SPACE AND MISSILE SYSTEMS CENTER

PROGRAMMATIC ENVIRONMENTAL, SAFETY, AND HEALTH EVALUATION (PESHE) GUIDE

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SECTION I: OVERVIEW

1. This document is intended to assist Program Managers and their staffs comply with the requirements of DoD Directive 5000.2R. As environmental requirements change frequently, Program Managers are reminded to consult with environmental, safety, and legal counsel for the most recent environmental compliance requirements.

2. **Programmatic Environmental, Safety, and Health Evaluation (PESHE).** DOD Regulation 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs* (MDAPs) *and Major Automated Information System (MAIS) Acquisition Programs*, requires the Program Manager (PM) to "initiate the environment, safety and occupational health (ESOH) evaluation of the program at the earliest possible time and to maintain an updated evaluation throughout the life cycle of the program." This evaluation is commonly referred to as a PESHE.

3. The PESHE is a management tool to assist the PM in identifying ESH issues and requirements early in the acquisition process, in order to mitigate environmental, safety and health impacts and program risks. It evaluates the ESH program in the six program areas listed in DOD Regulation 5000.2-R:
    i. System Safety and Health
    ii. Explosives Safety
    iii. National Environmental Policy Act (NEPA)
    iv. Environmental Compliance
    v. Hazardous Material Management
    vi. Pollution Prevention (P2)

4. The PESHE describes the Program Executive Officer's (PEO's) strategy for meeting ESH requirements, and establishes ESH responsibilities.
    a. The Program Manager uses the PESHE to evaluate the ESH program status.
    b. The ESH Manager monitors all activities, with emphasis on activities evaluated as medium or high risk, to ensure key issues are addressed to reduce program risks.

5. The PESHE is a living document that is updated and maintained throughout the system life cycle as the program evolves.
    a. Each PESHE update is maintained as part of the official record for the ESH program. The PESHE is a program document and, as such, is not intended to supersede or replace other ESH documents (such as Pollution Prevention Plans, NEPA Mitigation Plans, Environmental Impact Statements, etc.) developed in the course of the acquisition life cycle. It is an internal document protected by "Official Use Only", so it is not subject to Freedom of Information Act queries.
    b. Key Federal, DOD, and service compliance requirements listed in Appendix 1 are also evaluated and integrated into the ESH Program.

6. Much of the information in this document was reprinted from:

a. Guide to Development of the Description of Proposed Action and Alternatives (DOPAA), Department of the Army, June 2001.

b. Programmatic Environmental, Safety, and Health Evaluation (PESHE), National Missile Defense Joint Program Office, 14 July 2000.

c. Aeronautical Systems Center (ASC) Reconnaissance Systems Program Office, Programmatic Environmental, Safety, and Health Evaluation (PESHE) Template, Sep 99.

7. Operational Safety Suitability and Effectiveness (OSS&E)

The PESHE process is complimentary to the assurance of Operational Safety Suitability and Effectiveness throughout the life cycle of a space system. Fig. 1 illustrates the integration of OSS&E and PESHE activities at each major milestone and review of the program. Environmental safety and health risk management/mitigation is a key common element to the disciplined engineering process which incorporates both OSS&E assurance and the PESHE.

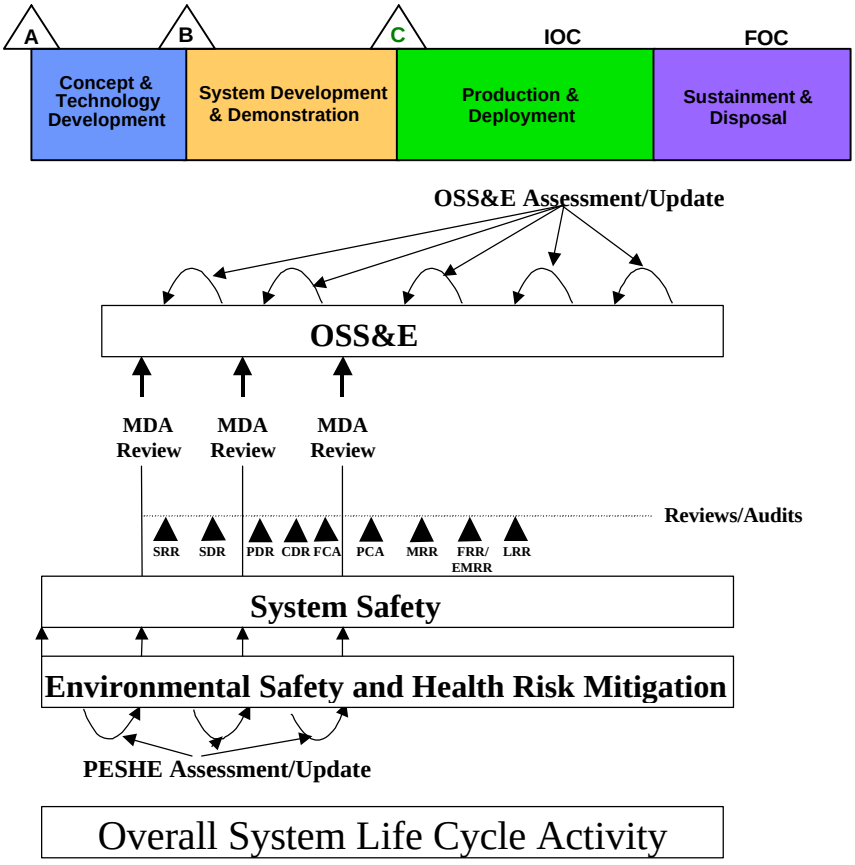


Figure 1 OSS&E Assurance during System

SECTION II: PESHE PROCESS

1. To ascertain the current "environmental posture" of the acquisition program and the potential environmental, safety and health (ESH) issues, the evaluation process consists of collecting ESH documentation, data, and information; evaluating ESH areas; determining overall risk; developing a plan and mitigation actions; final approval.

2. This PESHE process is illustrated Fig. 2. As indicated, this is an on-going process. The PM shall initiate the ESH evaluation at the earliest possible time in support of a program initiation decision (usually Milestone A) and shall maintain an updated evaluation throughout the life cycle of the program.

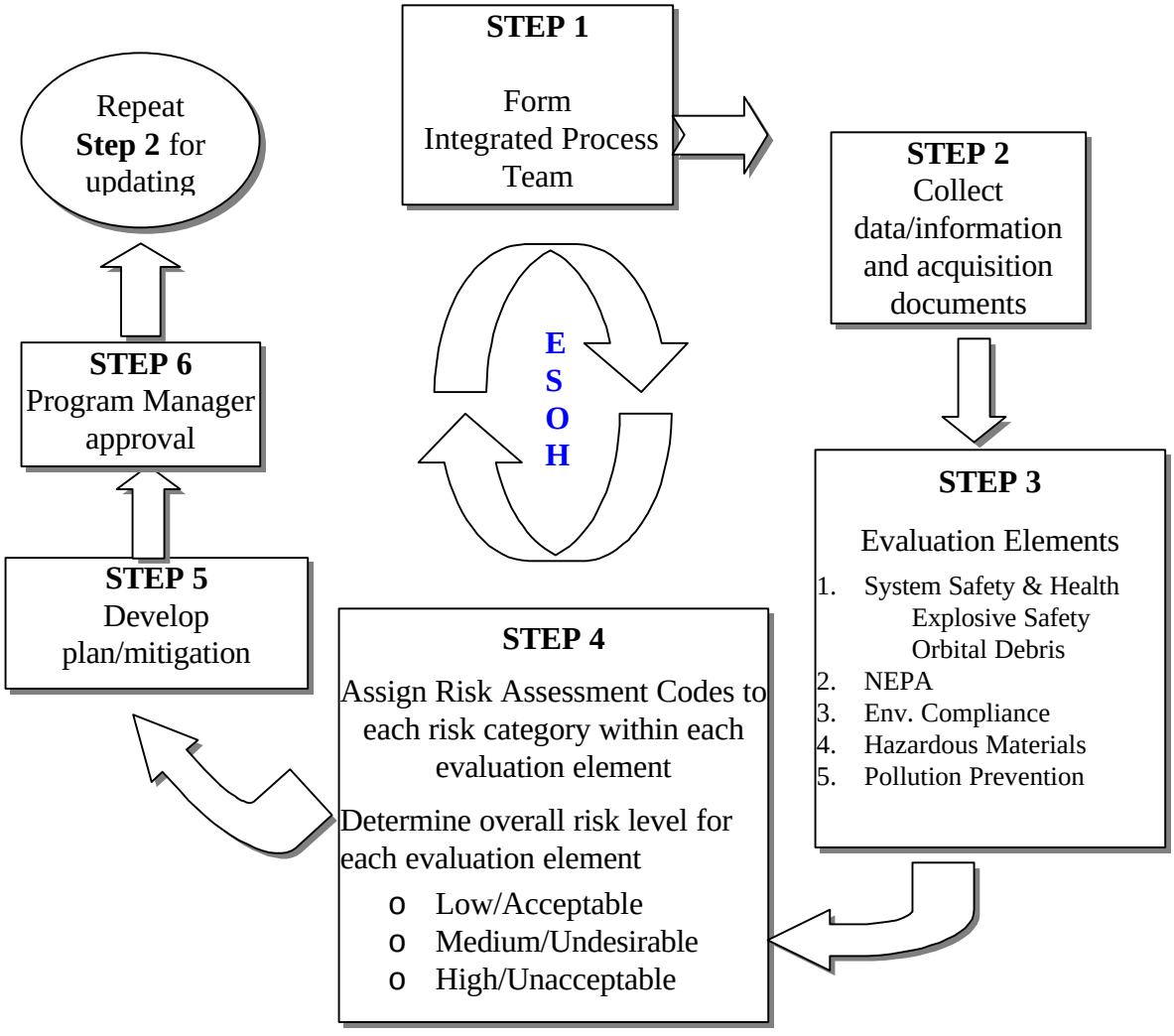


Figure 2 – PESHE Process

3. **The PESHE Process**. A generic six-step process is suggested to assist program managers in developing PESHE documents. A generic PESHE document outline is provided in Section 3. The PM's strategy for managing their acquisition program ESOH compliance review requirement should be summarized in the Programmatic Environment Safety and Health Evaluation (PESHE).

   a. **Step 1: Form An Integrated Process Team:** An effective method to accomplish this is for the Program Office to create an Integrated Process Team (IPT) under the direction of the Program Office with SMC/AXF (acquisition environmental management staff), SMC/AXZ (health and safety staff), and SMC/JA (legal staff) as members. The staff of SMC is organized to support Program Office needs in environmental, safety and health areas. The relevant organizations are:

      1. SMC/AXFV – Acquisition Environmental Management. This office can help Program Offices prepare the PESHE and maintain expertise and a database of environmental documents for SMC programs. They have prepared most of the SMC NEPA documents and will facilitate pollution prevention activities. http://ax.losangeles.af.mil/axf/

      2. SMC/AXZ – Health and Safety Office. This office can help Program Offices prepare the Health and Safety evaluations for program PESHE and maintain expertise and documents in this field relevant to SMC programs. http://ax.losangeles.af.mil/axz/

      3. SMC/JA – Staff Judge Advocate. This office provides the legal knowledge and interpretations relevant to SMC programs and legal requirements. http://www.losangeles.af.mil/ABG/JA/

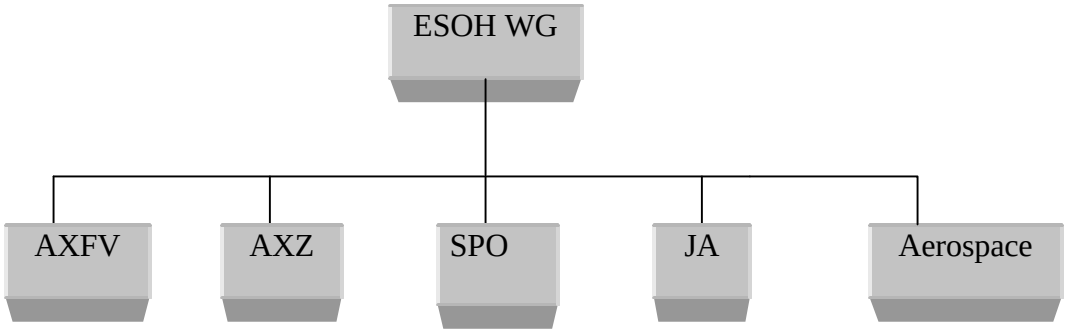


Figure 3: ESOH Working Group

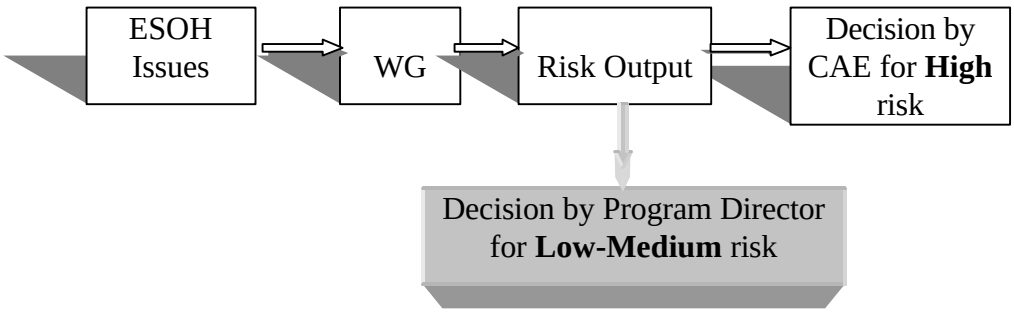


Figure 4: ESOH Decision Tree

b. **STEP 2. Collect data/information and acquisition documents**.

i. The PM will conduct periodic ESOH compliance reviews of statutory requirements to determine the level of ESOH risk during each phase of the system life cycle.
ii. The PESHE addresses the program's need for the ESOH compliance review to include compliance with applicable requirements for a NEPA schedule and supporting analyses, Safety and Health, Hazardous Materials Management, Pollution Prevention, and Explosives Safety.
iii. For example, determining what environmental statutes (CAAA conformity or community noise for example) may constrain the design or deployment of the system will be critical while determining the system architecture.
iv. Similarly, NEPA statutory requirements must be integrated into testing and fielding plans to avoid unnecessary impacts due to unforeseen ESOH restrictions due to testing, training or deployment activities.

c. STEP 3. Evaluate Elements. As required by DoD 5000.2R, the following elements should be evaluated.

i. **Safety and Health**. The PM shall:

A. System Safety:

1. Identify, evaluate and ensure control of system safety and health hazards throughout the system's life cycle.
2. Define and document mishap risk levels including associated mishap risk acceptance processes.
3. Establish a program that manages and documents the probability and severity of all hazards associated with development, use and disposal of the system.
4. All safety and health risks shall be managed in a manner that is cost effective and consistent with mission requirements. An optimum combination of safety and health with cost, performance, and schedule shall be sought.

B. Operational Safety: Ensure Federal Occupational Safety and Health Act standards and regulations applicable to all federal (military or civilian) and contractor employees working on DoD acquisition contracts or in DoD operations and workplaces.

C. Space Safety: Applying the principles of system safety, ensure that space safety (launch and orbital safety) requirements are established and implemented for all space systems. Launch safety includes launch operations safety, flight safety analysis, and mission flight control; orbital safety covers the post-launch phase of a space system and includes the control and minimization of hazards related to orbital debris, collision avoidance, laser clearing-house functions, environmental hazards, and safety procedures.

