, down to and including second tier, in any new RFP for reference to ODSs and EPA-17 materials. MIL-STD-882C is a waiverable standard and contains the guidelines for a System Safety Program. In addition, source selection criteria can be used to capitalize on a contractor's ability to provide

innovations that help the Air Force meet its ESH goals. Finally, the contracts may be incentivized through the award fee plan to reward contractors for innovation and success in the ESH area.

It is critical that several parts of the RFP include ESH requirements. Using ESH considerations as part of the down selection process and establishing ESH requirements early in a contract is one of the best ways to develop an ESH ethic on the program.

HMMP, SSP or other Contractor Documentation

The contractor's Integrated Management Plan, Pollution Prevention Plan, Hazardous Materials Management Plan, or any other NAS 411-type information that documents the contractor's initiatives in reducing the use of hazardous materials, should provide insight as to the nature of the program's pollution prevention and environmental compliance programs. If these documents do not exist, there may be other resources at the contractor level to provide the following information:

- Will NAS 411 be used or tailored for use on this procurement?
- Does the contractor have a System Safety Plan?
- What is the contractor corporate environmental policy?
- Does the contractor have operating procedures that meet Compliance regulations and Air Force objectives?
- Are the contractor's standard operating procedures good enough?

A good way to obtain information from the contractor is through the RFP process due to the leveraging available to the Government.

NAS 411 documentation, such as a Hazardous Materials Management Plan, may not be available from the contractor. However, the contractor should have internal procedures, such as the implementation of a hazardous materials pharmacy, that are pollution prevention-related and should be included in the ESH evaluation. Other contractor documents may provide relevant ESH evaluation information.

SUMMARY

This section of the Guide describes some of the program documentation that may be helpful in formulating the ESH evaluation. Following a review of these documents, the program office team should have a good understanding of the ESH efforts required.

SECTION 4

DOCUMENTING THE ESH EVALUATION

WHAT IS THE ESH EVALUATION FORMAT?

The ESH evaluation is not a formal document; therefore if the SM chooses to write an ESH evaluation, it would be an internal program document. Since it is internal, the format is flexible, but must include the required elements from DoD 5000.2-R, Section 4.3.7, (see below). This Guide describes a ***recommended*** format for the ESH evaluation. The format is just that - recommended; a key principle in conducting the ESH evaluation is "flexibility" to do what makes sense for each particular program.

This is guidance only. Each program is unique. Do what makes sense for your program while meeting the ESH evaluation requirements stipulated in DoD 5000.2-R.

While the format of the ESH evaluation is flexible, there are five elements that are required to be evaluated per DoD 5000.2-R:

- NEPA status and issues
- Environmental Compliance
- System Safety and Health Plans and Analyses
- Hazardous Materials Management
- Description of pollution prevention activities and approach

The ESH evaluation addresses the above elements in sufficient detail to provide a roadmap for the SM. The milestone decision authority will review, with heightened interest, a summary of the activities comprising the ESH evaluation as part of the Milestone Review. The level of detail is dependent on the program as well as its phase. As the program matures, the level of detail should be greater. For programs in the sustainment phase, the information in the ESH evaluation will be significantly different from that in the ESH evaluation of a concept exploration phase program, but just as critical in support of WSPARs.

SECTION-BY-SECTION DESCRIPTION OF A DOCUMENTED ESH EVALUATION

Flexibility is encouraged in the development of the ESH evaluation. Each program, and the environmental risks associated with each program, may be vastly different. For example, for programs late in the development cycle, issues related to NEPA and system safety and health may be limited and the ESH evaluation would focus on Environmental Compliance,

Hazardous Material Management and Pollution Prevention. For the purposes of this guide, we have adopted a recommended format that makes sense for the "typical" program and meets DoD 5000.2-R ESH evaluation requirements. The recommended outline for the ESH evaluation is included in Table 2.

The format and content of a documented ESH evaluation will vary depending on the program's phase. More mature programs will be able to provide greater detail regarding NEPA, environmental compliance, system safety and health, hazardous material management and pollution prevention.

Section 1. Introduction and ESH Management

Section 1 should discuss the program's purpose, phase and tactical ESH strategy used in the program. The purpose and phase are straightforward, but provide an overview to those not intimately familiar with the system (e.g., congressional inquiry, inspector general, new program office team member). The purpose should describe what the system does (e.g., performs surveillance of electronic systems) and why it is needed (e.g., intelligence information). The phase discussion should describe the acquisition decision points and milestones, projected contract dates for the next phase and initial operational capability (IOC) and other fielding dates. Near term information is most important and including a high-level program schedule is valuable.

The tactical strategy can take many forms. Some acquisition programs assign environmental, safety and health functions to individuals as a collateral, rather than primary, duty. For example, both the engineer and logistics expert are responsible for ESH within their respective disciplines. As such, the ESH "program" consists of a set of people from each of the particular functional areas carrying out various actions appropriate to their area of concern. The ESH evaluation provides the means to evaluate all inputs together.

Another approach would be to incorporate an ESH specialist into integrated product teams. This section of the ESH evaluation describes the IPT setup, including their purpose, organization and office codes (reference should be made to charters, if any). As an example, Electronic Systems Center (ESC) has issued an ACTION MEMORANDUM[14] covering acquisition pollution prevention that formalizes the ESC program in a charter and describes the ESC Acquisition Pollution Prevention Working Group (APPWG). The SM's participation in this forum should be discussed in this section of the ESH evaluation.

[14] Headquarters ESC memorandum of 8 June 1994, ESC Acquisition Pollution Prevention Program (Appendix D).

Table 2. Recommended ESH Evaluation Outline

1. **Introduction and ESH Management**
   - Purpose and Phase of the System
   - Management approach to addressing ESH issues

2. **NEPA Status**
   - Summary of previous actions and documents
   - Summary of upcoming actions
   - Status of NEPA documentation
   - Assessment of Risk

3. **Environmental Compliance**
   - Summary of compliance issues of the contractor
   - Summary of the compliance issues at the operation locations and primary depots
   - Minimize cost, performance and schedule risks with respect to regulations

4. **System Safety and Health**
   - Summary of system safety analysis issues
   - Summary of health issues on the program
   - Define risk levels, document decisions

5. **Hazardous Material Management**
   - Establish a hazardous material management program using National Aerospace Standard (NAS) 411 as a guide
   - Identify initiatives to reduce hazardous materials
   - Ensure DoD incurs the lowest cost required to protect human health over the entire life cycle

6. **Pollution Prevention**
   - Summary of pollution prevention program geared to eliminating pollutants in the weapon system to the maximum extent possible
   - Summary of pollution prevention initiatives at the contractor and the depot

7. **Program Environmental Risk Summary and Conclusion**
   - Current risks in ESH, cost, schedule and performance
   - Anticipated future risks
   - Risk mitigation

Besides formal working groups, the ESH related responsibilities of appropriate program individuals (by office code or name) should be listed in the ESH evaluation. The relationship of these responsibilities with other program functions and documents should be made clear. Contractors should be included, as appropriate.

Develop a tactical approach which is appropriate to the size, phase and complexity of the program.

Some unique program issues which may impact ESH activities should be identified. Examples of these issues include:

- The procurement is for non-developmental items.

- The acquisition has a foreign military sales (FMS) aspect, which means the ESH evaluation may need to address unique foreign ESH requirements. Perhaps a paragraph in the ESH evaluation addressing other countries' needs should be included, as appropriate.

- The program is a "commodities" program or a "basket" SPO. A unique concern of these programs would be "does each individual program within the same SPO need its own ESH evaluation or is one for the entire SPO adequate (perhaps with appendices covering the individual programs)?"

- The program is in operations and support phase and is focused on pollution prevention and HAZMAT reduction in maintenance and system disposal.

- The program is munitions or satellites, and since they are not routinely maintained, disposal is the major concern.

Section 2. NEPA Status

This section addresses part of the classic question, "What does my program do to the environment?" DoD 5000.2-R states the Program Manager (PM) shall comply with NEPA and EO 12114 and EO 11514. The detailed requirements to accomplish this are contained in AFI 32-7061. Many NEPA analyses require a substantial amount of time to perform and work-arounds are difficult.

This section of the ESH evaluation should summarize the following:

- Previous EIAP/NEPA documents as discussed in this guide

- The milestones, status and responsible organization for each open action
- A program risk assessment

Risks associated with NEPA analyses are sometimes difficult to manage because outside agents could have a major impact on the acquisition of the weapon system.

NEPA risks may include those associated with basing, testing, noise issues and so forth. Areas that could be impacted from NEPA activities include schedule slips, test site changes, cost increases, design changes and performance capability. The SM must manage the risk such that it is acceptable with respect to other constraints of the program.

Section 3. Environmental Compliance

This section addresses the classic question of "How does the environment affect my program?" This section should discuss the major compliance issues ranging from a description of the requirement, reference to the regulatory source of the requirement, what the program is doing to comply with the requirement and potential cost, schedule and performance risk associated with complying or not complying. In addition, a description of how the program is actively keeping abreast of upcoming rules and regulations should be included.

Programs that are in early acquisition phases must be aware of compliance regulations on the contractor now as well as on the using organization and the weapon system's logistics center in the future. Environmental regulations are continually changing and the program must evaluate the risk with certain chemicals/processes in light of the escalating regulations. This task is particularly challenging in making contracting and design decisions now which will affect future compliance issues at logistics centers when the Government has total responsibility.

The contractor and subcontractors must meet the local, state and Federal laws and regulations and Executive Orders on air and water emissions while performing under the terms of the contract. Although the SM is not responsible for the contractor meeting these requirements, a program may be affected. If for instance the contractor must interrupt operations to incorporate capital improvements to meet compliance requirements, the program may be impacted on schedule and cost. One contractor in the Los Angeles area was using high VOC paint and the production schedule was tied to the contractor's allowable releases. If the allowable releases are reduced the production schedule would be slipped. Furthermore, should a DoD contractor or subcontractor be cited for a violation of environmental law, the adverse publicity generated could reflect poorly on the Air Force.

The user and the maintainer of the weapon system must also meet state and Federal environmental regulations. The state regulations vary widely so a system designed and fabricated in Louisiana may require different maintenance procedures if it will be operated

and maintained in California. The SM has the overall responsibility for the design and maintenance procedures being developed by the contractor and must carefully consider future impacts of the program when making today's decisions.

The nature of the changing regulations is similar to weapon system threat assessment. Environmental regulations are beyond the control of the SM and must be regularly monitored and reviewed.

Section 4. System Safety and Health

System safety analyses have been a part of the weapon system acquisition for many years. DoD 5000.2-R requires that the SM "identify and evaluate system safety and health hazards, define risk levels and establish a program that manages the probability of severity of all hazards associated with the development, use and disposal of the system." The regulation also requires that each management decision to accept the risk associated with an identified hazard shall be formally documented.

Acquisition reform has impacted several Military Specifications and Military Standards, but MIL-STD-882C is one that has survived. The fundamentals of an acceptable system safety program are described in MIL-STD-882C and will not be described here. The system safety and health activities must be integrated into the basic systems engineering process and adopting an ESH evaluation thought process is a method of accomplishing this.

There is a blanket waiver for use of MIL-STD 882 System Safety Program Requirements on all programs.

This section should contain a summary of the major acceptable risks, actions required to reduce hazards and any special or unusual circumstances requiring the acceptance of high or serious risks. The section can also refer to other documents such as the System Safety Plans and System Safety Hazards Analysis and identify contractor as well as Government actions.

Section 5. Hazardous Material Management

A HMMP is required by DoD 5000.2-R, Section 4.3.7.4. The Under Secretary of Defense for Acquisition and Technology requires[15] that SMs utilize NAS 411 in all phases of the system life cycle. The objective is identification and management of all HAZMATs in the weapon system. This includes HAZMATs delivered in the system and any which may be required to operate and maintain the system. Identifying the HAZMATs will provide the basis for prioritizing the reduction efforts.

The HMMP will vary significantly from one program to the other. The amount and extent of HAZMATs in a major aircraft weapon system will be much different than in a program acquiring a system consisting of the integration of commercial off-the-shelf computer and sensor systems.

This section of the ESH evaluation should summarize the major program HAZMATs, why they are being used and what procedures have been implemented to minimize their impact. One of the major drivers behind the identification and management of HAZMATs is that once a HAZMAT is in the system it is difficult to remove. It is much easier to change a paper design than it is to change hardware and capital equipment. The acquisition phase of weapon system programs are much shorter than the operational, support and disposal phase. The cost of handling HAZMATs will be significant over the life of a program. Cost savings associated with a reduction in the amount of HAZMATs in a system goes directly to the User, although it is not apparent.

It is easier to eliminate a HAZMAT from a weapon system early in the design process than after the weapon system has been fielded

Systems engineering principles can be used to minimize, reduce or eliminate HAZMATs. The chemical alternative must be available in sufficient quantities within production schedules and evidence of acceptable performance through test and evaluation needs to be obtained. The impacts of selecting alternative materials for an environmental reason must be assessed to ensure it does not increase safety or health hazards. Additionally, the environmental safety and health issues need to be traded-off with the performance, cost and schedule of the system. Another strategy is to examine the need for using the material and evaluate whether the requirement is a "hold on" from tradition or a legitimate requirement.

[15] USD (A&T) Memorandum, *National Aerospace Standard (NAS) 411, "Hazardous Materials Management Program,"* 19 January 1995, directs that NAS 411 shall be utilized by all system acquisition Single Managers in all phases of the system life cycle. (Appendix E)

Section 6. Pollution Prevention Program

Pollution is the contamination of air, soil, and/or water by the discharge of harmful substances. Pollution prevention is the reduction or elimination of pollution at the source (source reduction) instead of at the end-of-the-pipe or stack. Pollution prevention occurs when toxic substances are eliminated from the production process; when less harmful substances are substituted for hazardous ones; and when raw materials, water, energy and other resources are utilized more efficiently. By reducing the use and production of hazardous substances and by operating more efficiently, we protect human health, reduce maintenance and disposal cost, strengthen our economic well-being and preserve the environment.

