



**The Department of Defense
Executive Order 13423:
Agency-Level Toxic and Hazardous
Chemicals Reduction Plan**

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SUMMARY

This Department of Defense (DoD) Executive Order (EO) 13423: Agency-Level Toxic and Hazardous Chemicals Reduction Plan (“the Plan”) depicts the DoD programs, initiatives, and actions necessary to reduce procurement, use, release and disposal of toxic and hazardous chemicals under EO 13423, “Strengthening Federal Environmental, Energy, and Transportation Management”. The Plan strives to clarify the Department’s (1) current status and (2) planned next steps with regard to chemical management, both needed to ensure successful implementation of the EO. The current situation is characterized and best practices are identified based on DoD program leaders’ assessments of their individual programs against the “Checklist for Toxic and Hazardous Chemicals Plans” provided by the Office of the Federal Environmental Executive (OFEE). DoD programs and initiatives relevant to chemical management are sequenced in the Plan according to the three phases of the weapon systems and facilities lifecycle: Acquisition, Operations and Sustainment, and Disposal.¹ Potential barriers to implementation of the EO toxic and hazardous chemicals requirements are described. The introductory section provides an explanation of the Plan’s foundational concepts, with emphasis on the role of DoD’s Environmental Management System (EMS) framework, while the conclusion section reflects a number of benefits to other existing efforts within the Department upon execution of the Plan.

¹Refer to Appendix A for definitions of these and other terms important to the Plan.

INTRODUCTION

Executive Order Background²

EO 13423, “Strengthening Federal Environmental, Energy, and Transportation Management,” was signed by President Bush on January 24, 2007. EO 13423 instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. The Order sets goals in the following areas:

- Acquisition
- Electronic Stewardship
- Energy Efficiency
- Fleets
- Recycling
- Renewable Energy
- Sustainable Building
- Toxic Chemical Reduction and
- Water Conservation.

EO 13423 rescinds several previous EOs, including EO 13101, EO 13123, EO 13134, EO 13148, and EO 13149. The Order also requires more widespread use of Environmental Management Systems (EMSs) as the framework in which to manage and continually improve these sustainable practices. It is supplemented by implementing instructions, issued on March 29, 2007 by the Council on Environmental Quality (CEQ). The Office of Management and Budget (OMB) is also integral in the execution of EO 13423, as the EO requires the OMB Director to issue instructions concerning periodic evaluation, budget matter, and acquisition relating to its implementation by each of the Federal agencies.

The following Plan represents the Department of Defense’s initiative under Executive Order 13423 in the area of toxic chemical reduction.

Foundational Concepts

This Plan is built on three basic concepts. First, the Plan builds upon existing DoD programs and initiatives relevant to toxic and hazardous chemicals. Though the Department has focused its efforts to date primarily on EMS implementation at the *facility*-level, DoD has implemented other management practices (e.g., Malcolm Aldridge-based systems) that enable systematic improvement of environmental performance. And while the Department continues to strive to reduce its hazardous *waste*, DoD has already begun to reduce its hazardous *materials*, with pollution prevention (P2) language and lifecycle assessment in existing policies. This is especially true for new weapons systems development. Consequently, the Department has programs and initiatives in-place addressing almost all of the “Checklist for Toxic and Hazardous Chemicals Plans” requirements distributed by OFEE. These programs are generally robust, well-managed, and based in sound policy, goals, and strategic plans across DoD.

Second, the Plan is a snap-shot in time of the *major* DoD programs and initiatives relevant to toxic and hazardous chemicals. It does not attempt to provide an exhaustive dissertation on all

²Excerpted from www.FedCenter.gov.

such programs, nor to be the “final word” on chemical management within the Department. The Plan is intended to define a starting point for continual improvement across the primary DoD-level programs relevant to toxic and hazardous chemical management in the Department.

Third, the Plan uses the DoD EMS framework as a tool for achieving continual improvement in toxic and hazardous chemical management in DoD. The EMS framework is a particularly important enabling concept for the Plan and, therefore, warrants additional explanation.