D. Explosive Safety:

1. Establish an explosives safety program that ensures munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed.
2. Comply with DoD explosives safety requirements in all acquisition programs that include or support munitions, explosives, or energetics.
3. Evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap to optimize the trade-off of munitions reliability against unexploded ordinance liability.

E. Health:

1. 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.
2. Health hazards on the occupational worker and on the community shall be evaluated for the effects of chemicals, radiation (ionizing and non-ionizing), heat and cold stress, noise and ergonomics.

ii. Environmental Compliance. The PM shall:

1. Identify and integrate environmental regulations into program execution.
2. Using PESHE, highlight the potential environmental compliance issues associated with the system.

iii. **National Environmental Policy Act.** The PM shall:

1. Comply with the National Environmental Policy Act (NEPA) (42 USC4321 - 4370d), implementing regulations (40 CFR1500 – 1508), and Executive Orders (EO 12114 and EO 11514).
2. Analyze proposed actions for upcoming program phases that may require NEPA or EO analysis by providing the Milestone Decision Authority (MDA) with milestones and status for each planned action.
3. Complete any analysis required under either NEPA or EO before the appropriate official may make a decision to proceed with a proposed action that may affect the quality of the human environment.
4. Prepare documentation in accordance with Air Force implementation regulations and NEPA guidance and EO analysis tied to proposed, program-specific actions.
5. Forward system-related NEPA and EO documentation to the Component Acquisition Executive as the final approval authority.
6. Forward a copy of final NEPA documents for ACAT I programs to the Defense Technical Information Center.

iv. **Hazardous Materials**. The PM shall:

1. 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).
2. Evaluate and manage the selection, use, and disposal of hazardous materials considering ESOH factors so that 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.
3. Where a hazardous material use cannot be avoided, develop and implement plans and procedures for identifying, minimizing use of, tracking, storing, handling, packaging, transporting, and disposing of hazardous materials and equipment.
4. Replace hazardous materials in the system through changes in the system design, manufacturing, and maintenance processes, where technically and economically practical as alternate technology becomes available.
5. Work with the contractor and other PMs in identifying and testing mutually acceptable alternatives to minimize costs whenever possible.

v. **Pollution Prevention**. The PM shall:

1. Prevent or reduce at the source all forms of pollution in designing, manufacturing, testing, operating, maintaining, transporting, and disposing of systems, whenever feasible.
2. Recycle or reuse in an environmentally safe manner, pollution that cannot be prevented or reduced at the source.

3. Treat pollution in an environmentally safe manner that pollution which cannot be prevented or recycled.
4. Employ and monitor, as required, disposal or other release to the environment only as a last resort.
5. Establish a pollution prevention program to help minimize environmental impacts and the life-cycle costs associated with environmental compliance.
6. Identify the following:
    a. The impacts of the system on the environment during its life (including disposal)
    b. Actions needed to prevent or control the impacts
    c. The types and amounts of pollution that will be released
    d. ESH risks associated with using the new system
    e. Other information needed to identify source reduction, alternative technologies, and recycling opportunities.

7. Many opportunities for pollution prevention can be incorporated into contract documents. In developing work statements, specifications, and other product descriptions, EO 12873 requires PM's to eliminate the unnecessary use of virgin material and consider reuse of recovered and/or recycled materials. The use of environmentally preferable products, waste prevention (including toxicity reduction or elimination), and ultimately, disposal, as appropriate (see FAR 11.301) is another pollution prevention opportunity.

d. STEP 4. Assign Risk Assessment Codes to each risk category within each evaluation element. Determine overall risk level for each element.

i. Hazards will be assessed in terms of hazard severity and accident probability and assigned a Hazard Risk Index

ii. Safety Hazard Risk Index. Analyze all hazards to determine the degree of risk. The procedure below, or use of another risk tool such as Continuous Aerospace Risk Management and Assessment (CARMA), may be used to analyze safety hazards:

	HAZARD CATEGORIES			
	I	II	III	IV
	Catastrophic	Critical	Marginal	Negligible
Frequent				
Probable				
Occasional				
Remote				
Improbable				

High Risk	Medium Risk	Low Risk
Unacceptable	Undesirable	Acceptable
CAE Approval	PM Approval	Element PM Approval

Frequent	Likely to occur frequently in life of system, item, facility, etc. Continuously experienced in fleet/ inventory.
Probable	Will occur several times in life of item. Will occur frequently in fleet/inventory.
Occasional	Likely to occur sometime in life of item. Will occur several times in fleet/ inventory.
Remote	Unlikely but possible to occur in the life of an item. Unlikely, but can reasonably be expected to occur in fleet or inventory.
Improbable	So unlikely it can be assumed occurrence may not be experienced. Unlikely to occur, but possible in fleet or inventory.

Catastrophic	Death or permanent total disability, system loss, major property damage.
Critical	Permanent partial disability or temporary total disability in excess of three months, major system damage, significant property damage.
Marginal	Minor injury, lost workday accident, or compensable injury/illness; minor system or property damage.
Negligible	First aid or minor supportive medical treatment, minor system impairment.

e. STEP 5. Develop Plan/Mitigation

i. Define the level of risk to the program and the mitigation of these risks using a systems engineering approach.
ii. Cost of correction, future intended use of the facility, and availability of desirable alternative methods of control will be considered
iii. Hazards will be eliminated on a worst-first basis

f. STEP 6. Program Manager Approval

i. Each management decision to accept the risks associated with an identified hazard shall be formally documented.
ii. The Component Acquisition Executive (CAE) shall be the final approval authority for acceptance of high-risk hazards.
iii. All participants in joint programs shall approve acceptance of high-risk hazards.
iv. Acceptance of serious risk hazards may be approved at the Program Executive Officer (PEO) level.

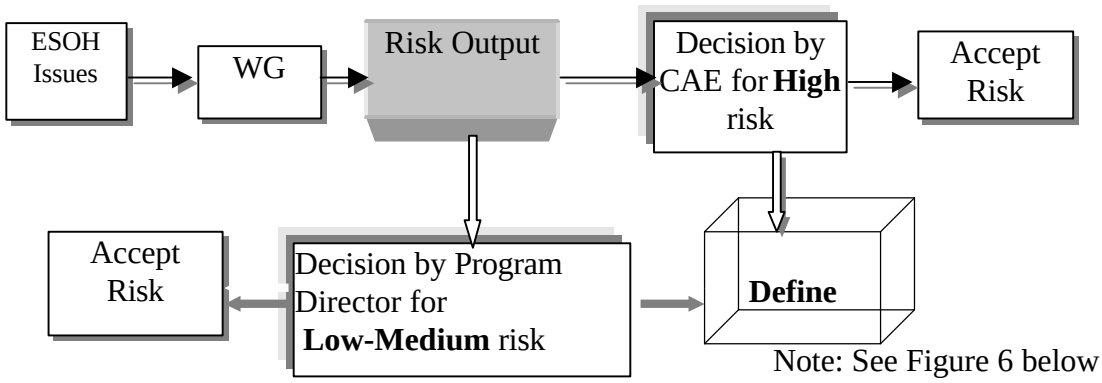


Figure 5: ESOH Decision Tree

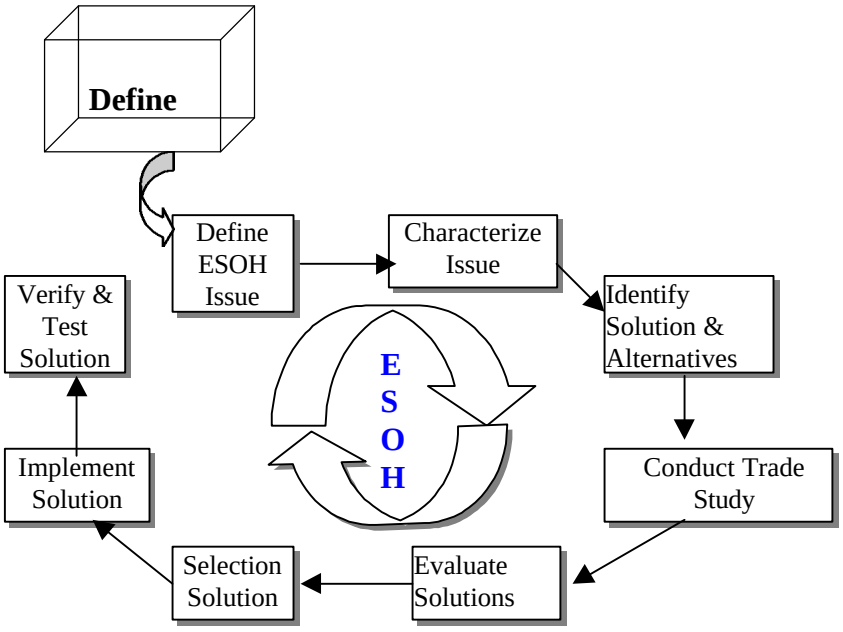


Figure 6: Decision Process

SECTION III: SAMPLE PESHE (TEMPLATE)

Program Name
And
Name of System Program Office

PROGRAMMATIC ENVIRONMENTAL SAFETY AND HEALTH EVALUATION (PESHE)

AS OF:

APPROVAL SIGNATURE PAGE

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):_____

AREA POTENTIALLY IMPACTED	CHECK ONE				CHECK IF YES
	POSITIVE EFFECT	NO EFFECT	ADVERSE EFFECT	UNKNOWN EFFECT	CHANGE IN STATUS FROM LAST REPORT?
System Safety and Health (System Safety, Operational Safety, Orbital Safety, Explosive Safety, Health) See Chapter 2	☐	☐	☐	☐	☐
Environmental Compliance (Permits, Plans, etc) See Chapter 3	☐	☐	☐	☐	☐
National Environmental Policy Act See Chapter 4	☐	☐	☐	☐	☐
Hazardous Materials Management See Chapter 5	☐	☐	☐	☐	☐
Pollution Prevention See Chapter 6	☐	☐	☐	☐	☐

PART V - PROGRAM MANAGER REVIEW AND APPROVAL

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

Signature: _____

Print Name and Title:

_____

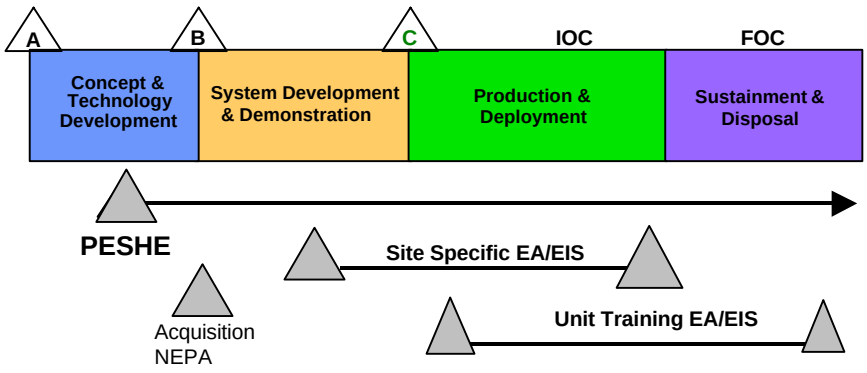
EXECUTIVE SUMMARY

1. Highlight the Program's environmental, safety and occupational health (ESOH) goals and strategy. Define how these ESOH goals and strategies are relevant to the specifics of the acquisition program's plans and objectives.

2. Summarize the ESOH integration with the Systems Engineering process.

3. Identify the major ESOH accomplishments and risks.

4. Provide the PESHE and NEPA schedule.



NEPA: National Environmental Policy Act
EA – Environmental Assessment
EIS – Environmental Impact Statement

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ACRONUMS AND ABBREVIATIONS

ACAT	Acquisition Category
AF	Air Force
AFI	Air Force Instruction
AOA	Analysis of Alternatives
AOA	Analysis of Alternatives
ASC	Aeronautical Systems Center
CAAA	Clean Air Act Amendment
CAE	Component Acquisition Executive
CARMA	Comprehensive Aerospace Risk Management Assessment
CATEX	Categorical Exclusion
CEQ	Council on Environmental Quality
CFC	Chlorinated Fluoral Carbon
CFR	Code of Federal Regulations
CFR	Code of Federal Regulations
COTS	Commercial Off the Shelf
CSOW	Contract Statement of Work
DoD	Department of Defense
DOPAA	Description of Proposed Action and Alternatives
DOT	Department of Transportation
DT&E	Developmental Test and Evaluation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESH	Environmental Safety and Health
ESOH	Environmental Safety and Occupational Health
EWR	East West Ranges
FMS	Foreign Military Sales
FONSI	Finding of No Significant Impact
FRR	Flight Readiness Review
FY	Fiscal Year
HAZMAT	Hazardous Material
HMMP	Hazardous Materials Management Plan
IAW	In Accordance With
IPT	Integrated Process Team
MAIS	Major Acquisition Information System
MAJCOM	Major Command
MAT	Mission Assurance Team
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MEK	Methyl Ethyl Ketone
MNS	Mission Need Statement

MRR	Mission Readiness Review
NEPA	National Environmental Policy Act
NOI	Notice of Intent
O&M	Operations and Maintenance
ODS	Ozone Depleting Substance
ORD	Operational Requirements Document
OSHA	Occupational Safety and Health Administration
OSS&E	Operational System Safety, Suitability and Effectiveness
OT&E	Operational Test and Evaluation
PEO	Program Executive Officer
PESHE	Programmatic Environmental Safety and Health Evaluation
PM	Program Manager
RCRA	Resource Conservation and Recovery Act
RF	Radio-Frequency
RFP	Request for Proposal
ROD	Record of Decision
SAMP	System Acquisition Master Plan
SMC	Space and Missile Systems Center
SOO	Statement of Objectives
SOW	Statement of Work
SPD	System Program Director
SPO	System Program Office
T&E	Test and Evaluation
TEMP	Test and Evaluation Master Plan
TOC	Table of Contents
U.S.C.	United States Code
US	United States
UXO	Unexploded Ordnance

CHAPTER 1: OVERVIEW OF THE PROGRAMMATIC ESOH EVALUATION

1. **SYSTEM PURPOSE AND DESCRIPTION.** This section provides a short description of the system including:
   a. Mission need
   b. Major program objectives
   c. System description
      i. Major program design requirements
      ii. Unique systems or subsystems
   d. Briefly explain the type of acquisition (for example: commercial off the shelf, modified COTS, government off the shelf, militarized, whole system or subsystem upgrade, technology program transition to acquisition program, or new developmental program).

2. **PROGRAM MASTER SCHEDULE.** This paragraph can consist of words and/or a figure. The information addressed should include:
   a. Acquisition strategy and background
   b. Fiscal or calendar year.
   c. Acquisition phases and decisions.
   d. Other major milestones (operational requirements document development, major test and evaluation actions, technology development, etc)

3. **PROGRAM MANAGEMENT APPROACH TO ESOH REQUIREMENTS**

   a. **ESOH MANAGEMENT STRATEGY.** This paragraph should discuss:
      i. Where the ESOH responsibility lies within both the government and contractor program management structures.
      ii. Organization roles and responsibilities for ESOH within:
         1. Program Office
         2. Environmental Planning Function.
         3. Integrated process teams (as described earlier in the SMC PESHE Guide).
         4. Test ranges, launch ranges and other host installations.
         5. Other support agencies
      ii. How this ESOH responsibility interfaces with other product or process responsibilities.

   b. **ESOH ISSUES TRACKING METHODOLOGY.** This paragraph should identify how ESOH issues are tracked by:
      i. The government
      ii. The prime contractor
   c. **ESOH BUDGET ALLOCATION.** This paragraph will explain the ESOH funding necessary for the program.
      i. Explain the ESOH funding required and budgeted for the program to comprehensively integrate ESOH into the system's engineering process.

ii. It is likely that as the program acquisition phases change, the requirements and funding amounts will vary. These changes should be addressed in PESHE revisions.
iii. Past year budgets, actual funding, and planned budgets (5 year minimum) should be addressed.
iv. If the prime contractor has a separate budget, then this funding should also be identified in addition to the program office ESOH staff labor and project funding.