The Pollution Prevention Act of 1990 (42 U.S.C. 13101-13109) established a new environmental management hierarchy as national policy. This hierarchy, also incorporated in Executive Order 12856, calls for the following:

- Pollution should be **prevented or reduced at the source** whenever feasible;
- Pollution that cannot be prevented should be **recycled** in an environmentally safe manner whenever feasible;
- Pollution that cannot be prevented or recycled should be **treated** in an environmentally safe manner whenever feasible; and
- **Disposal or other release** into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The SM should attempt to find a solution using source reduction before going on to recycling, treatment or disposal. In addition, source reduction is frequently the economically preferable solution because of the reduced cost in handling hazardous materials. Source reduction allows for the greatest and quickest improvements in environmental protection by avoiding the generation of waste and harmful emissions. Source reduction may also reduce the need for end-of-pipe controls to meet Government regulations.

The pollution prevention program is an area with significant overlap in the other ESH sections. It can be viewed as the culmination of having done the other sections correctly. Pollutants, such as noise and air emissions, can impact NEPA analyses of program actions depending upon the level of releases and possible impacts to the environment. Releases of harmful substances obviously have a direct impact on the compliance issues of a program during manufacturing, maintenance and disposal phases. Hazardous materials selected for use on a program will impact the pollution prevention program as well as worker safety and health. Pollutants which result from the operation and maintenance of the system, may have an impact on the system safety analyses, the use of personal protection equipment and engineering controls, and on the exposure monitoring and medical surveillance for workers. The HAZMAT identification program will have a direct impact on the prioritization of

pollution prevention initiatives. However the mature program will require increased concern with the use, control, capture and disposal of pollutants.

The program should be aware of all EPA-17/TRI/EPCRA materials used in the weapon system. The EPA-17 materials have been ubiquitous in manufacturing and maintenance processes in the past, but industry has made significant progress toward minimizing their use. TRI is important now because DoD submits to the public a TRI report as required by EO 12856. The 1994 Report[16] identified the five Air Force Air Logistics Centers and one Air Force Government Owned Contractor Operated in the top 10 DoD Installations. These six installations provide depot maintenance for current and future Air Force Weapon Systems. The TRI Report can be used as an input for targeting chemicals for reduction in current and future Air Force Weapon Systems.

Pollution prevention initiatives will have a beneficial impact on the other four areas in the ESH evaluation because it will reduce HAZMAT usage, will reduce the risk of compliance violations, will improve health and safety of personnel and is generally better for the environment. It is smart business and reduces overall costs.

The extent of a program's pollution prevention activities depends on many program variables, including the nature and phase of the program. For instance, a munitions program may not be as concerned with pollution prevention as an aircraft program, since munitions are not routinely "maintained." Similarly, a mature program in the operations and maintenance phase may not have as many opportunities for pollution prevention as one in the earlier phases.

What are the economic incentives for pollution prevention? Government contractors who adopt pollution prevention practices and techniques may lower their manufacturing operation and compliance costs. These reduced costs will eventually benefit the Government with reduced weapon system costs. An inherited benefit of pollution prevention will be the reduced out year cost for the operation, support and disposal of the weapon system. Pollution prevention initiatives on the program also reduce liability in the operation, support and disposal phases. The regulations are continually becoming more restrictive and since the essence of pollution prevention is to eliminate the pollutants, the risk of not meeting compliance in the future is reduced if there are no pollutants generated to operate and maintain the system.

This section of the ESH evaluation is driven by the same question as the compliance section "how the environment affects the program". DoD 5000.2-R requires the SM establish a pollution prevention program to minimize the environmental impacts and life cycle costs

[16] 1994 Toxic Release Inventory for the Department of Defense Public Data Report, 7 March 1996. Appendix F.

associated with environmental compliance. Provide the level of detail in this section that makes sense. Examples of issues that this section should describe include the following:

- Impacts of environmental issues on design, testing and manufacturing concepts; maintenance and operation concepts; and system disposal and how the program is addressing these issues.

- Efforts at implementing hazardous material issue and control programs, such as the "pharmacy" concept, at the manufacturing and maintenance facilities.

- How the program is minimizing the use of "EPA-17" and Toxic Release Inventory chemicals.

- Potential impact of future laws and requirements as best as can be anticipated (such as with global warmers).

- A general discussion of specific projects, initiatives and studies and how they relate to reducing the cost, schedule and performance risks.

- A general statement addressing the program's funding for pollution prevention.

- Impact of Class II ODS production ban.

- The top 3 or 5 pollution prevention issues which may require increased attention.

This section is also a good place for the program to "blow its own horn" and show that it is being proactive in the pollution prevention arena. Pollution prevention activities, such as the following examples, would be appropriate for inclusion in this section:

- The program has a means for minimizing the use of hazardous materials and the generation of hazardous wastes over the system's life cycle. The method of doing this is through a Hazardous Materials Management Program (such as that defined in NAS 411) specified in the contract. As part of this program, the contractor is directed to conduct trade-off analyses where the use of a hazardous material exceeds a certain threshold.

- The program office is evaluating the performance impacts of not painting the exterior of some aircraft to eliminate the need of methylene chloride for stripping and reducing VOC emissions during repainting.

- Plans are in place to replace the program's use of Halons, while at the same time ensuring that the use of Class II ODSs is minimized. For those areas where the replacement of Halons and other Class I ODSs is impractical, the program has

ensured that sufficient quantities will be available. (It should be noted that even if ODSs are reserved in the ODS bank, there is no guarantee that the ODSs will be available when the program goes to withdraw them; therefore, continuing efforts to eliminate the dependence on ODSs is a prudent approach.)

- The program is active in continuing to baseline and find replacements for the Class II ODSs, EPA-17, TRI materials and global warmers still in use.

- The program is an active participant in various working groups related to pollution prevention, including an IPT and the Joint Group for Acquisition Pollution Prevention (JG-APP) (a multi-service effort aimed at tackling pollution prevention problems that are common to the Navy, Army and Air Force). The efforts at finding replacements are leveraged through the sharing of information in these groups.

- TRI history of the contractor and the possible participation in the voluntary EPA 33/50 program.

Section 7. Program Environmental Risk Summary

This section summarizes the cost, schedule and performance risks associated with ESH for the program. If certain risk mitigation measures are being taken, such as an active pollution prevention program, the risk summary should highlight how the mitigation measures have lowered the risks. Conversely, if various pollution prevention measures have been proposed but not funded, the ESH evaluation should show how the risk is adversely affected by this decision. It may be appropriate to divide the risks into current and anticipated future risks.

Cost Considerations

There are requirements in place that direct programs to conduct life cycle costing for the use of hazardous materials in all phases of the weapon system acquisition[17]. This policy boils down to selecting, using and managing hazardous materials such that the DoD incurs the lowest cost over the program's life cycle while protecting human health and the environment.

Guidance from the DoD on exactly how this life cycle costing is to be conducted is presently weak. Models have been developed for this purpose but are not widely used. Until something is "blessed" by the DoD or Air Force, the best approach for a SM to use in attacking this requirement is one of common sense. SMC and ESC are currently working with the Army, Navy and OSD to resolve this issue.

Listed below are some examples of types of hazardous materials which have cost considerations associated with their use:

[17] DoD 5000.2-R, Section 4.3.7.4

- Class I ODSs
- Class II ODSs
- EPA-17/TRI/EPCRA Materials
- Hazardous Air Pollutants (HAPs)
- Global warmers (some are more acceptable [HFC 134a] than others [perfluorohexane])

Class I ODSs went out of production at the end of 1995. For programs that continue to rely on the use of Class I ODSs for such things as fire suppression or refrigeration, alternatives should be considered. The costs associated with replacing a Class I ODS with an alternative, if available, should be considered. In some cases, the cost associated with the continued use of an ODS is small, but the logistics and support risk are high. In other instances, there may be high costs associated with the engineering and/or testing necessary to qualify an alternative for a particular use.

The ESH evaluation should address, when summarizing the cost risks associated with environmental compliance, how the program deals with its use of various "targeted" chemicals, including both Class I and II ODSs, EPA-17/TRI/EPCRA materials, HAPs and potential global warmers.

Section 612 of the Clean Air Act tasked the EPA to identify alternatives to Class I and Class II ODSs and to publish lists of acceptable and unacceptable substitutes. The EPA identified this effort as the Significant New Alternatives Policy (SNAP) Program. Alternatives which are identified as unacceptable or which are not listed in the SNAP are not allowed (because the EPA wants to ensure that replacements are not equally harmful to human health and the environment). The SNAP list of acceptable substitutes for ODSs has been updated several times, with the most recent update occurring 22 May 1996. It should be noted that just because an alternative is listed in the SNAP does not necessarily make it acceptable for a particular program.

It should be noted that Class II ODSs, while not of paramount importance compared to Class I ODSs, will be essentially phased out within the next 20 years. In addition, potential global warmers probably will come under increased scrutiny in the future.

Logistics and Support Considerations

Logistics and support considerations relate mainly to routine and depot-level maintenance that the system undergoes at various intervals. Many of the processes involved typically require the use of hazardous materials for such things as metal plating, chemical cleaning, painting and paint stripping. The efficiency of some of the processes may be reduced due to the use of personal protection equipment and HAZMAT handling, thereby increasing cost. If Government or industry decides that moving away from some of these processes is in their best interest, as the trend indicates, then the SM needs to make allowances to minimize the potential risk associated with not being able to support the fielded system.

As with the cost risks the future availability of Class I and II ODSs, EPA-17/TRI/EPCRA materials, HAPs and global warmers should be addressed when looking at materials that are routinely used to support and maintain the weapon system.

Besides being important in cost considerations, the same classes of materials (Class I ODSs, EPA-17/TRI/EPCRA materials, HAPs, Class II ODSs and global warmers) should be addressed in logistics and supportability considerations. For instance, Class I ODSs have been used in various solvent applications, especially where the highest level of cleanliness is required. Since these materials are out of production, the program needs to have a plan in place for either ensuring the continued availability of the product (from a stockpile) or for qualifying an alternative for its use. Programs should be aware that reliance on the Defense Logistics Agency (DLA) stockpile for future uses of Class I ODSs is not desirable.

The use of HAPs material will involve compliance issues at maintenance, operations and manufacturing facilities. The compliance issues will affect all facilities but will have the greatest impact on those located in Clean Air Act non-attainment areas. These issues are best addressed during the system design phase as the processes and process controls are selected and refined.

EPA 17/TRI/EPCRA materials, HAPs, Class II ODSs and global warmers should be evaluated for elimination/reduction in similar fashion and realizing that there is not the same degree of urgency as there is for Class I ODSs. Whereas EPA 17 and TRI/EPCRA materials, HAPs and global warmers will probably never be completely eliminated, there is a timetable in place for elimination of production of Class II ODSs.

Test Considerations

Testing considerations can be divided into the following two groups:

- How does my test program affect the environment, NEPA issues, safety and health?

- How can my test program evaluate alternative materials and processes with respect to system performance? (pollution prevention, safety and health considerations)

The first set of test considerations is fairly straightforward. Testing can affect the environment such that the issues appear in the program's NEPA documentation. The levels of testing that the SM participates in are evaluation, component test, system test and special tests such as live fire testing. The ESH impact on each level of testing varies and the SM must evaluate these impacts to mitigate program risks.

The issue of how the test program can effectively evaluate pollution prevention alternatives is more involved. There has been a great deal of research and development on material and process alternatives to various pollution prevention problems, but to date very little test and evaluation has been completed. Frequently, the laboratories will recommend alternatives but experience under actual conditions is very limited. Science and Technology testing, by law, cannot be system specific. It is important for SMs to "pick up the ball." Wherever possible, SMs should look for promising pollution prevention technologies and incorporate their performance testing into the test program.

SUMMARY

This section of the Guide describes in detail, on a section-by-section basis, what the ESH evaluation might include The ESH evaluation should help in minimizing the program's cost and schedule risks associated with environmental, safety and health concerns.

SECTION 5

A STRATEGY FOR PREPARING THE DOCUMENT

At this point the teams should have a good understanding of the fundamentals of the ESH evaluation and the amount of ESH information incorporated in program documentation. The evaluation results will likely not be enough to adequately document the program's ESH status, so additional input must be solicited from those program experts in the appropriate areas (engineering, test, manufacturing, logistics, civil engineering, environmental management, system safety, occupational and public health, life cycle cost, program management, as well as the user). It is important to bring these participants into the ESH evaluation process early to help document the evaluation and to encourage the infusion of ESH concerns into their day-to-day decision making.

This section describes the steps necessary to arrive at a final version of the ESH evaluation. They include the following:

- Preparing the preliminary working draft of the ESH evaluation
- Identifying questions and areas where additional information is required
- Meeting with experts to finalize the ESH evaluation

PREPARING THE ESH EVALUATION PRELIMINARY WORKING DRAFT

The preparation of the preliminary working draft is simply writing down everything understood about the program's ESH plans and status in the ESH evaluation format described in Section 4 or another format decided on by the SM. This is where the ESH evaluation starts to take shape.

By following the recommended format, the writer can simply answer the appropriate questions and include the required material in the proper section. Care should be given to referencing where the information has come from, especially if it may not be immediately clear; this may be helpful later.

In addition, as the team goes through this writing process, the team members should make notes and observations regarding where additional information will be required or where there are questions. Doing this in concert with preparing the preliminary working draft will be easier than going back and doing it later; it will also minimize the likelihood that important information will be overlooked.

The ESH evaluation needs to involve all functional areas in the SPO. By preparing a rough draft of the evaluation early on, the team gains good working knowledge of what additional information will be required from the test, manufacturing, logistics, civil engineering, environmental management, system safety, occupational and public health, life cycle cost, program management and user communities.

IDENTIFYING AREAS REQUIRING ADDITIONAL INFORMATION

At this stage, a list should be made of areas where there are "holes" in the information or where questions remain. This list should be categorized by area (life cycle cost, logistics, NEPA, system safety, testing, manufacturing, etc.) and should include any risks associated with these subjects in order to give some ideas to the writer regarding what to ask of the experts. Examples of questions that may be addressed to the experts include the following:

- Halon 1301 is no longer in production. What is the program doing to address this potential risk (looking for alternatives, planning on receiving Halon 1301 as needed from the Defense Logistics Agency stockpile, etc.)?