4. **ESOH INTEGRATION INTO KEY PROGRAM REQUIREMENTS.** Each of the subsections below should be a cut and paste of the ESOH language from the actual document, with a corresponding reference section number or page number if available.

a. **ACQUISITION STRATEGY (SUPPORT STRATEGY).** Does Total Ownership Costs (TOC) address environmental, safety and health?
i. Direct costs
ii. Indirect costs

b. **MISSION NEED STATEMENT (MNS)/OPERATIONAL REQUIREMENTS DOCUMENT (ORD).** Summarize if the MNS/ORD addresses the capability of the system to be operated within the constraints of ESOH statutory requirements in the planned theater of operations. Potential ESOH risks include:
i. Hazardous materials
ii. Air emissions
iii. Noise emissions
iv. Fire suppression agents
v. Solid waste management
vi. Liquids management and discharge
vii. Physical hazards
viii. Human factors
ix. Radiation

c. **STATEMENT OF OBJECTIVES.** Potential ESOH risks include:
i. Hazardous materials
ii. Air emissions
iii. Noise emissions
iv. Fire suppression agents
v. Solid waste management
vi. Liquids management and discharge
vii. Physical hazards
viii. Human factors
ix. Radiation

d. **LOGISTICS PLANNING GUIDANCE DOCUMENTS.**

i. Use Logistics Management Information (MIL-PRF-49506) to identify non-compliance and the reduction of hazardous materials use, environmental impacts, and personnel hazards.
ii. Prepare all tech manuals as per MIL-STD-38784 and screen them for safety, hazardous substances and pollution prevention requirements.
iii. Screen manufacturing operations and maintenance activities including, but not limited to, the preparation of hazardous materials for military air shipments (AFJM 24-204).

e. **FACILITY PLANNING GUIDANCE DOCUMENTS.** Summarize construction and related ESOH issues (e.g., NEPA requirements)
i. New construction of facilities, utilities, communications
ii. Modified facilities, communications, etc
iii. DD Form 1391.
iv. Requirements and Management Plan (RAMP)
v. Requirements Document (RD)

f. **ANALYSIS OF ALTERNATIVES.** Summarize alternatives specifically addressing applicable constraints of ESOH statutory requirements. Potential ESOH risks include:
i. Hazardous materials
ii. Air emissions
iii. Noise emissions
iv. Fire suppression agents
v. Solid waste management
vi. Liquids management and discharge
vii. Physical hazards
viii. Human factors
ix. Radiation

g. **TEST AND EVALUATION MASTER PLAN.** Summarize the Test and Evaluation Master Plan, specifically addressing:
i. Adequacy of ESOH review(s) to be conducted for each test.
ii. The types of test activities identified for each test site.
iii. NEPA analysis conducted and/or planned.
iv. Potential ESOH impact(s) associated with testing including operation, maintenance, and disposal requirements
v. Test activities requiring unique training, workarounds, or personal protective equipment.
vi. Provisions to collect relevant health and safety data for definitive evaluation.

h. **COST ANALYSIS REQUIREMENTS DESCRIPTION.** Summarize Total Ownership Costs (TOC) addressing environmental, safety and health.
i. Direct costs

ii. Indirect costs

i. **DEMILITARIZATION AND DISPOSAL PLANNING.** Summarize the demilitarization and disposal plan, specifically addressing
   i. Hazardous materials
   ii. Hazardous wastes
   iii. Space debris mitigation

5. **ESOH PROVISIONS IN CONTRACT PROCUREMENT AND MANAGEMENT**

a. **INSTRUCTIONS TO OFFERORS.** Summarize ESOH instructions by PESHE element (if not applicable, annotate "Not Applicable")
   i. System Safety and Health
      a. Explosive Safety
      b. Orbital Debris
   ii. Environmental compliance
   iii. NEPA
   iv. Hazardous Materials Management
   v. Pollution Prevention

b. **EVALUATION FACTORS.** Summarize ESOH evaluation factors by PESHE element (if not applicable, annotate "Not Applicable")
   i. System Safety and Health
      a. Explosive Safety
      b. Orbital Debris
   ii. Environmental compliance
   iii. NEPA
   iv. Hazardous Materials Management
   v. Pollution Prevention

c. **CONTRACT CLAUSES.** Summarize ESOH contract clauses by PESHE element (if not applicable, annotate "Not Applicable")
   i. System Safety and Health
      a. Explosive Safety
      b. Orbital Debris
   ii. Environmental compliance
   iii. NEPA
   iv. Hazardous Materials Management
   v. Pollution Prevention

d. **STATEMENT OF WORK.** Summarize ESOH requirements by PESHE element (if not applicable, annotate "Not Applicable")
   i. System Safety and Health
      a. Explosive Safety

b. Orbital Debris
ii. Environmental compliance
iii. NEPA
iv. Hazardous Materials Management
v. Pollution Prevention

e. **CONTRACT DATA REQUIREMENTS LIST.** Summarize ESOH contract data requirements by PESHE element (if not applicable, annotate "Not Applicable")
i. Safety and Health
a. Explosive Safety
b. Orbital Debris
ii. Environmental compliance
iii. NEPA
iv. Hazardous Materials Management
v. Pollution Prevention

f. **INTERNATIONAL CONSIDERATIONS.** Summarize ESOH international considerations by PESHE element (if not applicable, annotate "Not Applicable")
i. Safety and Health
a. Explosive Safety
b. Orbital Debris
ii. Environmental compliance
iii. NEPA
iv. Hazardous Materials Management
v. Pollution Prevention

CHAPTER 2: SYSTEM SAFETY AND HEALTH

1. **REQUIREMENTS.** The System Program Director must ensure that safety and health is an integral part of systems engineering. The Publication L. 91-596 (1990) makes Federal Occupational Safety and Health Act standards and regulations applicable to all federal and contractor employees working on DoD acquisition contracts or in DoD operations and work places.

    a. System Safety and health must receive proper management attention including resources for both program and contractor areas of responsibilities.
    b. Both the government and contractor program managers shall designate their respective system safety managers and Industrial Hygienist to be the focal point for all program safety and health issues. The appointed system safety managers and industrial hygienist shall be provided with direct line of communication with the program managers.
    c. The SPO shall evaluate hazards in categories of "High Risk", "Serious Risk", "Medium Risk" and "Low Risk".
    d. All acquisition programs that include or support munitions, explosives, or energetics shall comply with DoD explosive safety requirements. To establish an explosives safety program that ensures that munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed.
    e. Also to evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap to optimize the trade-off of munitions reliability against unexploded ordinance liability.

2. **EVALUATION:** Provide a summary evaluation of identified system safety and health issues, risk mitigation measures, residual risks, and total costs.

3. **IDENTIFICATION OF SYSTEM SAFETY AND HEALTH ISSUES.**

    a. **System Safety:** The System Program Director shall ensure and describe in the PESHE how the following system safety requirements are met (same requirements are applicable in space safety, operational safety, and explosives safety):

        i. General Requirements.

            1. System safety is an integral part of systems engineering for both the program and contractor.
            2. System safety receives proper management attention including resources for both the government and contractor areas of responsibilities.
            3. Both the government and contractor program managers shall designate their respective system safety managers to be the focal point for all program system safety issues.

4. Both the government and contractor program system safety managers are provided a direct line of communication with the program manager.

ii. System Safety Training.

1. The government program system safety manager is trained in the weapons and space safety courses.
2. The government program system safety manager provides system safety awareness training to program non-system safety personnel.
3. The contractor system safety manager meets the training requirements.

iii. Hazard Identification and Resolution.

1. Both the government and contractor program system safety managers monitor safety program management throughout the system life cycle to identify and assess hazards.
2. Both the government and contractor program managers shall receive timely information on identified hazards with high mishap potential.
3. The risk acceptance authority is identified and the authority's decisions are documented.
4. Both the government and contractor program system safety managers ensure that an appropriately tailored system safety program per MIL-STD-882D is established and maintained.
5. Accepted residual risks and those that require PEO or higher action are documented.
6. Special tests are developed and conducted to verify proper system performance and are used to resolve or control hazards.
7. Tracking procedures for all identified hazards and their solutions are developed and residual risks documented.
8. Quantitative and/or qualitative system safety criteria and operating limits in concert with the using or operational command are developed.

iv. SSGs/SSWGs and TIMs.

1. SSGs are established for all Acquisition Category (ACAT) 1 programs.
2. The government program manager chairs and conducts SSGs/SSWGs for each appropriate program.
3. The SSG meets at least annually.
4. The SSG has a Charter which includes all the appropriate members.
5. The government program system safety manager organizes/co-chairs system safety TIMs.

v. Provide Input to Program Management Plans/Documentation and System Safety Portion of Contract.

1. The government program system safety manager reviews the MNS, ORD, Request for Proposal (RFP), System Acquisition Master Plan (SAMP), Statement of Objectives (SOO), and PESHE.
2. The system safety managers for both program and contractor ensure that the requirements of East-West Ranges (EWR) 127-1 and MIL-STD-882D are included in the contract.
3. The government and contractor program system safety managers ensure that the IMP/IMS and CSOW have adequate system safety requirements.
4. The government program system safety manager participates in source selection.

vi. Monitoring Contractor Performance.

1. The government program system safety manager reviews and comments on the MSPSP, SSPP, MRAR, SAR, FSD, RSSR, GOP, and HOP.
2. The government program system safety manager participates in design reviews, GOWG, MRR, and FRR.
3. The government program system safety manager coordinates with system safety representatives at the plant and range.
4. The government program system safety manager verifies the system safety program implementation by audits/inspections.

vii. Coordination of System Safety Activities With Other SPO Activities, Other SMC Safety Activities and Outside Agencies.

1. Both the government and contractor program system safety managers ensure that the system safety program is integrated with other engineering disciplines such as reliability, maintainability, human factors, and program milestones.
2. The government program system safety manager coordinates with SMC System Safety and other SMC activities.
3. The government program system safety manager monitors range operations safety, system transportation safety, system safety in operations, maintenance, logistics and system disposal safety.

b. **Operational Safety:** Ensure Federal Occupational Safety and Health Act standards and regulations applicable to all federal (military or civilian) and contractor employees working on DoD acquisition contracts or in DoD operations and workplaces.

c. **Space Safety**:

i. Space Safety Program Management. All space-related missions must have a comprehensive space system safety program. Space system safety program activities are the same as in 3a (System Safety) above and shall be applied for the

specific system safety activities in the different phases/milestones of the system life cycle.

ii. Space System Safety Program. Space system safety consists of two elements: launch safety and orbital safety. Space system safety program must be tailored to meet mission requirements. Space systems range from unique support equipment to large boosters and satellites. Launches, ground support and operational equipment, personnel, and the operational environment are all sources of potential mishaps. Safe operations within the space environment are only possible if positive mishap prevention programs are established and faithfully followed.

1. Launch Safety. Launch operations require a comprehensive safety program to ensure safe operations. The launch safety program covers activities associated with the ground handling, launching, and preorbital operations of space systems. It also includes activities connected with the deployment, operation, reentry, and recovery (if required) of test vehicles or payloads that don't attain orbit (either planned or unplanned).
    a. Major Range Test Facility Base (MRTFB) Range Safety. Typically, launch operations will be conducted from an MRTFB range and will comply with appropriate range safety requirements.
    b. Launch Collision Avoidance. Appropriate design and operations actions shall be taken to minimize the risk of collisions with other satellites or space debris during launch.
    c. Mission Flight Control. Adequate design and operational measures shall be in place to ensure complete control over launch systems at all times. The surrounding public and property shall not be exposed to undue risk.
2. Orbital Safety. The extremely high cost of orbital assets and irrecoverable nature of orbital operations makes orbital safety mishap prevention a critical component of orbital systems. The orbital safety program covers activities, after orbital insertion, associated with testing and operating space vehicles in orbit or deep space, including reentry, recovery and disposal. Orbital safety begins in the earliest phases of a program when considerations of this section must be incorporated in the design phase. Orbital safety programs should cover, at a minimum, the following areas:
    a. Collision Avoidance. Appropriate action shall be taken to minimize the risk of on-orbit collisions with other satellites or space debris. Collision avoidance shall include maintaining separation of functional and non-functional space objects through coordinated launch window management, accurate tracking and orbital element set updating; and coordination of planned orbit changes and evasive maneuvering to preserve operational space systems and to avoid the generation of additional space debris.
    b. Directed Energy Clearing House. Programs or experiments using directed energy, either ground or space-based, shall take appropriate action to minimize hazards or interference with spacecraft or the general public and property on the earth's surface or in the atmosphere.

c. Orbital Debris Minimization. Orbital systems shall be designed to minimize the risk from generation of orbital debris during and after their service life.
d. Booster disposal. Space vehicle boosters shall be designed and planned to minimize hazards to future vehicles and the ground when their mission is complete. At a minimum, vehicles should reenter the atmosphere or be moved into a disposal orbit at the end of their useful life where they will be less likely to interfere with operational spacecraft.
e. Orbital vehicle end of life saving. Vehicles should safely reenter the atmosphere or be moved into a disposal orbit at the end of its useful life where it will be less likely to interfere with operational spacecraft. End of life saving actions for systems disposal of in space include, but are not limited to: venting all pressure vessels, saving batteries, saving any remaining ordnance systems and turning off any transmitters.
f. Space environment. Orbital systems shall be designed to minimize damage due to natural phenomena such as meteoroids, solar radiation, spacecraft charging and high-energy cosmic radiation, solar flares, etc.

3. Space Safety Training. Ensure that space safety offices provide adequate training to all individuals involved in space operations. Safety training shall be tailored to particular systems and the individual's specific duties. Ensure that lesson plans are developed to implement training guidance.

d. Explosive Safety:

i. Prior to placing systems containing explosives in operation, the System Program Offices (SPOs) shall provide the necessary means to accomplish weapons/explosives safety and logistical requirements testing identified by users and authoritative agencies.
ii. System safety programs for acquisition of space and missile systems must include planning for analyses and tests to determine explosives hazard information to support production, storage, transportation, maintenance and use of the systems.
iii. Prior to shipment or routine storage, explosives must be assigned an interim / final Explosive Hazard Classification (EHC) in accordance with (IAW) and applicable Department of Transportation (DoT)/DoD directives. Reference T.O 11A-1-47.
iv. Contractors will have a process for obtaining approved DoD interim / final EHCs for transportation and storage of explosive ordnance prior to acceptance at DoD launch / test facilities.
v. Quantity - Distance (Q-D) requirements for explosive safety often refer to the DoD Directive 6055.9, DoD Explosives Safety Board (DDESB), and DoD Component Explosive Safety Responsibilities. It establishes uniform safety standards applicable to ammunition, explosives and propellants. These criteria are designed to provide specific levels of protection from the effects of fire and explosion for personnel and nearby structures. Standard Q-D criteria have

been well established, and are based on numerous field tests and accident investigations. Reference AFMAN 91-201.

e. Health:

i. 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.

ii. 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.

iii. The most stringent standards shall be applied where Federal, State, Air Force or host nation agreements are enforced.

iv. Health hazards on the occupational worker and on the community shall be evaluated for the effects of chemicals, radiation (ionizing and non-ionizing), heat and cold stress, noise and ergonomics.

v. Select proper personal protective equipment according to hazard conditions.

vi. Generate hazardous communication plan for the presence of hazardous materials and conditions in the work environment.

vii. If federal safety and health standards cannot be applied, the military unique equipment is still subject to mishap risk management via the system safety process. This is the case whether or not OSHA-type requirements have been applied.

4. **SYSTEM SAFETY AND HEALTH RISKS, ACCOMPLISHMENTS, FUTURE ACTIONS AND COSTS BY LIFE-CYCLE PHASE.** The sections and tables below will be completed as the program progresses through the applicable acquisition phase. This will provide a history and additional tracking methodology for systems safety and health issues, actions and costs.

a. **CONCEPT AND TECHNOLOGY DEVELOPMENT.** Summarize system safety and health risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here.

Risk	Severity	Mitigation	Cost	Status

b. SYSTEM DEVELOPMENT AND DEMONSTRATION. Summarize system safety and health risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for

implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here.

Risk	Severity	Mitigation	Cost	Status

c. PRODUCTION AND DEPLOYMENT. Summarize system safety and health risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here.

Risk	Severity	Mitigation	Cost	Status

d. OPERATIONS AND SUPPORT. Summarize system safety and health risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here.

Risk	Severity	Mitigation	Cost	Status

e. DEMILITARIZATION AND DISPOSAL. Summarize system safety and health risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here.

Risk	Severity	Mitigation	Cost	Status

CHAPTER 3: ENVIRONMENTAL COMPLIANCE

1. **REQUIREMENTS.** Acquisition programs are required to comply with applicable federal, state, interstate, and local ESOH codes, statutes, and regulations as well as Executive Orders, treaties, and agreements.
   - **a.** System development must include regulatory compliance (at a minimum) or program managers risk creating systems that are not deployable due to unacceptable risks to personnel safety, system operability (including human-machine interface), unacceptable environmental impacts, and associated public-perception issues.
   - **b.** It is essential to address these issues early in the development process to avert expensive and time-consuming impacts on system readiness.
   - **c.** Program managers will perform periodic compliance reviews of statutory requirements to determine the level of risk from these statutory requirements on program cost, schedule and performance.

2. **EVALUATION.** Provide a summary of environmental compliance, risks, mitigation measures and total costs.

3. **IDENTIFICATION OF ENVIRONMENTAL COMPLIANCE REQUIREMENTS**

   a. **Permits**

Permit Title	Holder	Date of Permit	Thresholds

   b. Plans

Plan Title	Author	Date

   a. **ENVIRONMENTAL COMPLIANCE RISKS, ACCOMPLISHMENTS, FUTURE ACTIONS AND COSTS BY LIFE-CYCLE PHASE.** The sections and tables below will be completed as the program progresses through the applicable acquisition phase. This will provide a history and additional tracking methodology for environmental compliance issues, actions and costs.

   b. **CONCEPT AND TECHNOLOGY DEVELOPMENT.** Summarize environmental compliance program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE

elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

a. **SYSTEM DEVELOPMENT AND DEMONSTRATION.** Summarize environmental compliance program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

a. **PRODUCTION AND DEPLOYMENT.** Summarize environmental compliance program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

d. OPERATIONS AND SUPPORT. Summarize environmental compliance program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

e. DEMILITARIZATION AND DISPOSAL. Summarize environmental compliance program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	**Severity**	**Mitigation**	**Cost**	**Status**

CHAPTER 4: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) AND EXECUTIVE ORDER (EO) 12114 COMPLIANCE

1. **REQUIREMENTS.** NEPA requires analysis of ESOH impacts on the human and natural environment.
   a. DoD 5000.2R requires all acquisition programs to comply with NEPA, implementing regulations and EO 12114, as applicable.
   b. NEPA analysis, documentation formats, and reporting requirements are statutory. NEPA analysis completion schedule must be included in the Acquisition Strategy.
   c. All NEPA analysis must be completed prior to initiation of the proposed action.

2. **EVALUATION.** Provide a summary of NEPA documents, document status and mitigation plan activities (if required).

3. **IDENTIFICATION OF ACTIONS TRIGGERING NEPA AND EO 12114 COMPLIANCE.** Summarize NEPA actions required, the NEPA and/or EO reference that triggers this action, and status of complying with these requirements.

Action	NEPA or EO reference triggering action	Status

4. ACCOMPLISHMENTS, FUTURE ACTIONS AND COSTS BY LIFE-CYCLE PHASE. The sections and tables below will be completed as the program progresses through the applicable acquisition phase. This will provide a history and additional tracking methodology for ESOH issues, actions and costs.

a. CONCEPT AND TECHNOLOGY DEVELOPMENT. Summarize in the table below NEPA accomplishments, future actions and costs. If a NEPA action negates the need for follow on NEPA action, the subsequent sections should be annotated "Not Applicable" in the "Status" column (for example, if a Categorical Exclusion (CATEX) is issued, then an Environmental Assessment (EA), Finding of No Significant Impact (FONSI), Environmental Impact Statement (EIS) and Record of Decision (ROD) are not required).

Title	Costs	Dates	Status
AF Form 813/DOPAA			
CATEX			
EA/FONSI			
EIS			
ROD			
Mitigation Plan			

b. SYSTEM DEVELOPMENT AND DEMONSTRATION. Summarize in the table below NEPA accomplishments, future actions and costs. If the program is not yet in this phase of acquisition, this table may be left blank. If a NEPA action negates the need for follow on NEPA action, the subsequent sections should be annotated "Not Applicable" in the "Status" column (for example, if a Categorical Exclusion (CATEX) is issued, then an Environmental Assessment (EA), Finding of No Significant Impact (FONSI), Environmental Impact Statement (EIS) and Record of Decision (ROD) are not required).

Title	Costs	Dates	Status
AF Form 813/DOPAA			
CATEX			
EA/FONSI			
EIS			
ROD			
Mitigation Plan			

c. PRODUCTION AND DEPLOYMENT. Summarize in the table below NEPA accomplishments, future actions and costs. If the program is not yet in this phase of acquisition, this table may be left blank. If a NEPA action negates the need for follow on NEPA action, the subsequent sections should be annotated "Not Applicable" in the "Status" column (for example, if a Categorical Exclusion (CATEX) is issued, then an Environmental Assessment (EA), Finding of No Significant Impact (FONSI), Environmental Impact Statement (EIS) and Record of Decision (ROD) are not required).

Title	Costs	Dates	Status
AF Form 813/DOPAA			
CATEX			
EA/FONSI			
EIS			
ROD			
Mitigation Plan			

a. **OPERATIONS AND SUPPORT.** Summarize in the table below NEPA accomplishments, future actions and costs. If the program is not yet in this phase of acquisition, this table may be left blank. If a NEPA action negates the need for follow on NEPA action, the subsequent sections should be annotated "Not Applicable" in the "Status" column (for example, if a Categorical Exclusion (CATEX) is issued, then an Environmental Assessment (EA), Finding of No Significant Impact (FONSI), Environmental Impact Statement (EIS) and Record of Decision (ROD) are not required).

Title	Costs	Dates	Status
AF Form 813/DOPAA			
CATEX			

EA/FONSI			
EIS			
ROD			
Mitigation Plan			

a. **DEMILITARIZATION AND DISPOSAL.** Summarize in the table below NEPA accomplishments, future actions and costs. If the program is not yet in this phase of acquisition, this table may be left blank. If a NEPA action negates the need for follow on NEPA action, the subsequent sections should be annotated "Not Applicable" in the "Status" column (for example, if a Categorical Exclusion (CATEX) is issued, then an Environmental Assessment (EA), Finding of No Significant Impact (FONSI), Environmental Impact Statement (EIS) and Record of Decision (ROD) are not required).

Title	Costs	Dates	Status
AF Form 813/DOPAA			
CATEX			
EA/FONSI			
EIS			
ROD			
Mitigation Plan			

5. MITGATION STATUS FOR PROGRAM NEPA AND EO 12114 DECISIONS. Summarize NEPA program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here.

Mitigation	**Cost**	**Status**

6. PROGRAM RISKS. Summarize NEPA program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution). If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate.

Risk	**Severity**	**Mitigation**	**Cost**	**Status**

CHAPTER 5: HAZARDOUS MATERIALS

1. **REQUIREMENTS.** Hazardous materials management includes establishing a program to meet goals for identifying, eliminating or minimizing the use of hazardous materials (HAZMATs).
   a. The program process should include tracking, storing, handling, and disposal considerations.
   b. The analysis should include health-hazard assessment of materials and processes. The materials shall be clearly delineated in an Authorized Use List.
   c. Hazardous materials management is often contracted to the design and production contractor.
   d. The results are provided to the sustainment community when the system is deployed so the risk imposed by HAZMATs in the system configuration can be managed.
   e. Costs and risk of hazardous material procurement, usage, and disposal should be considered in the overall life cycle of the system and as exit criteria at each acquisition phase.
   f. Hazardous materials management is a regulatory requirement.
   g. The Hazardous Materials Management Plan (HMMP) is a separate document and may be summarized here. Ensure the program office HMMP and the contractor's HMMP are differentiated.

2. **EVALUATION.** Provide a summary of the hazardous materials management program.

3. **IDENTIFICATION OF HAZARDOUS MATERIALS ISSUES.** See appendices for (1) AFMC List of 24 Hazardous Materials, (2) Class I Ozone Depleting Substances (ODSs), (3) Class II Ozone Depleting Substances (ODSs).

   a. **Program Process Analysis.**

Hazardous Material	Tracking	Storage	Handling	Disposal	Health Hazard Assessment
1.					
2.					

   b. Authorized Use List. See appendices for (1) AFMC List of 24 Hazardous Materials, (2) Class I Ozone Depleting Substances (ODSs), (3) Class II Ozone Depleting Substances (ODSs).

Hazardous Material
1.
2.

4. HAZARDOUS MATERIALS MANAGEMENT RISKS, FUTURE ACTIONS AND COSTS BY LIFE-CYCLE PHASE.

a. **CONCEPT AND TECHNOLOGY DEVELOPMENT.** Summarize hazardous materials management program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank

Risk	Severity	Mitigation	Cost	Status

b. SYSTEM DEVELOPMENT AND DEMONSTRATION. Summarize hazardous materials management program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank

Risk	Severity	Mitigation	Cost	Status

b. **PRODUCTION AND DEPLOYMENT.** Summarize hazardous materials management program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

d. OPERATIONS AND SUPPORT. Summarize hazardous materials management program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

e. DEMILITARIZATION AND DISPOSAL. Summarize hazardous materials management program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

CHAPTER 6: POLLUTION PREVENTION

1. **REQUIREMENTS.** Pollution prevention establishes a program to meet goals and to manage mission-critical materials used in and by the system.
   a. Pollution prevention is integrated into applied research and advanced technology for introducing new technologies and cost/performance trade studies affecting the system architecture.
   b. A fundamental purpose of the program is to identify and quantify pollution impacts, such as noise, as early as possible during system development, and to identify and implement actions needed to prevent or abate the impacts.
   c. Pollution prevention encourages the use of recovered and recycled materials and environmentally preferable materials and processes.
   d. All forms of environmental pollution and occupational exposures should be eliminated or reduced at the source in designing, manufacturing, testing, operating, maintaining, and disposing of the system.
   e. Pollution prevention activities are usually contracted to the design or production contractor in conjunction with hazardous materials management.
   f. Pollution prevention is integrated into new design and re-design (engineering changes) for retrofitting systems with alternative technologies and materials or operation and support procedures. Where issues cannot be "designed out" they are turned over to hazardous materials management.
   g. Pollution prevention is a statutory requirement.

2. **EVALUATION.** Provide a summary of the pollution prevention risks and opportunities.

3. **RISKS, ACCOMPLISHMENTS, FUTURE ACTIONS AND COSTS BY LIFE-CYCLE PHASE.**

   a. **CONCEPT AND TECHNOLOGY DEMONSTRATION.** Summarize pollution prevention program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

b. SYSTEM DEVELOPMENT AND DEMONSTRATION. Summarize pollution prevention program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for

implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

c. PRODUCTION AND DEPLOYMENT. Summarize pollution prevention program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

d. OPERATIONS AND SUPPORT. Summarize pollution prevention program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

e. DEMILITARIZATION AND DISPOSAL. Summarize pollution prevention program risks, severity, mitigation options, costs and status (may include program manager decision not to implement, schedule for implementation, and status of mitigation execution) during this phase. If mitigation options affect other program areas (cost, performance, schedule) and/or other PESHE elements so annotate here. If the program is not yet in this phase of acquisition, this table may be left blank.

Risk	Severity	Mitigation	Cost	Status

SECTION IV: CHECKLISTS

MILESTONE A
Concept and Technology Development Acquisition Checklist

STEP 1: Form Integrated Process Team

STEP 2: Collect data/information and acquisition documents

- ❑ Collect ESOH related documents from previous or similar systems and assess lessons learned/problems. The action of documenting and assessing lessons learned will establish an "ESOH baseline" for the program.
  - ❑ Program Master Schedule
  - ❑ ESOH budget allocation.
  - ❑ Acquisition Strategy
  - ❑ Mission Needs Statement
  - ❑ Operational Requirements Document (ORD)
  - ❑ Statement of Objectives
  - ❑ Logistics Planning Documents
  - ❑ Facility Planning Guidance Documents
  - ❑ Analysis of Alternatives (AOA)
  - ❑ Test and Evaluation Master Plan (TEMP)
  - ❑ Single Acquisition Management Plan (SAMP)
  - ❑ Cost Analysis Requirements Description (CARD)
  - ❑ ESOH Provisions in Contract Procurement and Management
    - ❑ Instructions to Offerors
    - ❑ Evaluation Factors
    - ❑ Contract Clauses
    - ❑ Statement of Work
    - ❑ Contract Data Requirements List
    - ❑ International Considerations.
  - ❑ Hazardous Materials Management Program (HMMP)
    - ❑ Government
    - ❑ Contractor
  - ❑ System Safety Plan (SSP) – government and contractor
  - ❑ Integrated Master Plan (IMP) – contractor
  - ❑ Overall System Safety and Suitability Evaluation (OSS&E) Plan
- ❑ NEPA documents for SMC programs are available at http://ax/losangeles.af.mil/axf.
- ❑ Review the appropriate elements of DoDD 5000.1, DoDI 5000.2, DoD 5000.2-R, NEPA and applicable Air Force Instructions to determine relevant ESOH actions.