- Our Air Logistics Center (ALC) has informed us that they have phased out the cadmium plating line. Have we qualified the replacement process for use on our system's fasteners?

- Our program still uses CFC-113 for precision cleaning of electronics. Since CFC-113 is no longer produced, what will happen when current supplies are depleted?

- The contractor has informed us that, because of air quality regulations at its facility, they would like to switch to a low-VOC coating. How is the program addressing this situation?

MEETING WITH THE EXPERTS TO ADDRESS ESH EVALUATION ISSUES

Once the ESH evaluation team is comfortable with the information the members have gathered, the team can meet with the appropriate program personnel to answer the outstanding questions related to ESH issues. As ESH concerns are required to be considered in various aspects of the program, the questions should not come as a surprise to those involved.

Incorporation of the information learned from the experts into the ESH evaluation finalizes the document. This information is in the form of "we have identified an unacceptable risk" and "this is what the program is doing about it," or "this is the plan we have in place to address the situation." After including the additional data, the ESH evaluation should be ready for the SM's approval.

SECTION 6

CONCLUSION

In summary, programs must perform an evaluation of the environmental, safety and health considerations on the program. The evaluation will serve as a roadmap for the SM during the system life cycle and be used to support Milestone Reviews and Weapon System Program Assessment Reviews. The SM must demonstrate that ESH concerns are addressed in the program. ESH considerations must be incorporated in all of the basic documents in the program office such as SAMP, RFP, CARD and TEMP. The ESH evaluation will help the early detection of ESH problems and will assist in minimizing cost and schedule risk. The ESH evaluation will vary in content and level of detail depending on the program's nature and phase.

The process of writing the ESH evaluation gives a "sanity" check to the ESH program. While the ESH evaluation is only updated periodically, it is a good idea for the program to complete a checklist that reminds the SM of the ESH issues on an annual basis. This checklist is included in Appendix G and, when completed, should be filed in the ESH evaluation.

Management should lead by example in order to instill a culture which ensures that people consider environment, system safety and health in day to day activities. While a policy statement in the form of a SPO ESH letter in itself is not sufficient for setting this example, it is a good start.

APPENDIX A - DOD 5000.2-R SECTION 3.3.6 AND 4.3.7

The following paragraphs are taken from DoD 5000.2-R for the convenience of the reader.

3.3.6 Environmental, Safety and Health Considerations

The acquisition strategy shall include a programmatic environmental, safety and health (ESH) evaluation. The PM shall initiate the ESH evaluation at the earliest possible time in support of a program initiation decision (usually Milestone I) and shall maintain an updated evaluation throughout the life cycle of the program. The ESH evaluation describes the PM's strategy for meeting ESH requirements (see 4.3.7), establishes responsibilities and identifies how progress will be tracked.

4.3.7 Environment, Safety and Health

All programs, regardless of acquisition category, shall comply with this section and be conducted in accordance with applicable federal, state, interstate and local environmental laws and regulations, Executive Orders (EOs), treaties and agreements.

Environmental, safety and health (ESH) analyses shall be conducted, as described below, to integrate ESH issues into the systems engineering process and to support development of the Programmatic ESH Evaluation (see 3.3.6).

4.3.7.1 National Environmental Policy Act

The PM shall comply with the National Environmental Policy Act (NEPA) **(42 USC 4321-4370d**), implementing regulations **(40 CFR 1500-1508) and** executive orders (**EO 12114 and EO 11514** by analyzing actions proposed to occur in upcoming program phases that may require NEPA or EO analysis and providing the MDA with milestones and status for each planned analysis. Any analysis required under either NEPA or EO must be completed before the appropriate official may make a decision to proceed with a proposed action that may affect the quality of the human environment. NEPA and EO analysis is tied to proposed, program-specific actions. NEPA and EO documentation shall be prepared in accordance with DoD Component implementation regulations and guidance. The CAE is the final approval authority for system-related NEPA and EO documentation. The PM shall forward a copy of final NEPA documentation for ACAT I programs to the Defense Technical Information Center for archiving.

4.3.7.2 Environmental Compliance

Environmental regulations are a source of external constraints that must be identified and integrated into program execution. To minimize the cost and schedule risks that changing

regulations represent, the PM shall regularly review environmental regulations and shall analyze the regulations and evaluate their impact on the program's cost, schedule and performance.

4.3.7.3 System Safety and Health

The PM shall identify and evaluate system safety and health hazards, define risk levels and establish a program that manages the probability and severity of all hazards associated with development, use and disposal of the system. All safety and health hazards shall be managed consistent with mission requirements and shall be cost-effective. Health hazards include conditions that create significant risks of death, injury, or acute chronic illness, disability, and/or reduced job performance of personnel who produce, test, operate, maintain, or support the system.

Each management decision to accept the risks associated with an identified hazard shall be formally documented. The CAE shall be the final approval authority for acceptance of high risk hazards. All participants in joint programs shall approve acceptance of high risk hazards. Acceptance of serious risk hazards may be approved at the PEO level.

EO 12196 and **DoDI 6055.1** make Federal Occupational Safety and Health Act regulations applicable to all federal employees working in non-military-unique DoD operations and workplaces, regardless of whether work is performed by military or civilian personnel. In the case of military-unique equipment, systems, operations, or workplaces, Federal safety and health standards, in whole or in part, apply to the extent practicable.

4.3.7.4 Hazardous Materials

The PM shall establish a hazardous material management program that ensures appropriate consideration is given to eliminating and reducing the use of hazardous materials in processes and products rather than simply managing pollution created (**EO 12856**). The selection, use and disposal of hazardous materials shall be evaluated and managed so the DoD incurs the lowest cost required to protect human health and the environment over the system's life cycle, consistent with the program's cost, schedule and performance goals. Where a hazardous material use cannot be avoided, the PM shall plan for later material replacement capability in the system design, if technically feasible and economically practical and shall develop and implement plans and procedures for identifying, minimizing use, tracking, storing, handling and disposing of such materials and equipment.

4.3.7.5 Pollution Prevention

In designing, manufacturing, testing, operating, maintaining and disposing of systems, all forms of pollution shall be prevented or reduced at the source whenever feasible. Pollution that cannot be prevented shall be recycled in an environmentally safe manner. Pollution that cannot be prevented or recycled shall be treated in an environmentally safe manner. Disposal or other releases to the environment shall be employed only as a last resort and must be conducted in an environmentally safe manner. The PM shall establish a pollution prevention program to help minimize environmental impacts and the life cycle costs associated with environmental compliance. The PM shall identify

the impacts of the system on the environment, wastes released to the environment, ESH risks associated with using new technologies and other information needed to identify source reduction and recycling opportunities.

Many opportunities for pollution prevention can be incorporated into contract documents. In developing work statements, specifications and other product descriptions, **EO 12873** requires PMs to consider elimination of virgin material requirements, use of recovered materials, reuse of products, life cycle cost, recyclability, use of environmentally preferable products, waste prevention (including toxicity reduction or elimination) and ultimately, disposal, as appropriate.

Title 42, United States Code, Section 4321-4370d, National Environmental Policy Act

Title 40, CFR 1500-1508, National Environmental Policy Act Regulations

Executive Order 12114, Environmental Effects Abroad of Major Federal Actions

Executive Order 11514, Protection and Enhancement of Environmental Quality

Executive Order 12196, Occupational safety and health programs for Federal employees

Department of Defense Instruction 6055.1, DoD Occupational Safety and Health Program (Changes 1-2), October 26, 1984

Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements

Executive Order 12873, Federal Acquisition, Recycling and Waste Prevention

APPENDIX B - AIR FORCE POLLUTION PREVENTION STRATEGY

This letter is co signed by the Secretary of the Air Force and the Chief of Staff of the Air Force and presents the Air Force Strategy to Institutionalize Pollution Prevention.

SECRETARY OF THE AIR FORCE
WASHINGTON

JUL 24 1995

MEMORANDUM FOR: ALMAJCOM/CC
DISTRIBUTION C

SUBJECT: Air Force Pollution Prevention Strategy

The Air Force is committed to environmental leadership and we have made tremendous strides in our environmental programs; however, we still have work to do. We recently outlined three environmental, safety and occupational health initiatives in our 13 March 1995 memorandum. They are to sustain readiness, be good neighbors, and leverage our limited resources. Pollution prevention is key to realizing these initiatives.

We have made great progress in the Pollution Prevention Program to include significant reductions in hazardous and solid waste disposal, and we are well on our way to instilling pollution prevention as a way of life. To this end we have revised the Air Force Pollution Prevention Strategy to reflect recent changes in environmental laws, executive orders, and new Department of Defense policies and goals. This strategy replaces the Air Force Pollution Prevention Action Plans originally published in January 1993.

We must continue to be leaders in environmental stewardship, and search for new ways to further reduce our dependence on hazardous materials, reduce our waste streams, and reuse or recycle the waste we do generate. We are relying on your support to implement this strategy. Together we can support our national defense mission while creating a cleaner, healthier environment for our people today and for future generations.

//SIGNED//

Ronald R. Fogleman
General, USAF
Chief of Staff

//SIGNED//

Sheila E. Widnall
Secretary of the Air Force

Attachment:
Pollution Prevention Strategy

AIR FORCE
POLLUTION PREVENTION
STRATEGY

VISION STATEMENT:

EFFECTIVELY PROMOTE POLLUTION PREVENTION[1] BY MINIMIZING OR ELIMINATING THE USE OF HAZARDOUS MATERIALS AND THE RELEASE OF POLLUTION INTO THE ENVIRONMENT. MEET OR EXCEED REGULATORY REQUIREMENTS THROUGH THE USE OF EDUCATION, TRAINING AND AWARENESS PROGRAMS, HEALTH-BASED RISK ASSESSMENTS, ACQUISITION PROCTICES, CONTRACT MANAGEMENT, FACILITIES MANAGEMENT, ENERGY CONSERVATION, AND INNOVATIVE POLLUTION PREVENTION TECHNOLOGIES.

OBJECTIVE 1. *PERMEATE ALL MISSION AREAS WITH THE POLLUTION PREVENTION ETHIC THROUGH COMPREHENSIVE EDUCATION, TRAINING AND AWARENESS.*

Sub-objective 1. Develop an environmentally aware and knowledgeable Air Force Team (including military and civilian personnel) through integrated education and training.

a. Employ the Air Force Environmental Education and Training Master Plan to identify and program for education and training requirements (*OPR: AF/CE; OCR: SAF/MI, AF/DP*).

b. Utilize the Interservice Environmental Education Review Board to ensure efficient/effective delivery of educational products with the joint Services (*OPR: AF/CE*).

c. Promote pollution prevention awareness at each educational level; basic and technical training, commissioning programs, professional military and continuing education, and base introduction programs (*OPRs: AF/DP, AETC, USAFA; AFMC [SAM]; OCRs AF/CE, SAF/MI*).

Sub-objective 2. Incorporate the pollution prevention ethic into relationships with other agencies and the public.

[1] "Pollution Prevention" means "source reduction" as defined in the Pollution Prevention Act of 1990,(42 USC 13101-13109), and other practices that reduce or eliminate the creation of pollutants. Pollution should be prevented or reduced at the source whenever feasible. Pollution that cannot be prevented should be recycled in an environmentally safe manner. Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

a. Strengthen working relationships with environmental regulators at all levels (*OPR: AF/CE OCR: AF/SG, SAF/MI*).

b. Champion partnerships with other Services, agencies, industry, and the public (*OPRs: AF/CE, SAF/PA; OCRs: SAF/AQ, AF/LG, SAF/MI*).

Sub-objective 3. Recognize outstanding individual, team, and installation pollution prevention contributions through the environmental awards, publicity, and recognition programs at all levels (*OPR: AF/CE; OCR: SAF/PA, SAF/MI*).

Sub-objective 4. Ensure installations use internal information sources such as base newspapers, commander's access channel and commander's calls to promote pollution prevention. Installation pollution prevention contributions should also be promoted to the media and community leaders (*OPR: SAF/PA; OCR: AF/CE*)

OBJECTIVE 2*. INSTITUTIONALIZE POLLUTION PREVENTION INTO ALL PHASES OF THE WEAPON SYSTEM LIFE CYCLE.*

Sub-objective 1. Integrate pollution prevention, system safety, health risk assessments, and environmental impact assessments into the entire life-cycle[2] of weapon systems programs[3] from concept development to final disposal.

a. Develop policies, procedures, training, and contract provisions (to include source selection criteria) to incorporate pollution prevention, system safety, health risk assessments, and environmental impact assessments as described in DODI 5000.2, Part 6, Section I, into the systems engineering activities of every Air Force Single Manager (*OPRs: SAF/AQ, AF/LG; OCRs: AF/CE, AF/SE, AF/SG, SAF/MI, AF/TE, AFMC, AFOTEC*).

b. Focus existing AFMC infrastructure to support Single Managers' Pollution Prevention programs and to share lessons learned and maximize use of resources across Air Force Single Managers, other Services and with industry (*OPRs: SAF/AQ, AF/LG; OCRs: AFMC, SAF/MI*).

c. Develop and incorporate procedures to ensure pollution prevention, system safety, health risk assessments, and environmental impact assessments are properly addressed during program reviews to include Air Force System Acquisition Review Council and Weapon

[2] "Life Cycle" means concept, design, development testing, production, deployment, training, maintenance, supply management, distribution, and disposal/demilitarization.

[3] "Weapon System Program" refers to every Air Force Program run by an Air Force Single Manager (System Program Director or SPD, Product Group Manager or PGM, and Material Group Manager or MGM).