STEP 3: Evaluate Elements

System Safety and Health

A. System Safety:

- ❑ Evaluate system safety design features.
- ❑ Identify possible safety interface problems.
- ❑ Highlight special safety considerations.
- ❑ Describe safety tests/data needed for next phase.
- ❑ PHA required to identify inherent hazards.
- ❑ Update requirements based on this phase.
- ❑ Review designs of similar systems.
- ❑ Use past experience with similar systems for requirements.
- ❑ Identify waiver requirements.
- ❑ Prepare a report for milestone reviews.
- ❑ Tailor subsequent phase system safety programs.
- ❑ For contracted effort, provide system safety input in RFP packages.
- ❑ Participate in the source selection activities.
- ❑ SSPP with contractor's safety effort proposed.
- ❑ Establish criteria for validating contractor performance.
- ❑ Update specifications, requirements, safety characteristics.
- ❑ PHA for hazards and inherent risks.
- ❑ Identify, conduct and/or review tradeoff studies.
- ❑ Identify qualitative/quantitative system safety requirements.
- ❑ Develop, review and/or analyze methods to control hazards.
- ❑ Perform system and equipment interface analyses (SHA/O&SHA).
- ❑ Update test plans.
- ❑ Project activities in production and operational phases.
- ❑ Prepare summary report for milestones briefs.
- ❑ Perform SSHA, SHA, and O&SHA.
- ❑ Review test plans.
- ❑ Review training plans.
- ❑ Evaluate mishap and failures for corrective actions.
- ❑ SHA on test configuration model
- ❑ Expand production analysis requirements.
- ❑ Identify need for special tests.
- ❑ Review O&M publications.
- ❑ Review safety information from DOT, EPA, and OSHA.
- ❑ Establish a system safety program to identify, track, assess, and mitigate system-related life cycle hazards and accept residual risks.

B. Operational Safety:

- ❑ Review system safety or health hazard assessments for similar systems, with attention given to the causes of accidental losses and injuries to operators and maintainers.
- ❑ Identify and develop methods to control projected accident, incident, or personal injury rates for your system.

- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system. Safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health are regulatory requirements.

C. Explosive Safety:

- ❑ Establish an explosives safety program that ensures that munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed.
- ❑ Comply with DoD explosives safety requirements in all acquisition programs that include or support munitions, explosives, or energetics.
- ❑ Evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap to optimize the trade-off of munitions reliability against unexploded ordinance liability.

D. Health:

- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system. Safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health are regulatory requirements.
- ❑ Identify and document personal protective equipment required to operate or maintain the system.
- ❑ Document residual system-related risks.
- ❑ Identify, assess, track, document and resolve health risks.
- ❑ Complete a Health Hazard Assessment(s) and identify, track and resolve all health hazards.
- ❑ Identify necessary controls for personnel in the system's work place/facilities who may be exposed to physical, radiological, biological or chemical hazards.

NEPA

- ❑ Identify the risks imposed on the program from noncompliance with NEPA or analysis of ESOH impacts on the human environment.
- ❑ Document all required NEPA schedule/analyses for this and the next phase.
- ❑ Perform industrial/manufacturing process Environmental Assessments (EA) peculiar to your system’s needs.
- ❑ Summarize and document:
  - ❑ NEPA documents
  - ❑ NEPA document status
  - ❑ NEPA or Executive Order reference triggering NEPA action
  - ❑ Mitigation plan activities and associated costs (if required)

Environmental Compliance

- ❑ Establish a risk management process for monitoring changing compliance requirements, determining the impact of the statutory requirements, and taking appropriate action.
- ❑ Review and ensure compliance with:
  - ❑ Federal environmental laws and regulations
  - ❑ State environmental laws and regulations
  - ❑ Local environmental laws and regulations
  - ❑ All ESOH Federal Executive Orders
- ❑ Develop environmental compliance strategy.
- ❑ Ensure compliance review and evaluation considers the entire system life cycle (i.e., development, manufacturing, testing, support, operations, maintenance, and disposal).
- ❑ Summarize environmental compliance risks, mitigation options/status and total costs.
- ❑ Identify required environmental permits, to include:
  - ❑ Permit title
  - ❑ Permit holder
  - ❑ Date of permit
  - ❑ Applicable thresholds
- ❑ Identify required environmental plans, to include:
  - ❑ Plan title
  - ❑ Author
  - ❑ Date of document/status

Hazardous Materials

- ❑ Establish a Hazardous Materials Management program for identifying, eliminating or minimizing use, tracking, storing, handling, and disposing of hazardous materials (HAZMATs).
- ❑ Summarize the hazardous materials risks, severity, mitigation options, costs and status.
- ❑ Replace HAZMATs, which are similar to the system to be replaced.
- ❑ Complete the Approved Hazardous Material Use List and document the following:
  - ❑ Chemical nomenclature
  - ❑ Tracking mechanism
  - ❑ Storage requirements and considerations.
  - ❑ Handling requirements and considerations.
  - ❑ Disposal requirements and considerations.
  - ❑ Health Hazard Assessment.
- ❑ Ensure the Hazardous Material Management program is it based on National Aerospace Standard 411 or a similar standard.

Pollution Prevention

- ❑ Initiate pollution prevention to eliminate or reduce pollution to as near zero as feasible during new design or re-design (engineering changes) for retrofitting systems with alternative technologies and materials or operation and support procedures. Where issues cannot be “designed out”, they are turned over to hazardous materials management.

- ❑ Eliminate, or document justification why not, all Class I Ozone Depleting Chemicals (ODCs) from use by your system.
- ❑ Minimize the use of Class II ODCs, which will be banned effective CY 2015
- ❑ Develop a plan to investigate non-hazardous materials to replace ODCs and hazardous materials used in or by your system.
- ❑ Develop a pollution prevention (P2) program to address and/or correct P2 system deficiencies.
- ❑ Identify the projected types and quantities of pollutants to be released to the environment over the life of the system.
- ❑ Provide a summary evaluation of the pollution prevention risks, opportunities, mitigation options, costs and status.

STEP 4: Assign Risk Assessment Codes to Each Risk Category Within Each Evaluation Element

Refer to matrix on page 10.

STEP 5: Develop Plan/Mitigation

- ❑ Identify the ESOH-related plans are you planning to or have prepared (e.g., Pollution Prevention Plan, System Safety Plan, and Hazardous Material Management Plan)
- ❑ Summarized the Support Strategy and Acquisition Strategy in the PESHE.
- ❑ Influence the Request for Proposal (RFP)/Statement of Work (SOW) by:
  - ❑ Establish Incentive Fees/Profits for achieving various ESOH objectives.
  - ❑ Contractually require a System Safety and Occupational Health Program and integration of Hazardous Material Management and Pollution Prevention into concept development activities.
  - ❑ Identify ESOH source selection criteria. Possible criteria could include:
    - ❑ Demonstrate effective ESOH risk and cost management practices in past performance efforts.
    - ❑ Identify the formal contractor organization for ESOH issues.
    - ❑ Define the methodology for identifying hazardous materials, prioritizing hazardous materials relative to their impact on the program and systematically eliminating the hazardous materials from the program.
    - ❑ Require the integration of ESOH issues in the systems engineering process.
    - ❑ Require the analysis of ESOH risks, processes, materials, technology, and risk management.
    - ❑ Identify the number, type, kind of alternatives considered for ESOH trade-off studies and analyses.
  - ❑ Evaluate proposals.
    - ❑ Evaluate and document the contractor's integration of the ESOH using IPPD approach within integrated product teams.
    - ❑ Evaluate and document the contractor's analysis of the need for ESOH research, development, test and evaluation (RDT&E) projects.

- ❑ Establish procedures for the analysis, documentation, and decision for acceptance of high-risk environment items.

STEP 6: Program Manager Approval

The PM should consider the questions in support of ESOH Compliance Reviews:

- ❑ Are ESOH analyses documented in the PESHE?
- ❑ Has legal counsel reviewed ESOH requirements and program activities?
  - ❑ Have domestic laws (Federal, state and local) been analyzed as well as applicable international laws?
  - ❑ Have pending or proposed changes to ESOH statutory requirements been analyzed?
- ❑ Have applicable ESOH requirements been analyzed for developing system requirements for systems that will be used in international territories, in foreign countries, or will be sold abroad. International law is particularly important when overseas fielding locations, tests, or foreign military sales (FMS) are a part of the program. The possible impact of legal requirements on basing and operating locations also requires early and continuing attention. Similarly, if the system is going to be deployed outside the US, the ESOH requirements that are applicable to US forces in the host countries should be considered. Host country requirements should be determined on a country-by-country basis and are governed by the applicable Status of Forces Agreements.
- ❑ Has a clear policy been established requiring that materials or processes incorporated in the design, production, operation or support of the weapon system are reviewed by the ESOH and legal communities?

The following questions are specifically for system ESOH cost analysis purposes.

- ❑ What is the system's environmental quality life cycle cost?
  - ❑ Has it changed since the last milestone review?
  - ❑ If so, how and why?
- ❑ What are the ESOH system cost drivers?
  - ❑ For ESOH cost drivers, can you identify the ESOH costs at the subsystem/component level by Milestone C?
- ❑ What are the ESOH related labor and material costs?
- ❑ Who is responsible for and budgets for the disposal of your system?
  - ❑ Will an estimate of those costs be available at Milestone B review?
- ❑ When you identify an installation(s) needed to support your system during its life cycle, have you identified funding needed for ESOH related costs associated with that support?
  - ❑ What are those costs by fiscal year?
- ❑ Are any modifications/upgrades directly related to ESOH for existing systems?

- ❑ Can ESOH costs be identified for those modifications/upgrades by Milestone C?
- ❑ How does your system's environmental quality life cycle cost compare to analogous systems?
- ❑ Did you analyze the ESOH required depot level costs to support your system and did you get any insight to ESOH related costs and percentages?
  - ❑ If so, what is the result?
- ❑ Have any medical costs been identified for system specific HAZMATs and, considering those costs, have those system specific HAZMATs been prioritized for the purpose of eliminating or minimizing their use?
- ❑ Are you planning for the installations where you are fielding your system to require an emergency response team for ESOH related hazards?
- ❑ How much system ESOH related training must installation personnel receive to handle hazardous materials/wastes from your system?
- ❑ Is there any required staffing of installation safety and civil engineering offices associated with your system?
- ❑ Have you performed ESOH-related trade-off studies?
  - ❑ Are these documented?
- ❑ What ESOH alternatives are being considered and how are they being/were they evaluated?
  - ❑ Do you have any cost/benefit analyses completed or underway on those alternatives?
- ❑ How are environmental, safety, and occupational health (ESOH) issues handled within your program office?
- ❑ What is the demilitarization/disposal plan for your system?

MILESTONE B:
System Development and Demonstration Acquisition Checklist

STEP 1: Form Integrated Process Team

STEP 2: Collect data/information and acquisition documents

- ❑ Review international laws, treaties, and host nation obligations for ESOH requirements that must be met when the system is deployed overseas.
- ❑ Establish ESOH criteria that must be met to support the operations and maintenance of the deployed system.
- ❑ Update the ESOH baseline to reflect any ESOH changes to the following documents or lessons learned/problems.
  - ❑ Program Master Schedule
  - ❑ ESOH budget allocation.
  - ❑ Acquisition Strategy
  - ❑ Mission Needs Statement
  - ❑ Operational Requirements Document (ORD)
  - ❑ Statement of Objectives
  - ❑ Logistics Planning Documents
  - ❑ Facility Planning Guidance Documents
  - ❑ Analysis of Alternatives (AOA)
  - ❑ Test and Evaluation Master Plan (TEMP)
  - ❑ Single Acquisition Management Plan (SAMP)
  - ❑ Cost Analysis Requirements Description (CARD)
  - ❑ ESOH Provisions in Contract Procurement and Management
    - ❑ Instructions to Offerors
    - ❑ Evaluation Factors
    - ❑ Contract Clauses
    - ❑ Statement of Work
    - ❑ Contract Data Requirements List
    - ❑ International Considerations.
  - ❑ Hazardous Materials Management Program (HMMP)
    - ❑ Government
    - ❑ Contractor
  - ❑ System Safety Plan (SSP) – government and contractor
  - ❑ Integrated Master Plan (IMP) – contractor
  - ❑ Overall System Safety and Suitability Evaluation (OSS&E) Plan, including Space Safety planning
  - ❑ NEPA documents.

STEP 3: Evaluate Elements

Safety and Health

A. System Safety:

- ❑ Implement SSPP in a timely/efficient manner.
- ❑ Update system safety requirements.
- ❑ Perform hazard analyses (SHA/O&SHA).
- ❑ Evaluate system design for hazards and safety improvements.
- ❑ Establish test requirements and ensure verification of design.
- ❑ Participate in design reviews.
- ❑ Provide input to manuals, technical orders, emergency procedures.
- ❑ Evaluate mishaps/failures and make recommendations.
- ❑ Review/make input to tradeoff studies.
- ❑ Review drawings/specifications for safety.
- ❑ Identify safety/protective equipment requirements.
- ❑ Provide safety training requirements.
- ❑ Ensure design incorporates system safety.
- ❑ Ensure hazards identified in the CTD phase have been corrected.
- ❑ Evaluate storage, packaging, and handling.
- ❑ Review production plans.
- ❑ Set disposal/demilitarization requirements.
- ❑ Prepare report for milestone review.
- ❑ Tailor requirements for production/deployment.
- ❑ Review logistics support.
- ❑ Expand production analysis requirements.
- ❑ Contractually require in a RFP SOW a System Safety and Occupational Health Program

B. Operational Safety:

- ❑ Review system safety or health hazard assessments for similar systems, with attention given to the causes of accidental losses and injuries to operators and maintainers.
- ❑ Identify and develop controls for projected accident, incident, or personal injury rates for the system.
- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system.
- ❑ Conduct safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health.

C. Explosive Safety:

- ❑ Establish an explosives safety program that ensures munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed.
- ❑ Comply with DoD explosives safety requirements in all acquisition programs that include or support munitions, explosives, or energetics.
- ❑ Evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any

munitions or explosives mishap to optimize the trade-off of munitions reliability against unexploded ordinance liability.

D. Health:

- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system.
- ❑ Conduct safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health.
- ❑ Identify and document personal protective equipment required to operate or maintain the system.
- ❑ Document residual system-related risks.
- ❑ Identify, assess, track, document and resolve health risks.
- ❑ Complete a Health Hazard Assessment(s) been ensuring all health hazards identified, tracked, and resolved?
- ❑ Identify necessary controls for personnel in the system's work place/facilities who may be exposed to physical. Radiological, biological or chemical hazards.

NEPA

- ❑ Develop NEPA compliance schedule for test, training, and operational support sites
- ❑ Investigate NEPA documents with the organizations or elements that will be producing, testing, handling, using, maintaining, storing, and disposing of the system during system life-cycle.
- ❑ Conduct environmental noise signature measurements/acoustic directivity patterns early in this phase.
- ❑ Update risk summary imposed on the program from noncompliance with NEPA - or analysis of ESOH impacts on the human environment.
- ❑ Update and document changes relating to all required NEPA schedule/analyses for this and the next phase.
- ❑ Update, summarize and document:
  - ❑ NEPA documents
  - ❑ NEPA document status
  - ❑ NEPA or Executive Order reference triggering NEPA action
  - ❑ Mitigation plan activities and associated costs (if required)

Environmental Compliance

- ❑ Update system compliance evaluation, specifically addressing:
  - ❑ Federal environmental laws and regulations, not limited to the following:
    - ❑ NEPA 42 U.S.C. 4321-4370d, and implementing instructions
    - ❑ 40 CFR 1500-1508
  - ❑ State environmental laws and regulations
  - ❑ Local environmental laws and regulations
  - ❑ All ESOH Federal Executive Orders, not limited to the following:
    - ❑ E.O 12114
- ❑ Analyze ESOH compliance and update, if necessary, compliance strategy.

- ❑ Update and document compliance review and evaluation considering the entire system life cycle (i.e., development, manufacturing, testing, support, operations, maintenance, and disposal).
- ❑ Update risk assessment for:
  - ❑ Compliance requirements
  - ❑ Impact of the statutory requirements
  - ❑ Appropriate action required, if any.
  - ❑ Mitigation options/status
  - ❑ Total costs
- ❑ Update environmental compliance strategy.
- ❑ Update required environmental permits, to include:
  - ❑ Permit title
  - ❑ Permit holder
  - ❑ Date of permit
  - ❑ Applicable thresholds
- ❑ Update required environmental plans, to include:
  - ❑ Plan title
  - ❑ Author
  - ❑ Date of document/status
  - ❑ Status

Hazardous Materials

- ❑ Contractually require in a RFP SOW a Hazardous Material Management Program to minimize and/or eliminate hazardous materials.
- ❑ Update Hazardous Materials Management program summary for identifying, eliminating or minimizing use, tracking, storing, handling, and disposing of hazardous materials (HAZMATs).
- ❑ Update hazardous materials risks, severity, mitigation options, costs and status.
- ❑ Update status on replacing HAZMATs.
- ❑ Update the Approved Hazardous Material Use List and document the following:
  - ❑ Chemical nomenclature
  - ❑ Tracking mechanism
  - ❑ Storage requirements and considerations.
  - ❑ Handling requirements and considerations.
  - ❑ Disposal requirements and considerations.
  - ❑ Health Hazard Assessment.

Pollution Prevention

- ❑ Contractually require in a RFP SOW a Pollution Prevention Program.
- ❑ Update the plan to investigate non-hazardous materials to replace ODCs and hazardous materials used in or by your system.
- ❑ Update pollution prevention (P2) program activities addressing and/or correcting P2 system deficiencies.
- ❑ Update the projected types and quantities of pollutants to be released to the environment over the life of the system.

- ❑ Update the summary evaluation of the pollution prevention risks, opportunities, mitigation options, costs and status.

STEP 4: Assign Risk Assessment Codes to Each Risk Category Within Each Evaluation Element

See matrix on page 10.

STEP 5: Develop Plan/Mitigation

- ❑ Document ESOH issues in the PESHE.
- ❑ Update the Acquisition Strategy and Support Strategy.
- ❑ Review ESOH considerations with facility managers for planned sites.
- ❑ Provide input to TEMP regarding any unique testing activities for system.
  - ❑ Coordinate test activities for DT&E, OT&E and LFT&E including proper NEPA documentation for each test site
- ❑ Develop preliminary demilitarization and disposal planning documentation.
  - ❑ Ensure the system design allows hazardous materials to be accessed, removed, and safely disposed.
- ❑ Verify compliance with orbital debris mitigation requirements in DoDI 3001.2, Space Support and document in OSS&E plan.
- ❑ Complete assessment to ensure orbital debris will be controlled during normal operations.
- ❑ Complete assessment to ensure debris generated by accidental explosions will be minimized.
- ❑ Complete assessment to minimize probability that space system will become a source of debris due to collisions with man-made objects or micrometeoroids.
  - ❑ Identify collision expected collision rate with small debris and spacecraft design features (e.g. shielding or location of critical spacecraft components) that protect the spacecraft's capability for post-mission disposal in the event of a collision with debris smaller than 1 cm.
  - ❑ If tether systems are to be used, analyze the probability of collision with catalogued objects and small debris for both intact and severed conditions.
- ❑ Complete disposal procedures for launch vehicles components, upper-stage, spacecraft and other payloads at the end of mission life.
- ❑ Identify ESOH source selection criteria. Possible criteria could include:
  - ❑ Identify the formal contractor organization for consideration of ESOH issues.
  - ❑ ESOH performance including implementation of formal hazardous material management and pollution prevention programs.
    - ❑ The methodology for identifying hazardous materials, prioritizing hazardous materials relative to their impact on the program and systematically eliminating the hazardous materials from the program.
    - ❑ Require the integration of ESOH issues in the systems engineering process.
    - ❑ The analysis of the ESOH risks, processes, materials, technology, and risk management.

- ❑ The number, type, kind of alternatives considered for ESOH trade-off studies and analyses.
- ❑ Updates to ESOH risk assessments and risk management.

STEP 6: Program Manager Approval

- ❑ Evaluate proposals.
  - ❑ Has the contractor integrated ESOH using IPPD approach within integrated product teams?
  - ❑ Has the contractor conducted ESOH trade-off studies?
    - ❑ If so, what are the results?
  - ❑ Are the subcontractor/vendor programs for System Safety and Health in accordance with MIL-STD-882D, Hazardous Materials Management, and Pollution Prevention?
  - ❑ Are environment technology transfer plans integrated into the contractor's schedule for TDP development?
  - ❑ Is there requirements for formal hazardous material management and pollution prevention programs.
- ❑ Have ESOH risks been identified and evaluated?
  - ❑ Are there any medium to high risks?
    - ❑ If so, have they been brought to you for decision?
- ❑ Have environment issues and concerns been integrated into program reviews?
- ❑ Review incorporation of the ESOH analysis in decision management documents, trade-off analyses, life-cycle cost analyses, and risk and hazard analyses.

The following questions are specifically for system ESOH cost analysis purposes.

- ❑ What is the system's environmental quality life cycle cost?
  - ❑ Has it changed since the last milestone review?
  - ❑ If so, how and why?
- ❑ What are the ESOH system cost drivers?
  - ❑ For ESOH cost drivers, can you identify the ESOH costs at the subsystem/component level by Milestone C?
- ❑ What are the ESOH related labor and material costs?
- ❑ Who is responsible for and budgets for the disposal of your system?
  - ❑ Will an estimate of those costs be available at Milestone B review?
- ❑ When you identify an installation(s) needed to support your system during its life cycle, have you identified funding needed for ESOH related costs associated with that support?
  - ❑ What are those costs by fiscal year?
- ❑ Are any modifications/upgrades directly related to ESOH for existing systems?
  - ❑ Can ESOH costs be identified for those modifications/upgrades by Milestone C?
- ❑ How does your system's environmental quality life cycle cost compare to analogous systems?

- ❑ Did you analyze the ESOH required depot level costs to support your system and did you get any insight to ESOH related costs and percentages?
  - ❑ If so, what is the result?
- ❑ Have any medical costs been identified for system specific HAZMATs and, considering those costs, have those system specific HAZMATs been prioritized for the purpose of eliminating or minimizing their use?
- ❑ Are you planning for the installations where you are fielding your system to require an emergency response team for ESOH related hazards?
- ❑ How much system ESOH related training must installation personnel receive to handle hazardous materials/wastes from your system?
- ❑ Is there any required staffing of installation safety and civil engineering offices associated with your system?
- ❑ Have you performed ESOH-related trade-off studies?
  - ❑ Are these documented?
- ❑ What ESOH alternatives are being considered and how are they being/were they evaluated?
  - ❑ Do you have any cost/benefit analyses completed or underway on those alternatives?
- ❑ How are environmental, safety, and occupational health (ESOH) issues handled within your program office?
- ❑ What is the demilitarization/disposal plan for your system?

MILESTONE C
Production and Deployment Acquisition Checklist

STEP 1: Form Integrated Process Team

STEP 2: Collect data/information and acquisition documents

- ❑ Review regulatory requirements for planned deployment locations.
- ❑ Ensure that any needed ESOH changes resulting from legislated actions or observations made during production and deployment are being identified, evaluated, and remediated.
- ❑ Update the ESOH baseline to reflect any changes in the following documents or from lessons learned/problems.
  - ❑ Program Master Schedule
  - ❑ ESOH budget allocation.
  - ❑ Acquisition Strategy
  - ❑ Mission Needs Statement
  - ❑ Operational Requirements Document (ORD)
  - ❑ Statement of Objectives
  - ❑ Logistics Planning Documents
  - ❑ Facility Planning Guidance Documents
  - ❑ Analysis of Alternatives (AOA)
  - ❑ Test and Evaluation Master Plan (TEMP)
  - ❑ Single Acquisition Management Plan (SAMP)
  - ❑ Cost Analysis Requirements Description (CARD)
  - ❑ ESOH Provisions in Contract Procurement and Management
    - ❑ Instructions to Offerors
    - ❑ Evaluation Factors
    - ❑ Contract Clauses
    - ❑ Statement of Work
    - ❑ Contract Data Requirements List
    - ❑ International Considerations.
  - ❑ Hazardous Materials Management Program (HMMP)
    - ❑ Government
    - ❑ Contractor
  - ❑ System Safety Plan (SSP) – government and contractor
  - ❑ Integrated Master Plan (IMP) – contractor
  - ❑ Overall System Safety and Suitability Evaluation (OSS&E) Plan
  - ❑ NEPA documents.

STEP 3: Evaluation Elements

Safety and Health

A. System Safety:

- ❑ Monitor system for adequacy of design safety
- ❑ Evaluate design changes to prevent degraded inherent safety
- ❑ Review operations and maintenance pubs for safety information
- ❑ Evaluate mishaps: recommend design changes
- ❑ Review efficiency reports for operator
- ❑ Review disposal of hazardous materials
- ❑ Update SSPP and OSS&E Plan
- ❑ Production line safety for safety control of system
- ❑ Production manuals/procedures have warnings, etc.
- ❑ Verify test and evaluate early production hardware
- ❑ Review procedures for storage, handling, packaging
- ❑ Monitor field inspections; identify critical aging problems
- ❑ Update O&SHA
- ❑ Identify follow-on changes needed
- ❑ Identify critical parts, procedures, facilities inspections
- ❑ Quality control to achieve design during production
- ❑ Identify new hazards from engineering designs
- ❑ Ensure corrective action is taken on new hazards
- ❑ Review test plans for safety

B. Operational Safety:

- ❑ Review system safety or health hazard assessments for similar systems, with attention given to the causes of accidental losses and injuries to operators and maintainers.
- ❑ Do you have projected accident, incident, or personal injury rates for your system? What are those rates and how are they to be controlled?
- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system. Safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health are regulatory requirements.

C. Explosive Safety:

- ❑ Establish and explosives safety program that ensures that munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed.
- ❑ Comply with DoD explosives safety requirements in all acquisition programs that include or support munitions, explosives, or energetics.
- ❑ Evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap to optimize the trade-off of munitions reliability against unexploded ordinance liability.

D. Health:

- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system.

- ❑ Identify and document personal protective equipment required to operate or maintain the system.
- ❑ Document residual system-related risks.
- ❑ Identify, assess, track, document and resolve health risks.
- ❑ Complete a Health Hazard Assessment(s) and ensure all health hazards have been identified, tracked, and resolved.
- ❑ Identify necessary controls for personnel in the system's work place/facilities who may be exposed to physical, radiological, biological or chemical hazards.

NEPA

- ❑ NEPA analyses should concentrate on issues and concerns that impact ESOH during testing, deployment, training, maintenance, and disposal. The analyses should be coordinated with the organizations or elements responsible for handling, testing, using, maintaining, storing, or disposing of the system during system life cycle.
- ❑ Develop NEPA compliance schedule for test, training, installation and operational support and disposal sites.
- ❑ Update identified risks imposed on the program from noncompliance with NEPA - or analysis of ESOH impacts on the human environment.
- ❑ Update and document changes/status of all required NEPA schedule/analyses for this and the next phase.
- ❑ Update and summarize and document:
  - ❑ NEPA documents
  - ❑ NEPA document status
  - ❑ NEPA or Executive Order reference triggering NEPA action
  - ❑ Mitigation plan activities and associated costs (if required)

Environmental Compliance

- ❑ Update system compliance evaluation, specifically addressing:
  - ❑ Federal environmental laws and regulations, not limited to the following:
    - ❑ NEPA 42 U.S.C. 4321-4370d, and implementing instructions
    - ❑ 40 CFR 1500-1508
  - ❑ State environmental laws and regulations
  - ❑ Local environmental laws and regulations
  - ❑ All ESOH Federal Executive Orders, not limited to the following:
    - ❑ E.O 12114
- ❑ Analyze ESOH compliance and update, if necessary, compliance strategy.
- ❑ Update and document compliance review and evaluation considering the entire system life cycle (i.e., development, manufacturing, testing, support, operations, maintenance, and disposal).
- ❑ Update risk assessment for:
  - ❑ Compliance requirements
  - ❑ Impact of the statutory requirements
  - ❑ Appropriate action required, if any.
  - ❑ Mitigation options/status
  - ❑ Total costs

- ❑ Update environmental compliance strategy.
- ❑ Update required environmental permits, to include:
  - ❑ Permit title
  - ❑ Permit holder
  - ❑ Date of permit
  - ❑ Applicable thresholds
- ❑ Update required environmental plans, to include:
  - ❑ Plan title
  - ❑ Author
  - ❑ Date of document/status
  - ❑ Status

Hazardous Materials

- ❑ Identify and plan for ESOH training for hazardous material handling, protective equipment and hazardous waste disposal.
- ❑ Identify requirements for personal protection and disaster response equipment associated with approved hazardous materials.
  - ❑ Include personal protection and disaster response equipment in the supply and support equipment elements of the Support Strategy.
- ❑ Update Hazardous Materials Management program summary for identifying, eliminating or minimizing use, tracking, storing, handling, and disposing of hazardous materials (HAZMATs).
- ❑ Update hazardous materials risks, severity, mitigation options, costs and status.
- ❑ Update status on replacing HAZMATs.
- ❑ Update the Approved Hazardous Material Use List and document the following:
  - ❑ Chemical nomenclature
  - ❑ Tracking mechanism
  - ❑ Storage requirements and considerations.
  - ❑ Handling requirements and considerations.
  - ❑ Disposal requirements and considerations.
  - ❑ Health Hazard Assessment.

Pollution Prevention

- ❑ Update the plan to investigate non-hazardous materials to replace ODCs and hazardous materials used in or by your system.
- ❑ Update pollution prevention (P2) program activities addressing and/or correcting P2 system deficiencies.
- ❑ Update the projected types and quantities of pollutants to be released to the environment over the life of the system.
- ❑ Update the summary evaluation of the pollution prevention risks, opportunities, mitigation options, costs and status.

STEP 4: Assign Risk Assessment Codes to Each Risk Category Within Each Evaluation Element

See matrix on page 10.

STEP 5: Develop Plan/Mitigation

- ❑ Update ESOH issues in the PESHE.
- ❑ Update the Acquisition Strategy, Support Strategy.
- ❑ Report on the results of ESOH trade-off studies.
- ❑ Review ESOH considerations with facility managers for planned sites
- ❑ Ensure that precautionary and warning information for manuals, training documents, technical orders or manuals, and other instructional material associated with the system are being planned either by contract or in-house.
- ❑ Provide input to Training Plan and deployment planning regarding ESOH issues.
- ❑ Update preliminary demilitarization and disposal planning.
- ❑ Identify ESOH source selection criteria. Possible criteria could include:
  - ❑ Identification of the formal contractor for the consideration of ESOH issues.
  - ❑ ESOH performance including implementation of formal hazardous material management and pollution prevention programs.
  - ❑ The methodology for identifying hazardous materials, prioritizing hazardous materials relative to their impact on the program and systematically eliminating the hazardous materials from the program.
  - ❑ Require the integration of ESOH issues in the systems engineering process.
  - ❑ The analysis of the ESOH risks, processes, materials, technology, and risk management. The establishment of software resources for tracking hazardous materials incorporated in design.
  - ❑ The number, type, kind of alternatives for ESOH trade-off studies and analyses.
  - ❑ Updates to ESOH risk assessments and risk management.
  - ❑ Plans for contractor logistics support during system sustainment.
- ❑ Evaluate proposals.
  - ❑ Evaluate contractor's integration of the ESOH using IPPD approach within integrated product teams.
  - ❑ ESOH trade-off studies and results.
  - ❑ Evaluate training needs and expert resources.
  - ❑ Subcontractor/vendor programs for System Safety and Health in accordance with MIL-STD-882D, HMMP, and Pollution Prevention.
  - ❑ Environment technology transfer plans (associated with and integrated into the contractor's schedule for TDP development).
  - ❑ ESOH risk management.
  - ❑ Integration of environment issues and concerns into program reviews.
  - ❑ ESOH performance including implementation of formal hazardous material management and pollution prevention programs. Review incorporation of the ESOH analysis in decision management documents, trade-off analyses, life-cycle cost analyses, and risk and hazard analyses.