System Program Assessment Reviews *(OPRs: SAF/AQ, AF/LG; OCRs: AF/CE, AF/SE, AF/SG, SAF/MI, AFMC, AF/TE, AFOTEC).*

d. Develop and incorporate procedures to integrate pollution prevention, system safety, health risk assessments, and environmental impact assessments into weapon system documentation, strategies, plans, and in the planning and awarding of contracts *(OPRs: SAF/AQ, AF/LG, SAF/MI).*

e. Identify and/or develop tools (to include life cycle cost estimating) and milestones to support single managers with cost effective pollution prevention decisions *(OPRs: SAF/AQ, AF/LG; OCRs: SAF/MI, AF/SG, AFM).*

GOAL: By 31 December 1995, work with OSD PA&E and other Services to develop common methodology for necessary life cycle cost considerations *(OPRs: SAF/AQ, AF/LG; OCRs: SAF/MI, AFMC).*

Sub-objective 2. Establish and execute an aggressive program to identify and reduce or eliminate ozone depleting substances (ODSs), toxic chemicals[4], and extremely hazardous substances[5] procurement generated through the use of technical documentation.

a. Institute policies and procedures to minimize or eliminate the use of the above chemicals and substances. Prioritize efforts first on ODS, then the EPA 17 list of hazardous materials, and finally the remaining toxic and extremely hazardous materials. In ODS, prioritize efforts on solvents (1,1,1 Trichloroethane and CFC-113), then refrigerants, and finally halons *(OPRs: SAF/AQ, AF/LG; OCRs: SAF/MI, ALMAJCOMs).*

GOAL: By 3 August 995, review all standardized documents as listed in the DODISS and identify opportunities to eliminate and reduce the use of toxic chemicals, ODSs, and extremely hazardous substances. Complete all revisions by 31 December 1999 *(OPR: AFMC; OCRs: SAF/AQ, AF/LG, AF/SG, SAF/MI).*

b. Develop and implement a comprehensive strategy to integrate the identification and tracking of all hazardous materials usage with the identification and elimination of requirements in Air Force Technical Orders, MILSPECs, and MILSTDs that drive that hazardous material usage. The hazardous material usage data generated by installation Hazardous Material Pharmacies will focus senior management attention on the processes and requiring documents responsible for the majority of the overall Air Force usage. The

[4] Toxic chemical is a list of substances defines by 40 CFR 372.2 and is updated periodically by the Environmental Protection Agency (EPA).

[5] Extremely Hazardous Substances is a list of substances defines by 40 CFR 355.20 and is updated periodically by EPA.

owners of those requiring documents must prioritize their efforts to try to eliminate the requirements in their documents. This strategy should also include a process for tracking and reporting the status of needed changes to standardized document call-outs of hazardous materials being used in the field. Identify a centralized Air Force funding source and, to the maximum extent possible, integrate this effort across all DoD components *(OPR: SAF/AQ; OCRs: AF/LG, AF/CE, AF/SG, SAF/MI).*

c. Develop and incorporate procedures to evaluate the system safety risks, the occupational health risks, and the environmental impacts associated with process changes inherent to pollution prevention initiatives *OPR: SAF/AQ; OCR: AF/SG, SAF/MI).*

d. Issue clarifying guidance to address the content and timing of the Programmatic Environmental Analysis as a program's Environmental Master Plan as described in DODI 5000.2, Part 6, Section I. *(OPRs: SAF/AQ, AF/LG; OCRs: AF/CE, AF/SE, SAF/MI)*

e. Establish procedures to insure that all significant safety, occupational health, and environmental costs are included in the life-cycle cost estimates of Air Force acquisition programs to include analysis of direct/indirect costs, including disposal costs, and other environmental & health costs and benefits. *(OPRs: SAF/AQ, AF/LG; OCRs: AF/CE, AF/JA, AF/SG, SAF/MI)*

GOAL: By 3 August 1995, submit any FAR revisions necessary to implement this strategy to the Civilian Agency Acquisition Council. *(OPR: SAF/AQ; OCR: SAF/MI)*

Sub-objective 3. Specify requirements for the purchase of environmentally preferable products and services and implement affirmative procurement programs in accordance with the Resource Conservation and Recovery Act, 42 U.S.C. 6962, and Executive Order 12873, Federal Acquisition, Recycling, and Waste Prevention.

a. Implement acquisition policies and practices to integrate affirmative procurement considerations into all acquisition planning *(OPR: SAF/AQ; OCR: SAF/MI).*

- Emphasize purchase of recycled materials to the maximum extent practical.

- Encourage purchase activities to use environmental performance of vendors and products as selection criteria for awarding procurement contracts.

GOAL: By 31 August 1995, develop AFFARS supplemental guidance to implement aggressive affirmative procurement programs *(OPR: SAF/AQ; OCR: SAF/MI).*

GOAL: Develop guidance to meet or exceed the minimum materials content standards when purchasing or causing the purchase of printing and writing paper *(OPR: SAF/AQ; OCRs: AF/CE, AF/LG, SAF/MI, SAF/AA).*

(a) For high speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, and white woven envelopes, the minimum content standard shall be no less than 20 percent postconsumer materials beginning 31 December 1994. This minimum content standard shall be increased to 30 percent beginning on 31 December 1998.

(b) For other uncoated printing and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock, the minimum content standard shall be 50 percent recovered materials, including 20 percent postconsumer materials beginning on 31 December 1994. This standard shall be increased to 30 percent beginning on 31 December 1998.

(c) As an alternative to meeting the standards in goal (a) and (b), for all printing and writing papers, the minimum content standard shall be no less than 50 percent recovered materials that are a waste material byproduct of a finished product other than a paper or textile product which would otherwise be disposed of in a landfill, as determined by the State in which the facility is located.

OBJECTIVE 3. *INCORPORATE POLLUTION PREVENTION IN ALL ASPECTS OF INSTALLATION OPERATIONS.*

Sub-objective 1. Develop, maintain, and implement pollution prevention plans at each installation and facility. These plans should include baselines, pollution prevention assessments and investment strategies based on compliance with Federal regulations and health risk assessments.

a. Develop and implement plans to prevent releases and off-site transfers of toxic chemicals to all media (i.e., air, water, soil, surface and ground water) *(OPR: AF/CE; OCR: AF/SG, AF/LG, SAF/MI).*

GOAL: By 1 October 1995, develop installation and government owned contractor operated (GOCO) Pollution Prevention Plans. *(OPR: AF/CE; OCR: SAF/MI)*

Sub-objective 2. Minimize or eliminate the use of hazardous materials[6] and ozone depleting substances (ODS) in all activities.

[6] "Hazardous Material" means any material which is a physical or health hazard and requires a Material Safety Data Sheet (MSDS) as defined in Federal Standard 313c.

a. Implement the hazardous material pharmacy concept to license, track and control requisitions, receipts, issues, transfers, uses, and dispositions of all hazardous materials and ODS *(OPR: AF/LG; OCRs: AF/CE, AF/SG, SAF/MI).*

GOAL: By 1 October 1995, implement hazardous material tracking system at all Air Force bases. *(OPRs: AF/CE, AF/LG; OCRs: AF/SG, SAF/MI)*

b. Develop plans to eliminate purchases of ozone depleting substances (ODSs) and reduce purchases of EP 17 Chemicals *(OPRs: SAF/AQ, AF/LG, AF/CE; OCRs: SAF/FM, AF/PE, SAF/MI).*

GOAL: By December 1995, develop a refrigerant management plan and a halon management plan at each installation *(OPR: AF/CE; OCR: SAF/MI).*

GOAL: By 31 December 1996:
- Reduce purchases of EPA 17 Industrial Toxics by 50 percent from the 1992 baseline.
- Reduce hazardous waste disposal by 25 percent from 1992 baseline.

GOAL: By 31 December 1999:
- Reduce hazardous waste disposal by 50 percent from 1992 baseline.
- Reduce volatile air emissions by 50 percent from 1993 baseline.

Sub-objective 3. Implement cost-effective waste reduction[7] at all installations and facilities to include government owned-contractor operated (GOCO) or leased facilities.

GOAL: By 1 October 1995, institute recycling and composting (where possible) at each installation. *(OPR: AF/CE; OCR: SAF/MI)*

GOAL: By 31 December 1996, reduce municipal solid waste disposal by 30 percent from 1992 baseline. *(OPR: AF/CE; OCR: SAF/MI)*

GOAL: By 31 December 1997, reduce municipal solid waste disposal by 50 percent from 1992 baseline. *(OPR: AF/CE; OCR: SAF/MI)*

Sub-objective 4. Minimize or eliminate releases and off-site transfers of toxic chemicals through the use of pollution prevention practices.

a. Establish an Air Force-wide method and metric for documenting release reductions that properly credits activities undertaken prior to the 1994 baseline set in Executive Order 12856 *(OPR:AF/CE; OCRs: AF/LG, SAF/MI).*

[7] "Waste reduction" means preventing or decreasing the amount of waste being generated through source reduction, recycling, or purchasing recycled and environmentally preferable products.

GOAL: By 1999, achieve a 50 percent reduction of total releases and off-site transfers of toxic chemicals from the 1994 Toxic Reduction Inventory baseline. *(OPR: AF/CE; OCRs: AF/LG, SAF/MI)*

Sub-objective 5. Develop policy and guidance to ensure that installations comply with Emergency Planning Community Right-to-Know Act (EPCRA) as implemented by Executive Order 12856 with consistent and defensible reports *(OPR: AF/CE; OCRs: AF/LG, AF/SG, SAF/MI)*.

a. Develop and maintain a comprehensive inventory of toxic chemicals, ODSs, extremely hazardous substances and hazardous chemicals,[8] and the processes, systems, and management practices that use these chemicals *(OPR: AF/SG; OCRs: AF/CE, AF/LG, SAF/MI)*.

b. Foster cooperative approach between installations, their surrounding communities, and the Environmental Protection Agency in complying with the emergency planning and right-to-know requirements *(OPRs: AF/CE, SAF/PA; OCRs: AF/SG, SAF/MI)*.

c. Develop specific methods and procedures that installations can use to verify data prior to submission *(OPR: AF/CE; OCRs: AF/LG, AF/SG, SAF/MI)*.

Sub-objective 6. Support the Department's energy resources management programs to assure all Defense Components comply with the Energy Policy Act of 1992 (P.L. 102-486) and Executive Order 12902 to achieve energy and water conservation, and increased use of renewable energy sources.

a. Implement a comprehensive program to accomplish cost effective conservation in all existing installations and energy systems *(OPR: AF/CE; OCR: SAF/MI)*.

b. Develop and apply incentive programs such as gain sharing, shared energy performance contracting and utility demand side management programs *(OPR: AF/CE; OCR: SAF/MI)*.

c. Design and construct new facilities to minimize the life-cycle cost of the facility by utilizing energy and efficiency techniques and renewable energy technologies *(OPR: AF/CE; OCR: SAF/MI)*.

d. Operate, maintain and upgrade existing facilities to conserve water and energy when cost-effective to do so. Incorporate renewable energy technologies into existing facilities when cost-effective *(OPR: AF/CE; OCR: SAF/MI)*.

GOAL: Revise and issue design guidance to incorporate conservation practices.

[8] Hazardous chemical means any hazardous chemical as defined by 29 CFR 1910.1200(c).

GOAL: By 2005, identify and accomplish all energy and water conservation actions which pay back in ten years or less.

GOAL: By 2000, achieve a reduction in facilities energy consumption, as measured in BTU/SqFt, by 20 percent from the 1985 baseline. By 2005 reduce by 30 percent.

GOAL: By 2005, achieve an increase in industrial facilities energy use efficiency by 20 percent from the 1990 baseline.

Sub-objective 7. Maximize the use of environmentally friendly materials in the planning, programming, construction and maintenance of facilities and installations.

GOAL: By July 1995, issue guidance to promote the use of environmentally friendly materials in the construction and maintenance of facilities *(OPRs: AF/CE; OCRs: AF/LG, SAF/MI)*.

Sub-objective 8. Establish and promote efficient material/energy-use practices through conservation, reutilization, materials substitution, recycling, affirmative procurement and the creation of markets for recycled materials.

GOAL: By July 1995, issue guidance to promote efficient material/energy-use practices in the construction and maintenance of facilities *(OPRs: AF/CE, SAF/PA; OCRs: SAF/AQ, AF/LG, SAF/MI)*.

Sub-objective 9. As appropriate, installations' pollution prevention planning and investment strategies must consider environmental justice concerns in accordance with Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

a. Identify and address any aspects that could result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations *(OPR: AF/CE; OCRs: AF/JA, AF/SG, SAF/MI)*.

b. Ensure that the planning and investment strategies do not have the effect of excluding persons from participation therein, denying persons the benefits thereof, or subjecting persons to discrimination thereunder because of their race, color, or national origin *(OPR: AF/CE; OCRs: AF/JA, SAF/MI)*.

c. Ensure public participation in and access to information related to the planning and investment strategies in accordance with Executive Order 12898, including working to ensure that any public documents, notices, and hearings are concise, understandable, and readily accessible to the public *(OPRs: AF/CE, SAF/PA; OCRs: AF/JA, SAF/MI)*.

GOAL: By February 1996, develop guidance to incorporate environmental justice considerations in pollution prevention planning.

Sub-objective 10. Fully implement integrated pest management throughout the Air Force to reduce pesticide risk *(OPR: AF/CE; OCRs: AF/SG, SAF/MI)*.

GOAL: By 30 September 2000, reduce the amount of pesticide/herbicide applied annually, as measured in pounds of active ingredient, by 50 percent from the FY 1993 baseline.

Sub-objective 11. Develop and justify a comprehensive pollution prevention budget to obtain resources for high priority projects based on published funding guidance. *(OPR: AF/CE; OCRs: SAF/AQ, SAF/FM, AF/LG, AF/PE, AF/SG, SAF/MI).*

OBJECTIVE 4*. DEVELOP AND TRANSITION INNOVATIVE POLLUTION PREVENTION TECHNOLOGIES TO THE FIELD.*

Sub-objective 1. Identify and prioritize Air Force environmental technology needs.

a. Focus pollution prevention R&D on developing and validating critical technologies needed for material and process modification *(OPR: AF/CE; OCRs: AFMC, SAF/AQ, SAF/MI)*.

GOAL: By December of each year, publish the Prioritized Environmental Technology Needs list.

Sub-objective 2. Develop an "Air Force Environmental Quality Research, Development, and Acquisition (RD&A) Strategic Plan" which will formulate the resources necessary to address the Air Force's environmental technology needs.

GOAL: By March of each year, publish the strategic plan *(OPRs: AF/CE, AFMC; OCRs: SAF/AQ, SAF/MI).*

Sub-objective 3. Transition state of the art pollution prevention technologies developed under the Science and Technology or Manufacturing Technology Programs, or from outside the Air Force, to the field.

a. Crossfeed ideas through a technology information center, and aggressively market them Air Force-wide *(OPR: AF/CE; OCRs: SAF/AQ, SAF/MI, AFMC).*

Sub-objective 4. Leverage and integrate the Air Force's pollution prevention R&D programs with those of other Federal agencies; academia, and private industry.

a. Identify material and process substitutes in Defense technologies that have Government-wide and commercial application for expedited implementation *(OPR: SAF/AQ; OCR: SAF/MI)*.

b. Foster cooperative intergovernmental and government-industry partnerships/alliances to solve issues of environmental significance *(OPRs: AF/CE, SAF/AQ; OCR: SAF/MI)*.

c. Actively demonstrate and implement off-the-shelf technologies *(OPR: SAF/AQ; OCRs: AF/CE, AF/LG, SAF/MI)*.

APPENDIX C - BLANKET WAIVER MIL-STD-882C, SYSTEM SAFETY

This blanket waiver allows the use of MIL-STD-882C under Acquisition Reform.

Military Specifications and Standards Blanket Waiver Evaluation Summary

1. Military Specification/Standard Required (Number/Title): MIL-STD-882, System Safety Program Requirements

2. Requesters: HQ AFMC/SEP, ASC, HSC, OC-ALC, OO-ALC, SM-ALC, SMC, WR-ALC

3. Reason for Waiver Request: No acceptable non government standard (NGS)

4. Basis for Evaluation: Waiver requests per atch 1 and 2, follow-on discussion with Air Force Preparing Activity (address below), and copy of required document (atch 3).

5. Document Description: MIL-STD-882 describes tasks for contractor performance of specific safety program activities to identify hazards with a system and establish methods to eliminate or control the hazards. The standard includes twenty tasks which are selectively applied to each program. In addition, MIL-STD-882 contains a military unique requirement for development of explosive classifications.

6. Commercially-Available Alternatives/Equivalents: There are no applicable NGSs at this time. The Systems Safety Society is currently developing SSS Standard #1, System Safety Program Requirements for General Industry. SSS Standard #1 is basically a de-militarized version of MIL-STD-882C. Although basically the same, phase-in time will be required to ensure SSS Standard #1 will ensure an acceptable level of safety is provided as is provided via MIL-STD-882. The major difference between MIL-STD-882 and the new SSS Standard #1 is in terms of terminology, where the latter relies on commercial terms and definitions.

7. Mission Impacts if Document Not Available for Use: Per discussion with the preparing activity, until the commercial NGS is issued, there is no other way to guarantee with confidence system safety associated with the applicable program. In addition, newly developed items cannot be used by any DOD agency or stored or transported to any DOD facility. Even after the NGS is available, there is need to ensure field personnel are adequately trained in its use before MIL-STD-882 can be canceled.

8. Multiple-program Requirements: This standard is applicable for virtually all DOD major acquisition programs and to most smaller programs.

9. Blanket Waiver Recommendation:

a. Approval/Disapproval

☒ **Approve for the following reason:**
- ☐ **Military specification/standard determined to be performance-based document**
- ☐ **No acceptable NGS: requirement for military-unique specification or standard**
- ☒ **No acceptable NGS: unacceptable mission impact by using commercial alternative**
- ☐ **Use of performance specification or NGS not cost-effective.**

☐ **Disapprove**

b. Recommended Limitation on Blanket Waiver Application: Unlimited use from date of approval until 26 Dec 96, or until document is superseded by NGS, whichever comes first.

Evaluating Action Officer

//SIGNED//
Robert L. Rosell, P.E.
Air Force Standards Improvement Office

Date Submitted: 9 Dec 94

10. Blanket Waiver Disposition: ☒ **Approved** ☐ **Disapproved**

Waiver Approval Official

//SIGNED//
JAMES F. BAIR
Air Force Standards Improvement Executive

Date Approved: 10 Dec 1994

Attachments:
1. HQ AFMC/SEP Blanket Waiver Request
2. SMC Blanket Waiver Request
3. Copy of MIL-STD-882C

APPENDIX D - ESC POLLUTION PREVENTION LETTER

This ESC/CC memorandum, ESC Acquisition Pollution Prevention ACTION MEMORANDUM, is provided as an example of a center wide pollution prevention program.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ELECTRONIC SYSTEMS CENTER (AFMC)
HANSCOM AIR FORCE BASE, MASSACHUSETTS 01731

8 June 1994

MEMORANDUM FOR: SEE DISTRIBUTION

FROM: ESC/CC
9 Eglin St.
Hanscom AFB MA 01731-2109

SUBJECT: ESC Acquisition Pollution Prevention Program - ACTION MEMORANDUM

1. To enhance Acquisition Pollution Prevention (APP) efforts at ESC, I have directed that EN appoint an APP Program Manager to be responsible for providing oversight of these activities. That individual is Mark Siewers, ESC/EN-2, 377-8269.

2. The attached charter outlines the responsibilities of functional organizations, program offices and other mission organizations in accomplishing these efforts. It will provide appropriate management visibility, and help in analyzing our progress towards achieving APP goals.

3. EN will develop an overall strategy and plan to assist you in implementing the APP program for your activities. Organizations shown on Appendix 1 of the charter should identify their APP focal point to the above.

//SIGNED//

CHARLES E. FRANKLIN
Lieutenant General, USAF
Commander

Attachment:
ESC Acquisition Pollution Prevention Program Charter

DISTRIBUTION:

ESC/AV/AW/IA/IS/JS/MS/SR/TD/TG/TN/XR/YV/ZJ
ESC/AL/CE/EN/FM/JA/PK/SE/SC
ABG/CC
RL/CC
CSC/CC
MSC/CC
SSC/ED

The Electronic Systems Center
Acquisition Pollution Prevention Program
Charter

1.0 PURPOSE: This charter defines the goals and responsibilities for implementing the ESC Acquisition Pollution Prevention (APP) Program, and for providing management with the necessary visibility into acquisition pollution prevention activities.

2.0 BACKGROUND: On 7 Jan 93, the Secretary of the Air Force and Air Force Chief of Staff signed two memorandums that defined the Air Force Pollution Prevention Program and established the Air Force Ban on Purchases of Ozone Depleting Chemicals. AFMCR 500-13, "Environmental Leadership" calls for a team effort that institutionalizes pollution prevention in all phases of weapon system acquisition, maintenance and modification processes. SAF/AQ policy letter 93M-011, "Pollution Prevention on Air Force Acquisition Programs", issued on 23 Dec 93, provides further direction to Program Executive Officers (PEOs), Designated Acquisition Commanders (DACs), Single Managers (SMs), and the entire acquisition community.

3.0 GOALS & OBJECTIVES: For new and existing systems:

a. Implement Acquisition Pollution Prevention Policy effectively and uniformly.

b. Eliminate Class I Ozone Depleting Chemicals (ODCs).

c. Reduce EPA 17 Industrial Toxics (Goal - reduce usage in 1996 by 50% from 1992 levels).

d. Reduce other Hazardous Materials (HAZMATs) use as may be determined in the future.

4.0 RESPONSIBILITIES:

4.1 Functional Organizations:

a. EN is responsible for managing the APP Program at ESC, and will appoint an APP Program Manager (APPPM) who will have primary responsibility for developing the process, procedures, guidance and training for program offices to use in implementing this policy. The APPM will be the central distribution point for all guidance and materials necessary to execute the APP program, will maintain a repository of this information, and will identify external sources of information and technical expertise for use by ESC program offices. The APPPM office will be staffed accordingly to assist program offices with technical and policy related APP matters.

b. Functional organizations included in Appendix 1 will appoint an APP focal point and identify this individual to the ESC APPPM. This focal point will serve as the APP "expert" for their organization and will be the primary point of contact and representative at APP meetings.

c. Functional organizations are responsible for managing specific APP related matters within their area of expertise. They will report through EN to the ESC Commander on Center and Command wide APP matters.

4.2 Program Offices and Other Mission Organizations:

a. Program offices are responsible for implementing APP policy on their acquisitions. Develop a strategy and funding to implement the requirements of the APP program.

b. Compare the life cycle costs of using HAZMATs and ODCs to the life cycle costs of finding and implementing replacement chemicals or processes. For each hazardous material, evaluate and select environmentally acceptable alternatives using life cycle analysis. Include the estimated quantity and cost of each hazardous material used as well as wastes generated throughout the lifetime of the system, and the reasons for rejecting alternatives.

c. Include the Environmental Impact Analysis Process (EIAP) and System Safety Programs (SSP) in the systems engineering functions. Prepare Environmental Assessments/ Impact Statement (EA/EIS) with the assistance of the ESC/CE, and EN and SE staffs as required.

d. Measure and report Metrics as required. All ESC programs will measure progress towards eliminating Class I ODCs and reducing use of HAZMATs. Identify any programs that have eliminated requirements for using Class I ODCs, or have met goals for eliminating EPA 17 substances. Provide copies of APP metrics and related data to ESC/EN for management analysis, consolidation, and reporting purposes.

e. Acquisition organizations included in Appendix 1 will appoint an APP focal point and identify this individual to the ESC APPPM. This focal point will serve as the APP "expert" for their organization and will be the primary point of contact and representative at APP meetings.

5.0 <u>ESC Acquisition Pollution Prevention Working Group (APPWG)</u>: The ESC APPWG will meet monthly as long as it is needed, and will be chaired by the APPPM. Appendix 1 lists the Primary Members who will make up and attend ESC APPWG meetings, along with Associate Members who will establish and conduct their own APPWG, and whose chairperson will represent their organization on the ESC APPWG.

//SIGNED//

CHARLES E. FRANKLIN
Lieutenant General, USAF
Commander

Appendix
APPWG Membership

APPENDIX E - USD (A&T) MEMORANDUM 19 JANUARY 1995

This letter requires all programs to implement the tenants of NAS 411.

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION AND
TECHNOLOGY

19 Jan 1995

MEMORANDUM FOR: SECRETARIES OF THE MILITARY DEPARTMENTS
ATTN: ACQUISITION EXECUTIVES
ENVIRONMENTAL EXECUTIVES

SUBJECT: National Aerospace Standard (NAS 411), "Hazardous Materials Management Program"

Environmental analysis for weapon system acquisition is a mandate. Our knowledge of the relationship between environmental requirements, environmental risks, and the weapon system life-cycle, and the decision making process is growing. As that knowledge grows, it becomes increasingly important to utilize all available tools to help minimize risks, costs, and/or negative impacts that may be associated with potential environmental problems.

A new tool to assist the acquisition community is National Aerospace Standard (NAS) 411, "Hazardous Materials Management Program" (Attached). NAS 411 was created by the Aeronautical Industries Association as an industry Standard to be applied to United States Government Acquisition of systems, system components, associated support items and facilities. It applies to all acquisition phases; e.g., Concept Exploration, Demonstration and Validation, Engineering and Manufacturing Development, Production and Deployment, Operations and Support and Disposition. The Hazardous Materials Management Program is the contractor's plan to assure appropriate consideration is given to the elimination/reduction of hazardous materials, and to the proper control of hazardous materials that cannot be eliminated. The emphasis is on eliminating or reducing hazardous materials early in the design of processes and systems products.

By way of separate review, the Deputy Under Secretary of Defense for Acquisition Reform chartered the Military Specifications and Standards Process Action Team (PAT) to develop a comprehensive strategy to increase DoD's reliance on the commercial market and manufacturing base. As a part of its task, the PAT considered pollution prevention in system acquisition, and determined that NAS 411 "… should be adopted for mandatory DoD use."

Subsequently, DoD adopted NAS 411 on 5 April 1994 and approved the use of two data item descriptions (DID); DI-MISC-81398, Hazardous Materials Management Program Plan, and DI-MISC-81397, Hazardous Materials Management Program Report. The DIDs will be published in the next edition of the Acquisition Management Systems and Data Requirements Control Listing (AMSDL).

NAS 411 must be a sub-set of the broad requirements for programmatic environmental analysis. It must be tailored to meet the phase and objectives of the acquisition program. And it must be included in other appropriate environmental documentation. The results of proper

implementation will assist the Material Developer make better management decisions, while reducing program risk and cost. NAS 411 shall be utilized by all system acquisition program managers in all phases of all systems, life cycle, to assure that:

1. Materials and process call-outs are evaluated and selected to provide the minimum hazard to the environment feasible, consistent with the weapon system's mission objective.

2. Detailed planning for the various life cycle activities of the weapon system is evaluated (and influenced where feasible) to minimize environmental hazards and satisfy applicable environmental laws and regulations.

My point of contact for all NAS 411 questions is Mr. Bill Carlisle at 703-756-4790.

Attachment

//SIGNED//
PAUL G. KAMINSKI

APPENDIX F - 1994 TOXICS RELEASE INVENTORY FOR THE DEPARTMENT OF DEFENSE

March 7, 1996

1994 Toxics Release Inventory

for the

Department of Defense

Public Data Report

Executive Summary

The Toxics Release Inventory (TRI) is a database which provides information to the public about releases of toxic chemicals into the environment.

TRI was established under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and expanded under the Pollution Prevention Act of 1990. Presidential Executive Order 12856, *Federal Compliance with Right-to-Know Law and Pollution Prevention Requirements*, was issued in 1993 and directs all Federal facilities to comply with the reporting requirements of the two legislative drivers that established TRI.

This report contains TRI data for calendar year 1994, the first reporting year for all DoD installations. DoD submitted this data to the Environmental Protection Agency and the states in July 1995. DoD has 425 installations in the United States. Of these, 131 installations met the reporting thresholds for the TRI.

Executive Order 12856 also requires Federal agencies to reduce their releases and off-site transfers of toxic chemicals by 50% by 1999 from a 1994 baseline. DoD's baseline by which progress will be measured in future years includes both on-site releases to air, land, water, and underground injection, as well as off- site transfers for treatment, storage, or disposal.