STEP 6: Program Manager Approval

- ❑ Review exit criteria for Low Rate Initial Production (LRIP) and full rate production capability.

The PM should consider the questions in support of ESOH Compliance Reviews:

- ❑ Have ESOH evaluations, risks, mitigations been updated since the last review?
- ❑ Has SMC/JA reviewed ESOH requirements/program activities since the last update?
  - ❑ Have any changes to domestic laws (Federal, state and local) been analyzed as well as applicable international laws since the last update?
  - ❑ Have any new pending or proposed changes to ESOH statutory requirements been analyzed since the last update?
- ❑ Analyze the applicable ESOH requirements for developing system requirements for systems that will be used in international territories, in foreign countries, or will be sold abroad. International law is particularly important when overseas fielding locations, tests, or foreign military sales (FMS) are a part of the program. The possible impact of legal requirements on basing and operating locations also requires early and continuing attention. Similarly, if the Service is going to deploy the system outside the US, the ESOH requirements that are applicable to US forces in the host countries should be considered. Host country requirements should be determined on a country-by-country basis and are governed by the applicable Status of Forces Agreements.

The following questions are specifically for system ESOH cost analysis purposes.

- ❑ What is the system's environmental quality life cycle cost?
  - ❑ Has it changed since the last milestone review?
  - ❑ If so, how and why?
- ❑ What is the ESOH system cost drivers?
  - ❑ Identify the ESOH costs at the subsystem/component level.
- ❑ What are the ESOH related labor and material costs?
- ❑ Who is responsible for and budgets for the disposal of your system?
  - ❑ Update the estimate of those costs provided at the Milestone B review.
- ❑ When you identify an installation(s) needed to support your system during its life cycle, have you identified funding needed for ESOH related costs associated with that support?
  - ❑ What are those costs by fiscal year?
- ❑ Are any modifications/upgrades directly related to ESOH for existing systems?
  - ❑ Identified those modifications/upgrades.
- ❑ How does your system's environmental quality life cycle cost compare to analogous systems?
- ❑ Did you analyze the ESOH required depot level costs to support your system and did you get any insight to ESOH related costs and percentages?
  - ❑ If so, what is the result?

- ❑ Have any medical costs been identified for system specific HAZMATs and, considering those costs, have those system specific HAZMATs been prioritized for the purpose of eliminating or minimizing their use?
- ❑ Are you planning for the installations where you are fielding your system to require an emergency response team for ESOH related hazards?
- ❑ How much system ESOH related training must installation personnel receive to handle hazardous materials/wastes from your system?
- ❑ Is there any required staffing of installation safety and civil engineering offices associated with your system?
- ❑ Have you performed ESOH-related trade-off studies?
  - ❑ Are these documented?
- ❑ What ESOH alternatives are being considered and how are they being/were they evaluated?
  - ❑ Do you have any cost/benefit analyses completed or underway on those alternatives?
- ❑ How are environmental, safety, and occupational health (ESOH) issues handled within your program office?
- ❑ What is the demilitarization/disposal plan for your system?

MILESTONE C "Continue"
Sustainment and Disposal Acquisition Checklist

STEP 1: Form Integrated Process Team

STEP 2: Collect data/information and acquisition documents

- ❑ Review statutory requirements for planned deployment locations. Ensure that any needed ESOH changes resulting from legislated actions or observations made during production and deployment are being identified, evaluated, and remediated.
- ❑ Update the ESOH baseline to reflect any changes in the following documents or from lessons learned/problems.
  - ❑ Program Master Schedule
  - ❑ ESOH budget allocation.
  - ❑ Acquisition Strategy
  - ❑ Mission Needs Statement
  - ❑ Operational Requirements Document (ORD)
  - ❑ Statement of Objectives
  - ❑ Logistics Planning Documents
  - ❑ Facility Planning Guidance Documents
  - ❑ Analysis of Alternatives (AOA)
  - ❑ Test and Evaluation Master Plan (TEMP)
  - ❑ Single Acquisition Management Plan (SAMP)
  - ❑ Cost Analysis Requirements Description (CARD)
  - ❑ ESOH Provisions in Contract Procurement and Management
    - ❑ Instructions to Offerors
    - ❑ Evaluation Factors
    - ❑ Contract Clauses
    - ❑ Statement of Work
    - ❑ Contract Data Requirements List
    - ❑ International Considerations.
  - ❑ Hazardous Materials Management Program (HMMP)
    - ❑ Government
    - ❑ Contractor
  - ❑ System Safety Plan (SSP) – government and contractor
  - ❑ Integrated Master Plan (IMP) – contractor
  - ❑ Overall System Safety and Suitability Evaluation (OSS&E) Plan
  - ❑ NEPA documents.

STEP 3: Evaluation Elements

Safety and Health

A. System Safety:

- ❑ Monitor system for adequacy of design safety
- ❑ Evaluate design changes to prevent degraded inherent safety
- ❑ Review operations and maintenance pubs for safety information
- ❑ Evaluate mishaps: recommend design changes
- ❑ Review efficiency reports for operator
- ❑ Review disposal of hazardous materials
- ❑ Update SSPP
- ❑ Production line safety for safety control of system
- ❑ Production manuals/procedures have warnings, etc.
- ❑ Verify test and evaluate early production hardware
- ❑ Review procedures for storage, handling, packaging
- ❑ Monitor field inspections; identify critical aging problems
- ❑ Update O&SHA
- ❑ Identify follow-on changes needed
- ❑ Identify critical parts, procedures, facilities inspections
- ❑ Quality control to achieve design during production
- ❑ Identify new hazards from engineering designs
- ❑ Ensure corrective action is taken on new hazards
- ❑ Review test plans for safety
- ❑ Ensure corrective action is taken on system disposal hazards
- ❑ Personnel training/protective equipment
- ❑ Site selection
- ❑ Disposal methods
- ❑ Quantity/quality of material
- ❑ Solids/liquids disposal

B. Operational Safety:

- ❑ Review system safety or health hazard assessments for similar systems, with attention given to the causes of accidental losses and injuries to operators and maintainers.
- ❑ Do you have projected accident, incident, or personal injury rates for your system? What are those rates and how are they to be controlled?
- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system. Safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health are regulatory requirements.

C. Explosive Safety:

- ❑ Establish and explosives safety program that ensures that munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed.
- ❑ Comply with DoD explosives safety requirements in all acquisition programs that include or support munitions, explosives, or energetics.

- ❑ Evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap to optimize the trade-off of munitions reliability against unexploded ordinance liability.

D. Health:

- ❑ Identify regulatory requirements in the area of safety and human health as a result of design, operation, test, maintenance, operations and disposal of the system. Safety and health analysis of system safety and occupational health hazards to identify, mitigate and manage safety and occupational health are regulatory requirements.
- ❑ Is personal protective equipment required to operate or maintain the system? How is it identified and documented?
- ❑ How are residual system-related risks been documented?
- ❑ Have health risks been identified, assessed, tracked, documented and resolved?
- ❑ Has a Health Hazard Assessment(s) been completed and all health hazards identified, tracked, and resolved?
- ❑ Are personnel in the system's work place/facilities to be exposed to physical. Radiological, biological or chemical hazards? If so, are necessary controls identified?

NEPA

- ❑ NEPA analyses should concentrate on issues and concerns that impact the ESOH issues during deployment including follow-on operational test and evaluation (FOT&E), maintenance, and disposal. The analyses should be coordinated with the organizations or elements responsible for handling, testing, using, maintaining, storing, or disposing of the system during system life-cycle.
- ❑ Develop NEPA compliance schedule for any follow-on test, follow-on training, installation and operational support and disposal sites.
- ❑ Update identified risks imposed on the program from noncompliance with NEPA or analysis of ESOH impacts on the human environment.
- ❑ Update and document all required NEPA schedule/analyses.
- ❑ Update, summarize and document:
  - ❑ NEPA documents
  - ❑ NEPA document status
  - ❑ NEPA or Executive Order reference triggering NEPA action
  - ❑ Mitigation plan activities and associated costs (if required)

Environmental Compliance

- ❑ Update system compliance evaluation, specifically addressing:
  - ❑ Federal environmental laws and regulations, not limited to the following:
    - ❑ NEPA 42 U.S.C. 4321-4370d, and implementing instructions
    - ❑ 40 CFR 1500-1508
  - ❑ State environmental laws and regulations
  - ❑ Local environmental laws and regulations
  - ❑ All ESOH Federal Executive Orders, not limited to the following:

- ❑ E.O 12114
- ❑ Analyze ESOH compliance and update, if necessary, compliance strategy.
- ❑ Update and document compliance review and evaluation considering the entire system life cycle (i.e., development, manufacturing, testing, support, operations, maintenance, and disposal).
- ❑ Update risk assessment for:
  - ❑ Compliance requirements
  - ❑ Impact of the statutory requirements
  - ❑ Appropriate action required, if any.
  - ❑ Mitigation options/status
  - ❑ Total costs
- ❑ Update environmental compliance strategy.
- ❑ Update required environmental permits, to include:
  - ❑ Permit title
  - ❑ Permit holder
  - ❑ Date of permit
  - ❑ Applicable thresholds
- ❑ Update required environmental plans, to include:
  - ❑ Plan title
  - ❑ Author
  - ❑ Date of document/status
  - ❑ Status

Hazardous Materials

- ❑ Ensure that any requirements for environment permits, and ESOH training for hazardous material handling, protective equipment and hazardous waste disposal have been identified and are being planned.
- ❑ Ensure that procedures are being developed and will be in place for review of the system hazardous material authorized use list.
- ❑ Update the plan for ESOH training for hazardous material handling, protective equipment and hazardous waste disposal.
- ❑ Update requirements for personal protection and disaster response equipment associated with approved hazardous materials.
  - ❑ Include personal protection and disaster response equipment in the supply and support equipment elements of the Support Strategy.
- ❑ Update Hazardous Materials Management program summary for identifying, eliminating or minimizing use, tracking, storing, handling, and disposing of hazardous materials (HAZMATs).
- ❑ Update hazardous materials risks, severity, mitigation options, costs and status.
- ❑ Update status on replacing HAZMATs.
- ❑ Update the Approved Hazardous Material Use List and document the following:
  - ❑ Chemical nomenclature
  - ❑ Tracking mechanism
  - ❑ Storage requirements and considerations.
  - ❑ Handling requirements and considerations.

- ❑ Disposal requirements and considerations.
- ❑ Health Hazard Assessment.

❑ Establish software resources for tracking hazardous materials used in or by the system incorporated in production.

Pollution Prevention

❑ Update the plan to investigate non-hazardous materials to replace ODCs and hazardous materials used in or by your system.
❑ Update pollution prevention (P2) program activities addressing and/or correcting P2 system deficiencies.
❑ Update the projected types and quantities of pollutants to be released to the environment over the life of the system.
❑ Update the summary evaluation of the pollution prevention risks, opportunities, mitigation options, costs and status.

STEP 4: Assign Risk Assessment Codes to Each Risk Category Within Each Evaluation Element

See matrix at Page 10.

STEP 5: Develop Plan/Mitigation

❑ Update ESOH issues in the PESHE.
❑ Update the SS. Include demilitarization and disposal in the AS, SS
❑ Ensure that precautionary and warning information for manuals, training documents, technical orders or manuals, and other instructional material associated with the system are being planned either by contract or in-house.
❑ Update demilitarization and disposal planning, including space system disposal planning. Coordinate demilitarization and disposal requirements with Defense Reutilization and Management Office (DRMO)
❑ Establish Contractor Logistics Support or Contractor Maintenance Support prior to or in place of full organic capability
❑ Evaluate proposals.
- ❑ Evaluate contractor's integration of the ESOH using IPPD approach within integrated product teams.
- ❑ ESOH trade-off studies and results for block upgrades, modifications or pre-planned product improvements.
- ❑ ESOH risk management.
- ❑ Integration of environment issues and concerns into program reviews.
- ❑ ESOH performance including implementation of formal hazardous material management and pollution prevention programs.
- ❑ Evaluate supply support capacity, lead time, and handling of Hazardous Materials and Wastes for ESOH issues
- ❑ Report on environment technology associated with pre-planned product improvement efforts.

STEP 6: Program Manager Approval

- ❑ Coordinate material release at IOC to user activities.

The PM should consider the questions in support of ESOH Compliance Reviews:

- ❑ Have you documented ESOH analyses in the PESHE?
- ❑ Use legal counsel to periodically review ESOH requirements and program activities. Domestic laws (Federal, state and local) must be analyzed as well as applicable international laws. Importantly, the PM should use expertise from the DoD and Service legal community to keep abreast of pending or proposed changes to ESOH statutory requirements.
- ❑ Analyze the applicable ESOH requirements for developing system requirements for systems that will be used in international territories, in foreign countries, or will be sold abroad. International law is particularly important when overseas fielding locations, tests, or foreign military sales (FMS) are a part of the program. The possible impact of legal requirements on basing and operating locations also requires early and continuing attention. Similarly, if the Service is going to deploy the system outside the US, the ESOH requirements that are applicable to US forces in the host countries should be considered. Host country requirements should be determined on a country-by-country basis and are governed by the applicable Status of Forces Agreements.
- ❑ Establish a clear policy requiring that materials or processes incorporated in the design, production, operation or support of the weapon system are reviewed by the ESOH and legal communities.

The following questions are specifically for system ESOH cost analysis purposes.

- ❑ What is the system's environmental quality life cycle cost? Has it changed since the last milestone review? If so, how and why?
- ❑ What are the ESOH system cost drivers? For ESOH cost drivers, can you identify the ESOH costs at the subsystem/component level by Milestone C?
- ❑ What are the ESOH related labor and material costs?
- ❑ Who is responsible for and budgets for the disposal of your system when it is ready? Will an estimate of those costs be available at Milestone B review?
- ❑ When you identify an installation(s) needed to support your system during its life cycle, have you identified funding needed for ESOH related costs associated with that support? What are those costs by fiscal year?
- ❑ Are any modifications/upgrades directly related to ESOH for existing systems? Can the ESOH costs be identified for those modifications/upgrades by Milestone C?
- ❑ How does your system's environmental quality life cycle cost compare to analogous systems?
- ❑ Did you analyze the ESOH required depot level costs to support your system and did you get any insight to ESOH related costs and percentages? If so, what is the result?

- ❑ Have any medical costs been identified for system specific HAZMATs and, considering those costs, have those system specific HAZMATs been prioritized for the purpose of eliminating or minimizing their use?
- ❑ Are you planning for the installations where you are fielding your system to require an emergency response team for ESOH related hazards?
- ❑ How much system ESOH related training must installation personnel receive to handle hazardous materials/wastes from your system?
- ❑ Is there any required staffing of installation safety and civil engineering offices associated with your system?
- ❑ Have you performed ESOH-related trade-off studies? Are these documented?
- ❑ What ESOH alternatives are being considered and how are they being/were they evaluated? Do you have any cost/benefit analyses completed or underway on those alternatives?
- ❑ How are you planning to handle environmental quality, safety, and occupational health (ESOH) issues within your office?