DoD's baseline is 11.46 million pounds. About 7.4 million pounds of this total, or approximately two-thirds, were released on-site; the remaining one-third or 4.0 million pounds were transferred off-site for management.

Of the on-site releases, 7,244,137 pounds were released to air, 92,659 pounds to water, 97,363 pounds to land, and 390 pounds to underground injection wells. Air emissions represented over 97% of all toxic chemicals releases. Of the off-site transfers, 2,595,698 pounds were managed in a waste disposal facility, 1,333,449 pounds in a waste treatment facility, and 100,414 pounds in publicly owned treatment works.

By comparison, private industry releases for the TRI reporting year 1993, the most current available, were 2.8 billion pounds. Thus, DoD represents a small portion of those total TRI releases, approximately 0.41%.

Note: The DoD baseline published in this report may change if DoD installations submit refined data to the Environmental Protection Agency.

Contents

The Toxics Release Inventory – An Introduction

The Toxics Release Inventory (TRI) is a database which provides information to the public about releases of toxic chemicals into the environment.

TRI was established under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and expanded under the Pollution Prevention Act of 1990. Presidential Executive Order 12856, *Federal Compliance with Right-to-Know Law and Pollution Prevention Requirements*, was issued in 1993 and directs all Federal facilities to comply with the reporting requirements of the two legislative drivers that established TRI.

The Executive Order established calendar year 1994 as the first reporting year for most Federal agencies. The Executive Order required that calendar year 1994 data be submitted to EPA by July 1, 1995. DoD guidance issued in April 1995 instructed installations on complying with EPCRA and developing pollution prevention plans.

EPA will issue its Toxics Release Inventory National Report later this year which will provide more comprehensive information on DoD's TRI data. DoD is providing this advance report to inform communities surrounding its installations about the Department's toxic releases and waste management practices.

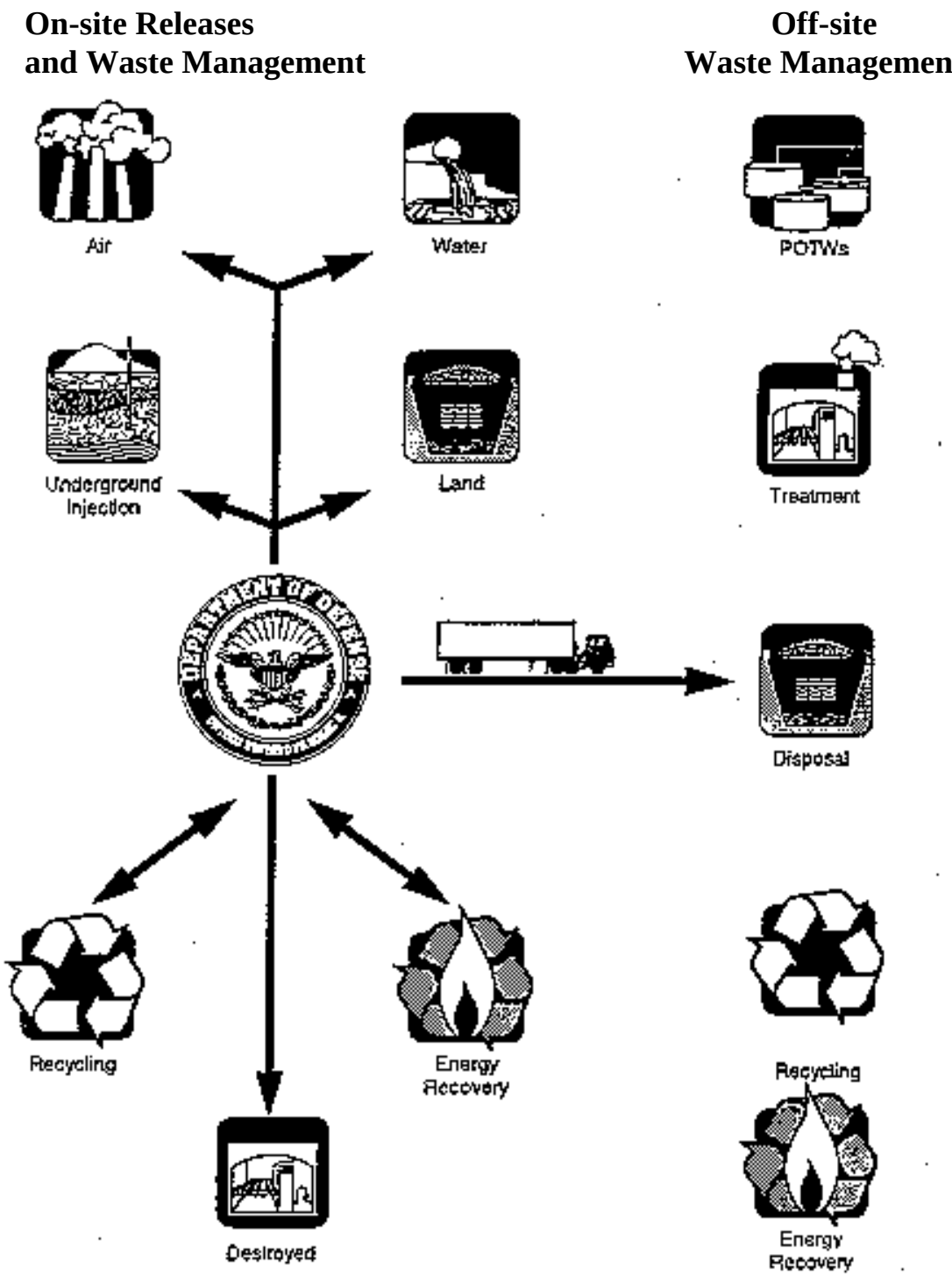
For 1994, TRI reporting was required for over 300 chemicals and 20 chemical categories. Facilities file a separate reporting form, called a "Form R," for each chemical they manufacture, process, or use in excess of reporting thresholds. Only those facilities that manufacture or process listed toxic chemicals in excess of 25,000 pounds within one calendar year or otherwise use listed toxic chemicals in excess of 10,000 pounds within one calendar year are required to submit TRI reports to EPA and the states.

The thresholds are chemical-specific and do not apply to the aggregate of all chemicals manufactured or used at a facility. Once a facility meets a threshold for individual toxic chemicals, the facility must submit a TRI Form R report that details the amount of the particular toxic chemical released into the environment. DoD has 425 installations in the United States. Of these, 131 installations filed 531 Form R's. Facilities report the amount released to the air, water, and land, as well as the amounts associated with waste management activities.

Figure 1 shows the different types of releases and associated waste management activities that are included in TRI reporting. Facilities report the amounts of the listed toxic chemicals that are released on-site directly to air, water, land, or injected in underground wells. In addition, facilities must report amounts of chemicals that are transported off-site to facilities that treat, store, or dispose of the chemical wastes. Finally, facilities must report amounts of chemicals recycled, burned for energy recovery, or treated (see the Appendix I -- Explanation of Terms for further discussion on these terms).

Figure 1

Information Available from Toxic Release Inventory Reports



DoD's 1994 Toxics Release Inventory Data

Executive Order 12856 requires that federal agencies reduce their releases and off-site transfers of toxic chemicals by 50% by 1999 from a 1994 baseline. DoD's baseline by which progress will be measured in future years includes both on-site releases to air, land, water, and underground injection, as well as off-site transfers for treatment, storage, or disposal. The actual quantity is the sum of the amounts that appear on the EPA Form R section 8.1 (quantity released) and section 8.7 (quantity treated off-site). In Figure 2, the data above the horizontal dotted line represents DoD's baseline of 11.46 million pounds.

DoD has 425 installations in the United States. Of these, 131 met the threshold reporting levels for one or more chemicals and filed a Form R for each chemical with EPA and the state. About 7.4 million pounds of the baseline or approximately two-thirds were released on-site; the remaining one-third or 4.0 million pounds were transferred off-site for management.

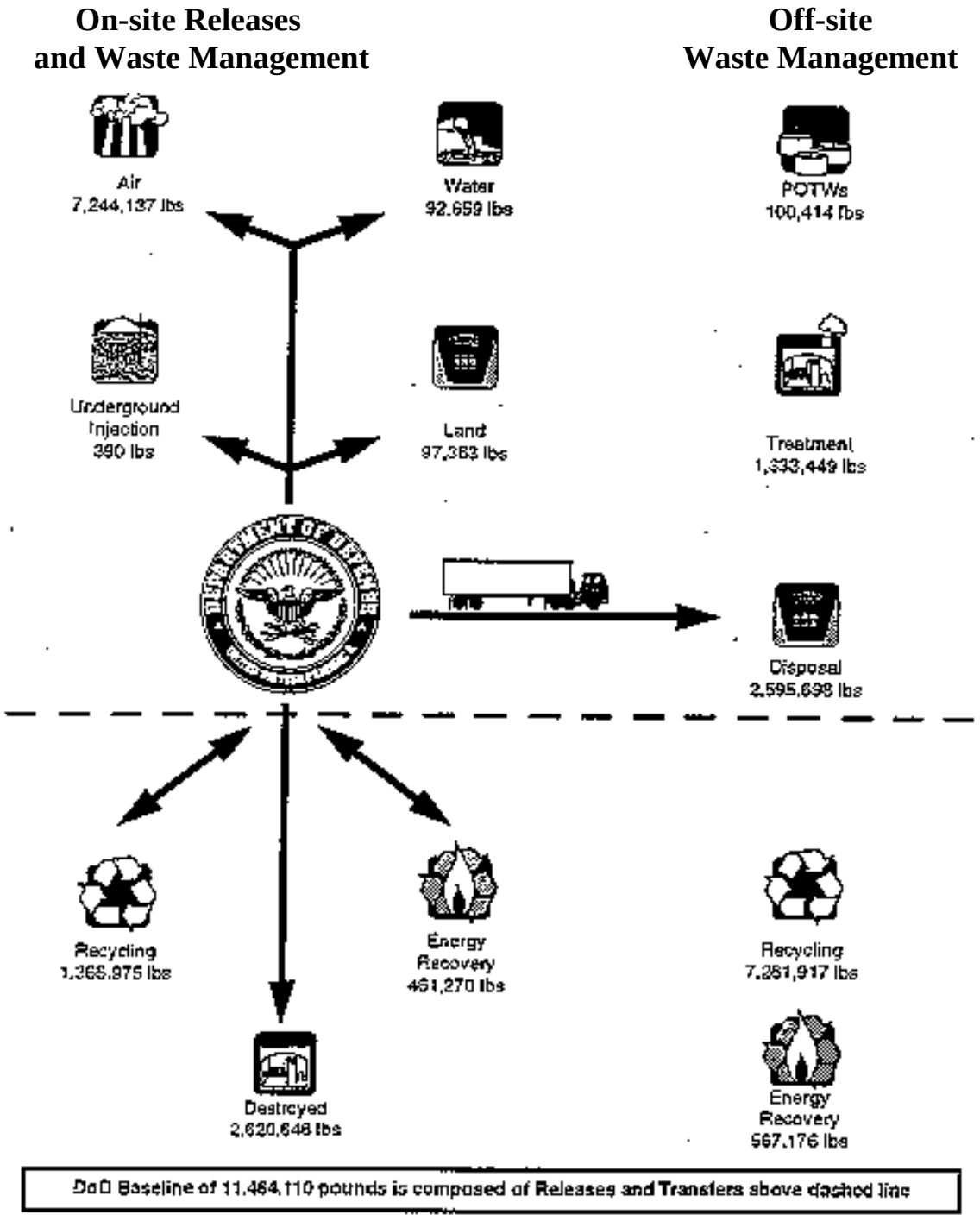
Of the on-site releases, 7,244,137 pounds were released to air, 92,659 pounds to water, 97,363 pounds to land, and 390 pounds to underground injection wells. Of the off-site transfers, 2,595,698 pounds were managed in a waste disposal facility, 1,333,449 pounds in a waste treatment facility, and 100,414 pounds in publicly owned treatment works. DoD anticipated that its releases would be relatively low when compared with private industry as the Department is primarily a downstream user of chemicals, and does not produce chemicals or have large-scale manufacturing processes as is the case with the largest TRI reporters.

By comparison, private industry releases for the TRI reporting year 1993, the most current available, were 2.8 billion pounds. Thus, DoD represents a small portion of those total TRI releases, approximately 0.41%.

Note: The DoD baseline published in this report may change if DoD installations submit refined data to the Environmental Protection Agency.

Figure 2

1994 DoD-Wide Toxic Release Inventory



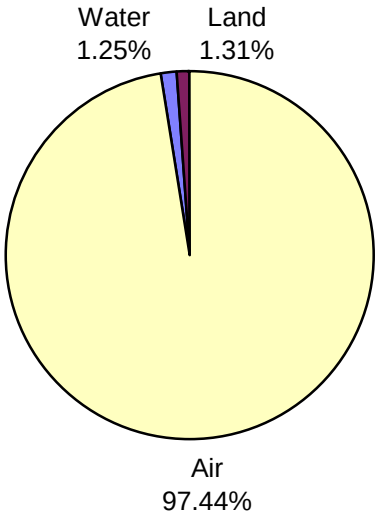
Environmental Distribution of TRI Releases

In 1994, air emissions represented over 97 % of all toxic chemicals releases as shown in Figure3. Surface water releases represented approximately 1 % of all releases and releases to the land accounted for the remaining 1%.

DoD's releases are primarily to the air and are associated with maintenance activities such as painting and depainting aircraft, cleaning, and degreasing.

Figure 3.

DoD Release by Media, 1994



Chemical Distribution

The top ten chemicals in DoD's baseline account for 68% of the 1994 DoD TRI total (see Table 1). Overall, DoD installations reported on 74 different TRI chemicals. Dichloromethane, or methylene chloride, is the most reported chemical and it accounts for 19% of DoD's total baseline. Facilities also reported large amounts of methyl ethyl ketone (MEK), 1,1,1-Trichloroethane, toluene, phenol, tetrachloroethylene, and hexachloroethane. Each of these are solvents that are used in a variety of painting, depainting, cleaning, degreasing, and other maintenance operations. In addition, DoD installations reported large

amounts of ethylene glycol, used in de-icing operations, as antifreeze, and as a constituent of other materials: zinc, used in munitions manufacturing; and hydrochloric acid, used in metal coating operations.