TEST AND EVALUATION

Planning for development, operational, live fire and follow-on testing and evaluation should address the following:

- ❑ Plan and perform NEPA analysis for test activities during:
  - ❑ DT&E
  - ❑ OT&E
  - ❑ LFT&E
  - ❑ FOT&E
- ❑ Assess and document in the Test and Evaluation Master Plan (TEMP) the ESOH impact (air, water, noise, natural resources, etc) of:
  - ❑ Testing
  - ❑ Operation
  - ❑ Maintenance
  - ❑ Disposal
- ❑ Include in the TEMP any safety or health issues during DT&E, OT&E, LFT&E and FOT&E that require:
  - ❑ Unique training
  - ❑ Workarounds
  - ❑ Personal protective equipment?
- ❑ Include in the TEMP provisions to collect relevant health and safety data for definitive evaluation?
- ❑ Include environmental processes in the master schedule?
- ❑ Include environmental requirements in the budget, not limited to:
  - ❑ NEPA
  - ❑ PESHE
  - ❑ Permits

APPENDIX 1
PESHE REQUIREMENTS DOCUMENTS

FEDERAL LAWS

15 USC 2601-2671	Toxic Substances Control Act of 1976 (TSCA)
16 USC 470 et seq.	National Historic Preservation Act of 1966
16 USC 470aa, et seq.	Archaeological Resources Protection Act of 1979
16 USC 661 et seq.	Fish and Wildlife Coordination Act
16 USC 670a-670o	Sikes Act of 1960
16 USC 703-712	Migratory Bird Treaty Act of 1918
16 USC 1361-1407	Marine Mammal Protection Act of 1972
16 USC 1001 et seq.	Watershed Protection and Flood Prevention Act (WPFPA)
16 USC 1451-1464	Coastal Zone Management Act of 1972
16 USC 1531 et seq.	Endangered Species Act of 1973
16 USC 3101-3233	Alaska National Interest Lands Conservation Act of 1980
16 USC 3501 et seq.	Coastal Barrier Resources Act (1988), reauthorized as Coastal Barrier Improvement Act of 1990
16 USC 3501 et seq.	Coastal Wetlands Planning, Protection, and Restoration Act (1988)
16 USC 4401-4412	North American Wetlands Conservation Act (1989)
16 USC 4901 et seq.	Wild Bird Conservation Act of 1992
25 USC 3001-3013	Native American Grave Protection & Repatriation Act of 1990
29 USC 651-678	Occupational Safety and Health Act of 1970
33 USC 1251-1376	Clean Water Act of 1977, as Amended (CWA)
33 USC 2702 to 2761	Oil Pollution Act of 1990 (OPA)
42 USC 300f et seq.,	Safe Drinking Water Act of 1974 (SDWA)
	6939b; 15 USC 1261 et seq.
42 USC 4321-4347	National Environmental Policy Act of 1969, as amended
42 USC 4901	Noise Control Act of 1972
42 USC 6961, 6927(c)	Federal Facilities Compliance Act of 1992
42 USC 6901 et seq.	Resource Conservation and Recovery Act of 1976
42 USC 7401-7671g	Clean Air Act of 1970 (CAA), as amended by the Clean Air Act Amendments of 1990 (CAAA)
42 USC 7412(r)	Chemical Safety Information, Site Security and Fuels Regulatory Relief Act (Public Law 106-40, amendment to Section 112(r) of the CAA)
42 USC 9620	Community Environmental Response Facilitation Act of 1992 (CERFA)
42 USC 9601-9675	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments Reauthorization Act of 1986 (SARA)
42 USC 11001-11050	Emergency Planning and Community Right-to-Know Act of 1986

42 USC 13101-13109	Pollution Prevention Act of 1990
49 USC 5101 et seq.	Hazardous Materials Transportation Authorization Act of 1994

FEDERAL REGULATIONS

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Occupational Safety and Health Standards for Construction
29 CFR 1960	Department of Labor Regulations on Federal Employee Occupational Safety and Health Programs
40 CFR	Protection of Environment (Various Sections)
49 CFR	Transportation (Various Sections)

EXECUTIVE ORDERS

EO 11514	Protection and Enhancement of Environmental Quality, as amended by EO 11991
EO 11593	Protection and Enhancement of the Cultural Environment
EO 11644	Use of Off-Road Vehicles on the Public Lands (as amended by EO 11989 and EO 12608)
EO 11738	Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contract, Grants, or Loans
EO 11912	Delegation of Authorities Relating to Energy Policy and Conservation
EO 11988	Floodplain Management
EO 11990	Protection of Wetlands
EO 12088	Federal Compliance with Pollution Control Standards, as amended by EO 12580
EO 12114	Environmental Effects Abroad of Major Federal Actions
EO 12196	Occupational Safety and Health Programs for Federal Employees, as amended by EO 12223, EO 12608, and EO 13062
EO 12777	Implementation of Section 311 of the Federal Water Pollution Control Act of October 18, 1972, as Amended, and the Oil Pollution Act of 1990
EO 12898	Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, as amended by EO 12948
EO 12902	Energy Efficiency and Water Conservation at Federal Facilities
EO 13031	Federal Alternative Fueled Vehicle Leadership
EO 13045	Protection of Children from Environmental Health Risks and Safety Risks

EO 13084	Consultation and Coordination with Indian Tribal Governments
EO 13089	Coral Reef Protection
EO 13101	Greening the Government through Waste Prevention, Recycling, and Federal Acquisition
EO 13123	Greening the Government through Efficient Energy Management
EO 13148	Greening the Government through Leadership in Environmental Management
EO 13158	Marine Protected Areas

DOD REGULATIONS, DIRECTIVES, INSTRUCTIONS

DOD 4140.1-R	Department of Defense Materiel Management Regulation
DOD 4145.26-M	Department of Defense Contractor's Safety Manual for Ammunition and Explosives
DOD 4715.5-G	Overseas Environmental Baseline Guidance Document
DOD 5000.4-M	Department of Defense Cost Analysis Guidance and Procedures
DOD 5000.2-R	Mandatory Procedures for Major Defense Acquisition Programs and Major Automated Information System Acquisition Programs
DOD 6055.9-STD	Ammunition and Explosives Safety Standards
DODD 3200.11	Major Range and Test Facility Base (MRTFB)
DODD 4700.4	Natural Resource Management Program
DODD 4710.1	Archeological and Historic Resources Management
DODD 4715.1	Environmental Security
DODD 4715.11	Environmental and Explosive Safety Management on Department of Defense Active and Inactive Ranges within the United States
DODD 4715.12	Environmental and Explosive Safety Management on Department of Defense Active and Inactive Ranges outside the United States
DODD 5000.1	Defense Acquisition
DODD 5030.41	Oil and Hazardous Substances Pollution Prevention and Contingency Program
DODD 6050.7	Environmental Effects Abroad of Major Department of Defense Actions
DODD 6055.9	DOD Explosives Safety Board (DDESB) and DOD Component Explosives Safety Responsibilities
DODD 6055.11	Protection of DOD Personnel from Exposure to Radio-Frequency Radiation and Military Exempt Lasers
DODI 3001.2	Space Support
DODI 3030.2	Community Planning and Impact Assistance

DODI 4145.26	Department of Defense Contractor's Safety Requirements for Ammunition and Explosives
DODI 4150.7	DOD Pest Management Program
DODI 4170.10	Energy Management Policy
DODI 4715.2	DOD Regional Environmental Coordination
DODI 4715.3	Environmental Conservation Program
DODI 4715.4	Pollution Prevention
DODI 4715.5	Management of Environmental Compliance at Overseas Installations
DODI 4715.6	Environmental Compliance
DODI 4715.7	Environmental Restoration Program
DODI 4715.9	Environmental Planning & Analysis
DODI 4715.10	Environmental Education, Training and Career Development
DODI 6050.5	DOD Hazard Communication Program
DODI 6055.1	DOD Safety & Occupational Health (SOH) Program
DODI 6055.5	Industrial Hygiene and Occupational Health
DODI 6055.7	Mishap Investigation, Reporting, and Record Keeping
DODI 6055.8	Occupational Radiation Protection Program
DODI 6055.11	Protection of DOD Personnel from Exposure to Radio Frequency (RF) Radiation
DODI 6055.14	Unexploded Ordnance (UXO) Safety on Ranges
MIL-STD-882D	Department of Defense Standard Practice For System Safety
MIL-STD-2105	Hazard Assessment Tests for Non-Nuclear Munitions
MIL-HDBK-454	General Guidelines to Electronic Equipment
AMCR-700-107	Preparation of Standing Operating Procedures (SOP) for Ammunition Operations
REC Standard 319-92	Range Commander Council Standard
TB 700-2	Department of Defense Explosives Hazard Classification Procedures
TB MED 523	Control of Hazards to Health from Microwave and Radio Frequency Radiation and Ultrasound
TD 705-938, Rev C	Safety for Non-Nuclear Weapons

BMDO DIRECTIVES

BMDO Directive 6050	Environmental, Safety, and Health Program Management for BMDO Acquisition Activities

FINAL GOVERNING STANDARDS

Standards Governing Environmental Protection for U.S. Installations in Greenland
Standards Governing Environmental Protection for U.S. Installations in the United Kingdom

SERVICE REGULATIONS

JOINT REGULATIONS

AFJM 24-204/TM 38-250/NAVSUP PUB 505/MCO P4030.19G/DLAI 4145.3: Preparing Hazardous Materials for Military Air Shipments

AR 75-14/OPNAVINST 8027.1G/MCO 8027.1D/AFI 32-3002: Interservice Support Responsibilities for Explosive Ordnance Disposal

AR 700-143/DLAD 4145.41/AFJI 24-201/NAVSUPINST 4030.55A/MCO P4030.40A: Packaging Of Hazardous Material

AR 740-32/OPNAVINST 8070.1B/AFR 136-4/MCO 4030.25B: Responsibilities for Technical Escort of Dangerous Materials

DLAI 4145.11/TM 38-410/NAVSUP PUB 573/AFJMAN 23-209/MCO 4450.12A/DLSC-LDD: Storage and Handling of Hazardous Materials

DAPAM 405-1/AFJI 32-9006: Army and Air Force Basic Real Estate Agreements

AIR FORCE

AFI 32-1052	Facility Asbestos Management
AFI 32-1053	Pest Management Program
AFI 32-3001	Explosive Ordnance Disposal Program
AFI 32-4002	Hazardous Material Emergency Planning and Response Program
AFI 32-7001	Environmental Budgeting
AFI 32-7006	Environmental Program in Foreign Countries
AFI 32-7020	The Environmental Restoration Program
AFI 32-7040	Air Quality Compliance
AFI 32-7041	Water Quality Compliance
AFI 32-7042	Solid and Hazardous Waste Compliance
AFI 32-7044	Storage Tank Compliance
AFI 32-7045	Environmental Compliance Assessment and Management Program (ECAMP)
AFI 32-7047	Compliance Tracking and Reporting
AFI 32-7060	Interagency and Intergovernmental Coordination for Environmental Planning
AFI 32-7061	The Environmental Impact Analysis Process
AFI 32-7062	Air Force Comprehensive Planning
AFI 32-7063	Air Installation Compatible Use Zone Program
AFI 32-7064	Integrated Natural Resources Management
AFI 32-7065	Cultural Resources Management
AFI 32-7066	Environmental Baseline Surveys in Real Estate Transactions
AFI 32-7080	Pollution Prevention Program
AFI 32-7086	Hazardous Materials Management
AFI 32-9003	Granting Temporary Use of Air Force Real Property
AFI 91-202	The U.S. Air Force Mishap Prevention Program
AFI 91-204	Safety Investigations and Reports
AFI 91-205	Non-Nuclear Munitions Safety Board

AFI 91-213	Operational Risk Management (ORM) Program
AFI 91-301	Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program
AFI 91-302	Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Standards
AFMAN 32-4013	Hazardous Material Emergency Planning and Response Guide
AFMAN 91-201	Explosives Safety Standards
AFPAM 32-7043	Hazardous Waste Management Guide
AFPAM 91-210	Contract Safety
AFPD 32-30	Explosive Ordnance Disposal
AFPD 32-70	Environmental Quality
AFPD 32-90	Real Property Management
AFPD 91-2	Safety Programs
AFPD 91-3	Occupational Safety and Health
AFOSHSTD 48-8	Controlling Exposures to Hazardous Materials
AFOSHSTD 48-9	Radio-Frequency Radiation Safety Program
AFOSHSTD 48-21	Hazard Communication
AFOSHSTD 91-25	Confined Spaces
AFOSHSTD 91-31	Personal Protective Equipment
AFOSHSTD 91-32	Emergency Shower and Eyewash Units
AFOSHSTD 91-38	Hydrocarbon Fuels-- General
AFOSHSTD 91-43	Flammable and Combustible Liquids
AFOSHSTD 91-56	Fire Protection and Prevention
AFOSHSTD 91-66	General Industrial Operations
AFOSHSTD 91-67	Liquid Nitrogen and Oxygen Safety
AFOSHSTD 91-68	Chemical Safety
AFOSHSTD 91-119	Process Safety Management (PSM) Of Highly Hazardous Chemicals

Appendix 2

List of Hazardous Chemicals

CLASS 1 ODS

Chlorofluorocarbon (CFC)-11	CFC-12
CFC-13	CFC-111
CFC-112	CFC-113
CFC-114	CFC-115
CFC-211	CFC-212
CFC-213	CFC-214
CFC-215	CFC-216
CFC-217	CFC-500 (Refrigerant)
CFC-502 (Refrigerant)	Halon-1011 (fire suppressant)
Halon-1202 (fire suppressant)	Halon-1211 (fire suppressant)
Halon-1301 (fire suppressant)	Halon-2402 (vector control on some missiles)
Methyl Bromide (fumigant)	Methyl chloroform (solvent)
Carbon Tetrachloride (CFC-10)	

CLASS II ODS

Hydrochlorofluorocarbon (HCFC)-21	HCFC-22
HCFC-31	HCFC-121
HCFC-122	HCFC-123
HCFC-123b	HCFC-124
HCFC-124b	HCFC-131
HCFC-132	HCFC-133
HCFC-141	HCFC-141b
HCFC-142	HCFC-142b
HCFC-151	HCFC-221
HCFC-222	HCFC-223
HCFC-224	HCFC-225
HCFC-225ca	HCFC-225cb
HCFC-226	HCFC-231
HCFC-232	HCFC-233
HCFC-234	HCFC-235
HCFC-241	HCFC-242
HCFC-243	HCFC-244
HCFC-251	HCFC-252
HCFC-253	HCFC-261
HCFC-262	HCFC-271

AFMC 24 HAZARDOUS CHEMICALS

Ammonia	CFC-11
CFC-113	CFC-12
Chlorine	Chromium
Ethylene Glycol	Glycol Ethers
HCFC-22	Lead
Methyl Ethyl Ketone (MEK)	Methanol
Methylene Chloride	Methyl Isobutyl Butyl Ketone (MIBK)
Nickel	Nitric Acid
Perchloroethylene	Phenol
Phosphoric Acid	Potassium Ferricyanide
Toluene	Xylene
Zinc	1, 1, 1-Trichloroethane