Table 1. List of top chemical baselines for DoD, 1994

Chemical	Total Baseline (pounds)
Dichloromethane	2,225,154
Methyl ethyl ketone	1,488,138
1,1,1-Trichloroethane	1,231,470
Ethylene glycol	588,067
Toluene	444,500
Phenol	411,988
Zinc compounds	409,180
Tetrachloroethylene	359,039
Hexachloroethane	351,370
Hydrochloric acid	289,896

DoD's Pollution Prevention program is actively engaged in numerous initiatives to find, develop, and implement less toxic alternatives. For example, in the case of dichloromethane, used primarily in depainting aircraft and stripping component parts, DoD is either testing or now using a variety of alternative techniques including:

- Pressurized water and benzyl alcohol mixtures
- Plastic media (small plastic pellets) blasting
- Sodium bicarbonate (baking soda) blasting
- Laser systems
- "Ice blast" mixtures

Tinker Air Force Base and Robins Air Force Base have used two of these techniques to reduce the use of dichloromethane. Tinker AFB uses a robotic high-pressure blast system for

aircraft component paint stripping. Tinker first operated the system in February 1995. During its first year of implementation, the system achieved a reduction of 131,348 pounds in dichloromethane, or 15% of total dichloromethane released. This same technology concurrently reduced 32,195 pounds of phenol, or 14% of the total phenol released.

Robins Air Force Base initiated a prototype effort, called the Aquamizer, to test bicarbonate of soda stripping (BOSS) on the C-130 and C-141 aircraft. Previously, Robins Air Force Base personnel used dichloromethane for aircraft stripping. Based on earlier studies of chemical use, Robins Air Force Base staff found that dichloromethane constituted approximately 78% of the EPA-17 chemicals used at the base in 1992. Under the old system, approximately 22,496 pounds of dichloromethane were required per C-130 aircraft. Through the use of the Aquamizer, this requirement has been reduced to 608 pounds per aircraft. The cost to implement the Aquamizer was quoted at $1.3 million for C-141 aircraft and $645,000 for C-130 aircraft. Overall, the Aquamizer has reduced dichloromethane use by 1.5 million pounds, decreasing usage of the chemical from 1,982,000 pounds (the CY92 baseline) to 440,000 pounds (the CY94 TRI baseline).

DoD has similar initiatives underway to find replacements for methyl ethyl ketone (MEK) which is also used in stripping and cleaning of aircraft components. As shown in Table 1, MEK ranks second in DoD's baseline. In addition to employing many of the same methods that limit the use of dichloromethane, DoD is examining the following techniques to limit releases associated with MEK:

- Vapor recovery systems to limit release of vapors associated with MEK
- Solvent recovery systems to recycle MEK needed to perform a stripping operation
- Alternative cleaning materials for spot removal of paints and other foreign material on aircraft surfaces and components
- Replacement of MEK handwipes with tank cleaning systems that do not use MEK
- High pressure water and environmentally friendly detergents

These initiatives that focus on specific chemicals are part of an extensive DoD pollution prevention program that is described later in this report.

Geographic Distribution

DoD's large maintenance and depot operations, primarily those engaged in overhauling and repairing aircraft, reported the largest volumes in DoD's baseline for 1994 (see Table 2). Of the 131 DoD installations reporting, the top ten installations represent 52% of DoD's baseline. The top installations in the baseline vary in the type of operations conducted, in size, and in the types of weapon systems maintained.

For example, Tinker Air Force Base is a large installation encompassing 5,000 acres and 761 buildings that enclose approximately 15.2 million square feet of floor space. The installation provides worldwide logistics support for a variety of mission critical large-frame

aircraft including B1B, B2, B-52, E-3, and the multipurpose KC-135 series, as well as providing depot support for Navy E-6 aircraft.

The Naval Air Station Jacksonville hosts the Naval Aviation Depot (NADEP). The primary mission of the NADEP is to provide a full range of high quality maintenance, engineering, logistics, and support services to the fleet and other DoD components. The Depot serves as a production center concentrating on repair and modification of patrol, fighter, electronic counter measure, and attack aircraft, engines, and associated components. The Depot has 102 acres and 44 buildings that enclose approximately 1.8 million square feet of floor space.

Table 2. List of top 10 baselines by DoD installation, 1994

DoD Component	Installation Name	Total Baseline (Pounds)
Air Force	Tinker Air Force Base, OK	1,569,614
Air Force	Robins Air Force Base, GA	776,616
Army	Pine Bluff Arsenal, AR	721,364
Air Force	Lockheed-Martin, Marietta, GA	554,555
Army	Anniston Army Depot, AL	548,073
Navy	Vought Aircraft Company, Dallas, TX	462,481
Air Force	Hill Air Force Base, UT	367,909
Air Force	Kelly Air Force Base, TX	344,631
Air Force	McClellan Air Force Base, CA	340,750
Navy	Naval Air Station, Jacksonville, FL	325,648

The Lockheed-Martin plant in Georgia and the Vought Aircraft plant in Texas are government owned, contractor operated sites.

All ten of the top installations have pollution prevention plans in place to identify and prioritize pollution prevention opportunities. At Tinker AFB, for example, the pollution prevention plan identifies projects that will reduce TRI releases 82% by 1999. In particular, the plan identifies the following projects:

- Water blast robotics technology for paint stripping to reduce use of dichloromethane by 96%;
- Solvent recovery, high pressure water wasters, and material substitutions for cleaning applications to reduce use of MEK by 47%;
- Aqueous cleaning systems, spray washers, and material substitutions for cleaning and degreasing to reduce use of tetrachloethylene by 93%.

DoD's Pollution Prevention Program

The specific initiatives discussed above are part of an extensive DoD Pollution Prevention program. A key goal of this program is to reduce DoD's TRI baseline 50% by 1999. Through planning, improved management practices, and technology insertion, DoD is well-organized to meet that goal. Below is an overview of the DoD Pollution Prevention Program.

DoD's Comprehensive Pollution Prevention Strategy

In the past decade DoD has embraced a new approach to eliminate rather than control its toxic and chemical releases. Pollution prevention is the preferred solution in DoD's environmental management hierarchy. This hierarchy includes a broad variety of source reduction, waste minimization, and recycling practices from redesigning weapon systems to improving installation management techniques. DoD turned to pollution prevention to keep pace with its legal requirements, to curb cleanup and compliance costs, and to eliminate inefficient use of resources. Pollution prevention is also critical to ensure operational readiness of weapon systems; DoD experience demonstrates that selection of materials and processes can enhance or harm the performance of systems, operational productivity, or product yield.

On August 11, 1994, the Secretary of Defense signed DoD's Comprehensive Pollution Prevention Strategy. The strategy requires DoD Components to consider pollution prevention as the first option in meeting compliance requirements; to integrate pollution prevention into both installation and weapon systems management; to foster an environmentally educated work force across all DoD mission areas; and to develop and transfer alternatives to toxic chemicals and processes. Some of the major pollution prevention initiatives for the Department follow:

Pollution Prevention Planning

DoD's strategy is to conduct opportunity assessments for both installations and weapon system management processes, and then develop an implementation plan that reduces the greatest environmental risks at the least cost. These plans are used to prioritize and implement pollution prevention opportunities, and to identify areas where no solutions are available. This information is also used to guide DoD's research and development and budget programs. All DoD installations were required to have pollution prevention plans in place by the end of 1995.

Best Management Practices

Some of the most successful measures to reduce the use and release of toxic chemicals at DoD are through improved management practices such centralized purchase, storage, distribution, and disposal of hazardous materials at installations. Each of the DoD components has established centralized control and other management practices that drastically reduce the use of hazardous materials such as "just in time" purchasing and distribution, exact quantity distribution, and distribution to authorized users. Best management practices can reduce waste, liabilities, environmental violations, and costs and can result in higher efficiency in maintenance activities. For example, the Navy's Consolidated Hazardous Material Reutilization and Inventory Management Program showed cost avoidance savings of $7.25 million in one year through reduced hazardous material purchases and hazardous waste generation. Air Force and Army have achieved similar savings through improved materials management.

In addition, the Department is deploying an information system that allows installations to track toxic chemicals and other hazardous materials from the time they arrive at the installation to the time they are disposed. This "cradle to grave" tracking provides the environmental managers with a detailed picture of how and where base personnel use hazardous materials and with a means to rapidly identify processes and materials for which less harmful alternatives may be substituted. The system also enhances DoD's ability to comply with federal, state, and local environmental regulations, to purchase less hazardous chemicals, and to communicate important health and safety information to personnel and the surrounding community.

Weapon System Pollution Prevention

There are toxic releases associated with every phase of a weapon system's life cycle -- from research, test, and evaluation to production, operations, maintenance, and disposal. DoD employs a two-fold strategy for weapon systems. For new systems, DoD's strategy is to ensure that the full environmental consequences of all phases of system’s life cycle are considered in the design and development phase. For existing systems, DoD is focusing its efforts on finding less toxic alternative materials and processes to operate and maintain the system inventory. This strategy is being implemented through a variety of programs: educating and training weapon system program managers, revising acquisition system policies, providing better life-cycle costing tools, revising military specifications and standards that require the use of toxic substances and processes, and researching and developing alternatives.

Ozone-Depleting Substance Reduction Program

DoD was one of the largest industrial users of ozone depleting substances (ODS) in the nation. ODSs are used as solvents, refrigerants, firefighting agents, and in foams in virtually every weapon system in the inventory and at every one of DoD's facilities. Their use is required by thousands of specifications and standards. Phase-out of the production of ODS as required by national and international law has had a profound effect on design, engineering, manufacture, operation, and support of most weapon systems and facilities. DoD has established a comprehensive program to reduce and eliminate the requirements for ODS use

in its operations. It includes four elements: identifying critical uses through an exhaustive search of standardization documents; finding alternatives through a research and development program; implementing alternatives into new and existing systems; and establishing a reserve for mission-critical uses where alternatives cannot be identified or implemented. DoD has made enormous progress in decreasing its use of ODSs. In just five years, the Department decreased its use of halon from 10,325,000 pounds in 1990 to 231,000 pounds in 1995; and its use of CFCs from 14,588,000 pounds in 1990 to 313,000 pounds in 1995.

ENVVEST

On March 16, 1995, the President announced the "Reinventing Environmental Regulation" initiative. This initiative contains innovative approaches to achieving environmental protection, in a cost-effective manner. One of the pilot programs jointly sponsored by the Department of Defense and the Environmental Protection Agency is entitled "ENVVEST."

ENVVEST was designed to test whether alternative regulatory strategies can produce greater environmental benefits over time than current regulatory requirements at the same or lower cost.

The "ENVVEST" concept will allow selected military installations to identify a combination of actions, both pollution prevention and "end-of-pipe" controls, that would protect human health and achieve greater overall environmental performance at less cost.

The installation and the regulators would agree to the best combination of pollution prevention and "end-of-pipe" controls in lieu of current regulatory requirements. They would also agree to a system to measure the environmental improvement. The results of these discussions will be recorded in a site-specific Final Project Agreement.

A key to this initiative will be involvement of the states, as well as partnerships with local stakeholders. To ensure full citizen involvement, the military installation and the local regulators will set up a partnership with local stakeholders. DoD will establish an independent evaluation process to measure the results and produce reports to allow all interested stakeholders to assess the progress at each selected site.

On November 2, 1995, EPA and DoD signed an umbrella Memorandum of Agreement that established the framework for testing "ENVVEST." The test will be conducted at up to five military installations. Efforts are well underway to begin testing the "ENVVEST" concept. The Military Departments are considering installations in Alaska, California, Florida, Texas, and Washington. Vandenberg Air Force Base in California will be the first installation to have a Final Project Agreement.

As a result of the ENVVEST effort, DoD hopes to improve environmental performance while finding ways to reduce environmental funding requirements. EPA and states hope to find new ways to improve environmental management at facilities nation-wide.

Toxic Reduction Investment and Management (TRIM)

DoD believes that the TRI data will provide a valuable tool to assist Components in evaluating and solving some of their largest pollution problems and in achieving the

Department's goal to reduce its TRI baseline 50% by 1999. In a pilot initiative the Department is calling Toxics Reduction Investment and Management, DoD intends to first identify and quantify the industrial and maintenance processes that produced the releases, then identify the military specification, standard, procedure, or other technical document that requires the process to use the TRI chemical. This analysis, although it cannot be used as the sole basis for prioritization, will provide valuable assistance to the Department in developing its pollution prevention investment strategy, managing environmental technology efforts, and prioritizing the revision of standardized documents.

DoD installations have conducted similar analyses of chemical use in the past. For example, Tinker Air Force Base is aggressively reducing the amount of toxic chemicals purchased and used in the depot-level operations. In 1992, Tinker AFB completed a comprehensive Process Assessment. This assessment identified and quantified high chemical use processes and suggested potential substitute technologies. From the assessment, a TRI roadmap was developed to systematically reduce TRI chemicals through implementation of pollution prevention projects. TRI chemical usage has been reduced at Tinker AFB by 59% since 1992.

Appendix I – An Explanation of Terms

Air Releases. Releases to air are reported either as stack or fugitive emissions. Stack emissions are releases to air that occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

Surface Water Releases. Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes or open trenches. Releases caused by runoff, including stormwater runoff, are also reportable under TRI.

Land Releases. Releases to land covered under TRI are those that occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals into landfills, land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal (such as spills, leaks, or waste piles).

Underground Injection. Underground injection is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

Recycling. Toxic chemicals can be either recycled on-site or sent off-site for recycling. The toxic chemicals may be recovered or regenerated by a variety of methods, including solvent recovery, metals recovery, and acid regeneration. Once recycled, these chemicals may be returned to the installation or sold for further processing or use. The quantity reported as on-site recycling in the Form R represents the quantity recovered at the facility, not the quantity that entered the recycling operation. The quantity reported as off-site recycling in the Form R represents the quantity that left the installation boundary for recycling, not the amount recovered at the off-site location.

Energy Recovery. Toxic chemicals can be either processed on-site or sent off-site for energy recovery. The toxic chemicals are combusted in industrial furnaces or boilers that generate heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery. The quantity reported as on-site energy recovery in the Form R represents the quantity of the toxic chemical that was destroyed in the combustion process, not the amount that entered the energy recovery unit. The quantity reported as off-site energy recovery in the Form R represents the quantity of the toxic chemical that left the installation boundary for recovery, not the amount destroyed at the off-site location.

Destruction. Toxic chemicals can be destroyed on-site using a variety of methods. After destruction, no further treatment or transfer to an off-site location is necessary. The quantity reported in the Form R represents the quantity of the toxic chemical that was destroyed in the on-site waste treatment operations, not the amount that entered any treatment operation.

POTWs. Toxic chemicals can be transferred off-site to a publicly owned treatment works (POTW). Wastewaters are transferred through pipes or sewers to a POTW. Not all TRI chemicals can be treated or removed by a POTW. The quantity reported in the Form R represents the quantity of the toxic chemical that left the installation boundary for POTW treatment, not the amount that was destroyed at the off-site location.

Treatment. Toxic chemicals may be sent off-site for treatment using a variety of methods, including biological treatment, neutralization, incineration, stabilization, and physical separation. These methods result in varying degrees of destruction of the toxic chemical.

Disposal. Toxic chemicals sent off-site to a facility for disposal generally are either released to land or injected underground at the off-site location.

Appendix II -- DoD Component Data

The following pages provide DoD Component specific details on the 1994 DoD baseline. Facilities shown as (GOCO) are government-owned, contractor-operated plants.

Army TRI Data

Top Installations - Baseline, 1994

Installation	**Total Baseline (pounds)**
Pine Bluff Arsenal, AR	721,364
Anniston Army Depot, AL	548,073
Red River Army Depot, TX	180,224
Letterkenny Army Depot, PA	144,485
Watervliet Arsenal, NY	104,275
Holston Army Ammunition Plant, TN	101,917
Lake City Army Ammunition Plant, MO	83,911
Rock Island Arsenal, IL	67,000
Fort Hood, TX	57,550
Stratford Engineering Plant, CT (GOCO)	55,442

Top Chemicals - Baseline, 1994

Chemical	**Total Baseline (Pounds)**
Zinc compounds	368,971
Hexachloroethane	351,370
Methyl ethyl ketone	230,817
1,1,1-Trichloroethane	225,777
Trichloroethylene	214,223
Dichloromethane	182,229
Ethylene glycol	173,143
Phosphoric acid	135,990
Chlorine	69,562
Ethylbenzene	56,590

Navy TRI Data

Top Installations - Baseline, 1994

Installation	**Total Baseline (pounds)**
Vought Aircraft Company, TX (GOCO)	462,481
Naval Air Station Jacksonville, FL	325,648
Naval Air Station Alameda, CA	227,500
Norfolk Naval Shipyard, VA	186,090
Grumman Aerospace Corporation, NY (GOCO)	184,602
Norfolk Naval Base, VA	133,830
Philadelphia Naval Shipyard, PA	129,340
Naval Weapons Industrial Reserve Plant, Hercules, TX (GOCO)	120,586
Puget Sound Naval Shipyard, WA	94,900
Naval Air Warfare Center, Patuxent River, MD	76,174

Top Chemicals - Baseline, 1994

Chemical	**Total Baseline (Pounds)**
1,1,1-Trichloroethane	596,172
Dichloromethane	358,283
Methyl ethyl ketone	288,488
N-butyl alcohol	184,055
Nitric acid	160,872
Xylene (mixed isomers)	130,312
Freon 113	129,933
Toluene	92,078
Hydrochloric acid	49,663
Phenol	48,068

Marine Corps TRI Data

Top Installations - Baseline, 1994

Installation	**Total Baseline (pounds)**
Marine Corps Logistics Base Barstow, CA	322,011
Marine Corps Air Station Cherry Point, NC	315,370
Marine Corps Logistics Base Albany, GA	282,273
Marine Corps Blount Island Command, FL	20,000
Marine Corps Air Station Yuma, AZ	1,050
Marine Corps Base Quantico, VA	34
Marine Corps Recruit Depot, Parris Island, SC	5

Top Chemicals - Baseline, 1994

Chemical	**Total Baseline (Pounds)**
Ethylene glycol	236,679
Dichloromethane	149,650
Methyl ethyl ketone	127,896
1,1,1-Trichloroethane	76,062
Toluene	68,054
Hydrochloric acid	52,000
Xylene (mixed isomers)	51,535
Freon 113	28,000
Glycol ethers	28,000
Chromium	25,897

Air Force TRI Data

Top Installations - Baseline, 1994

Installation	**Total Baseline (pounds)**
Tinker Air Force Base, OK	1,569,614
Robins Air Force Base, GA	776,616
Lockheed-Martin, GA (GOCO)	554,555
Hill Air Force Base, UT	367,909
Kelly Air Force Base, TX	344,631
McClellan Air Force Base, CA	340,750
Edwards Air Force Base, CA	170,976
Arnold Air Force Base, TN	154,096
Hughes Missile Systems, AZ (GOCO)	124,410
Rockwell International, OK (GOCO)	123,413

Top Chemicals - Baseline, 1994

Chemical	**Total Baseline (Pounds)**
Dichloromethane	1,534,992
Methyl ethyl ketone	840,937
Phenol	363,920
Tetrachloroethylene	335,798
1,1,1-Trichloroethane	333,459
Toluene	225,563
Ethylene glycol	162,300
Hydrochloric acid	161,733
Chromium compounds	151,886
Glycol ethers	139,390

Defense Logistics Agency TRI Data

Top Installations - Baseline, 1994

Installation	**Total Baseline (pounds)**
Grand Fork Fuel Support Point, ND (GOCO)	10,872
Verona Fuel Support Point, CA (GOCO)	5,516
Charleston Fuel Support Point, SC (GOCO)	4,274
Escanaba Fuel Support Point, CA (GOCO)	2,819
Defense General Supply Center, VA	2,432
Searsport Fuel Support Point, ME (GOCO)	1,780
San Pedro Fuel Support Point, CA (GOCO)	1,200
Tampa Fuel Support Point, FL (GOCO)	1,175
Melville Fuel Support Point, RI (GOCO)	1,035
Anchorage Fuel Support Point, AK (GOCO)	967

Top Chemicals - Baseline, 1994

Chemical	**Total Baseline (Pounds)**
Toluene	10,890
Cyclohexane	8,037
Benzene	6,353
Naphthalene	2,919
Xylene (mixed isomers)	2,648
Bromotrifluoromethane	1,372
Bromochlorodifluoromethane	960
Ethylbenzene	494
Dichlorodifluoromethane	100

APPENDIX G - ESH EVALUATION CHECKLIST

This checklist should be reviewed and completed periodically, thus demonstrating the incorporation of ESH considerations into the weapon system.

PROGRAMMATIC ENVIRONMENT, SYSTEM SAFETY AND HEALTH CHECKLIST

***NOTE:** This checklist should be completed by the Single Manager at least annually and prior to program decisions, revisions, milestones or contract actions. The checklist serves to document the programmatic evaluation of environmental, system safety and health considerations. A signed copy should be retained in the Program/Project Administrative Record*

PART I - PROGRAM/PROJECT DESCRIPTION

Program Title:_____

PEO/DAC:_____ Project Title:_____ PMD:_____ CAT:_____

Program/Project POC (Name and Phone Number):_____

Current Contractor Is:_____

PART II - PROGRAM/PROJECT STATUS

Next Milestone Is:

- ☐ 0 (Concept Exploration)
- ☐ I (Program Definition and Risk Reduction
- ☐ II (Engineering and Manufacturing Development)
- ☐ III (Production, Fielding/Deployment and Operational Support
- ☐ Demilitarization and Disposal
- ☐ Other (please specify):_____

Last PEO/DAC Review Was (date):_____

Status of Applicable Program/Project Documents:

	AVAILABLE	NEEDS TO BE PREPARED OR REVISED	NOT APPLICABLE
SAMP	☐	☐	☐
Acquisition Strategy	☐	☐	☐
Acquisition Plan	☐	☐	☐
Specification	☐	☐	☐
SOO/SOW	☐	☐	☐
Request for Proposal	☐	☐	☐
Contract	☐	☐	☐
TEMP	☐	☐	☐
AOA	☐	☐	☐
Environment, System Safety and Health Planning Documents	☐	☐	☐
Formal NEPA Document(s) (CATEX, EA/FONSI, EIS/ROD)	☐	☐	☐
Other (please specify)	☐	☐	☐

PART III - PROGRAM/PROJECT ENVIRONMENT, SYSTEM SAFETY AND HEALTH ISSUES

Current/Projected Environment, System Safety and Health ISSUES Involve (indicate more than one if necessary):

☐ Design ☐ T & E ☐ Manufacturing ☐ Maintenance (at any echelon)

☐ Support ☐ Operations ☐ Disposal ☐ Other (please specify):_____

Current/Projected Environment, System Safety and Health RISKS Involve (indicate more than one if necessary):

☐ Use of Class I ODS ☐ Use of Class II ODS

☐ Use of Hazardous Materials (as identified by NAS 411 or the WS HMRPP)

☐ Others (please specify):_____

PROGRAMMATIC ENVIRONMENT, SYSTEM SAFETY AND HEALTH CHECKLIST (cont'd)

PART IV - PROGRAM/PROJECT POTENTIAL ENVIRONMENT, SYSTEM SAFETY AND HEALTH IMPACTS

AREA POTENTIALLY IMPACTED	CHECK ONE				CHECK IF YES
	POSITIVE EFFECT	NO EFFECT	ADVERSE EFFECT	UNKNOWN EFFECT	CHANGE IN STATUS FROM LAST REPORT?
System Safety (Mechanical, Electrical, Hydraulic, Fire, etc.)	☐	☐	☐	☐	☐
Hazardous Materials/Waste (Use, storage and disposal)	☐	☐	☐	☐	☐
Health Hazards (Chemical, radiation, asbestos, etc.)	☐	☐	☐	☐	☐
Air Quality (Emissions, attainment status, SIPs, ODS, VOCs, etc.)	☐	☐	☐	☐	☐
Water Resources (Quality, quantity, source, etc.)	☐	☐	☐	☐	☐
Air Installation Compatible Use Zone/Land Use (Noise, encroachment, accident potential, etc.)	☐	☐	☐	☐	☐
Biological Resources (Wetlands, floodplains, flora, fauna, etc.)	☐	☐	☐	☐	☐
Cultural Resources (Native American burial sites, archeological, historical, etc.)	☐	☐	☐	☐	☐
Geology and Soils (Topography, IRP, minerals, geothermal, seismicity, etc.)	☐	☐	☐	☐	☐
Socioeconomic (employment, population, fiscal, etc.)	☐	☐	☐	☐	☐
Other (Potential impacts not addressed above), please specify:	☐	☐	☐	☐	☐

NOTE: IF ANY OF THE ABOVE ENVIRONMENT, SYSTEM SAFETY AND HEALTH IMPACTS WERE DETERMINED TO BE ADVERSE OR UNKNOWN, SUBMIT AN AF FORM 813 (be sure to include sufficient information in the "Description Of Proposed Action and Alternatives (DOPAA)" section) TO THE CENTER ENVIRONMENTAL PLANNING FUNCTION

PART V - SINGLE MANAGER REVIEW AND APPROVAL

Date of Last Evaluation:_____ Date of This Evaluation:_____

Signature:_____

Print Name and Title:_____

GLOSSARY

AFMC	Air Force Materiel Command
ALC	Air Logistics Center
AMARC	Aerospace Maintenance and Regeneration Center
AOA	Analysis of Alternatives
APPWG	Acquisition Pollution Prevention Working Group
APU	auxiliary power unit
ASP	Acquisition Strategy Panels
CAE	Component Acquisition Executive
CARD	Cost Analysis Requirements Description
CATEX	categorical exclusion
COEA	Cost of Operational Effectiveness Analysis
CSAF	Chief of Staff Air Force
DAB	Defense Acquisition Board
DLA	Defense Logistics Agency
DoD	Department of Defense
DRMS	Defense Reutilization & Marketing Services
DT&E	Development Test and Evaluation
DUSD(ES)	Deputy Under Secretary of Defense for Environmental Security
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EOs	Executive Orders
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESC	Electronic Systems Center
ESH	environment, safety and health
FMS	foreign military sales
FONSI	Finding of No Significant Impact
HAPs	Hazardous Air Pollutants
HAZMAT	hazardous material
HMMP	Hazardous Material Management Program
HQ	Headquarters
IFPP	Instruction for Proposal Preparation
INF	Intermediate Range Nuclear Forces
IOC	initial operational capability
IPS	Integrated Program Summary
IPT	Integrated Product Team

JG-APP	Joint Group for Acquisition Pollution Prevention
LCC	Life Cycle Cost
MAIS	Major Automated Information System
MDAP	Mandatory Procedures for Major Defense Acquisition Programs
NAS	National Aerospace Standard
NEPA	National Environmental Policy Act
ODC	ozone-depleting chemical
ODS	ozone-depleting substances
OIPT	Overarching Integrated Product Team
ORD	Operational Requirements Document
OT&E	operational test and evaluation
PEA	Programmatic Environmental Analysis
PEO	Program Executive Officer
PESHE	Programmatic Environmental, Safety and Health Evaluation
PM	Program Manager
P2	Pollution Prevention
RCM	Requirements Correlation Matrix
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
ROD	Record of Decision
SAF	Secretary of the Air Force
SAMP	Single Acquisition Management Plan
SM	Single Manager
SNAP	Significant New Alternatives Policy
SOO	statement of objective
SPO	System Program Office
SRD	System Requirements Document
SSP	System Safety Plan
TEMP	Test and Evaluation Master Plan
TRI	Toxic Release Inventory
VOC	volatile organic compound
WSPAR	Weapon System Program Assessment Review