DoD EMS Framework

The Department formally initiated DoD-wide implementation of EMSs at all appropriate facilities/organizations with the issuance of the DoD EMS Policy on April 5, 2002. The issuance of DoD Directive (DoDD) 4715.1E, *Environment, Safety and Occupational Health* on March 19, 2005 formalized the EMS framework as the basis for managing the environmental aspects of the DoD mission, and expanded the scope of the management system framework to incorporate safety and occupational health aspects as well. EMS implementation efforts across DoD have established an ISO (International Organization for Standardization) 14001-2004 based management system framework that supports integration of sound environmental management practices into appropriate mission activities at all levels of DoD, from individual installations to the Office of the Secretary of Defense (OSD). The primary focus for EMS implementation within DoD has been at the installation level, but the Department has also made significant advances in implementation of EMS-like management systems elsewhere. Specifically, EMS concepts and procedures have been adopted by the Acquisition community and the Department has developed a *Compliance Management Plan* (January 2007) that describes the top-level organizational EMS framework in DoD.

The DoD EMS framework is, therefore, becoming a more effective tool for aligning mission activities with the Department’s environmental policy and for improving environmental performance by sharing information and lessons learned across organizational and program boundaries. This Plan leverages DoD’s EMS framework to align and coordinate relevant programs, at all organizational levels, for the purpose of reducing the procurement, use and release or disposal of toxic and hazardous chemicals. *The Department views the issuance of this Plan as a first step in long-term, DoD-wide continual improvement in chemical management.*

THE PLAN

Current Status

The first step in an effective planning process is to document the current situation to provide a basis for identifying opportunities for improvement and for monitoring progress. To that end, a total of eight (8) DoD programs and initiatives were identified with particular relevance to toxic and hazardous chemicals reduction and planning:

- Systems Acquisition Environment Safety and Occupational Health (Systems Acq ESOH)
- Emerging Contaminants (EC)
- Environmental Management Systems (EMS)
- Green Procurement (GP)
- Hazardous Material Business Transformation (Hazmat BT)
- Hazardous Waste (HW)
- Ozone Depleting Substances (ODS) and
- Toxics Release Inventory (TRI).

A brief description of each of these programs and initiatives can be found in Appendix B. While it is generally accepted that *these Departmental programs can have direct and indirect impacts in more than one phase of the lifecycle*, it is nevertheless helpful to organize the programs according to their primary focus, for the sake of strategic plan management. For example, Acquisition ESOH, Green Procurement, and Emerging Contaminants are all depicted as ‘Acquisition’ phase programs. This is because early interventions and actions of these particular programs by means of, for example, sustainable (green) design and source reduction measures are likely to be more effective in reducing toxic and hazardous chemical procurement and, therefore, minimizing chemical use, release and disposal. Similarly, EMS, ODS, and the Hazardous Materials Business Transformation are grouped in the ‘Operations and Sustainment’ phase of the Plan, while Hazardous Waste and TRI are listed in the ‘Disposal’ phase.

Results of OFEE ‘Checklist’ Assessment

The programs identified above were assessed against the “Checklist for Toxic and Hazardous Chemicals Plans” to develop a holistic understanding of the programs and their alignment with overarching DoD and EO 13423 goals for reducing the procurement, use, release and disposal of toxic and hazardous chemicals. A table summarizing the results of the assessment is provided in Appendix C. The review resulted in identification of a number of practices, common to many of the listed programs, focused on enabling or improving communication, coordination and integration within or among the respective programs and stakeholder communities. The commonality of these practices across major DoD programs suggests that they are viewed as value-added or “best practices” by program leaders and subject matter experts (SMEs) alike. Guided by the management system and toxic and hazardous chemicals focus of the EO, the best practices include:

- ESOH Risk Management Framework – Broader implementation or use of the DoD EMS or ESOH Management System Framework throughout the Department
- Removing Organizational and Program Boundaries – Actions to remove organizational and program boundaries impeding progress toward DoD and EO 13423 toxic and hazardous chemical goals
- Cross-Functional Policy Integration – Actions to leverage cross-functional DoD policy as a means to integrate sound chemical management practices into the DoD mission

- Information Sharing – Active efforts to share information supporting DoD and EO 13423 toxic and hazardous chemical goals
- Partnerships – Development or participation in joint, federal, state, and industry partnerships supporting DoD and EO 13423 toxic and hazardous chemical goals.

Best Practices Identified by Lifecycle Phases

DoD anticipates that broader application of these best practices, in the context of the major programs listed, will lead to improvements in the Department's handling of toxic and hazardous chemicals. Accordingly, subsequent sections of the Plan specifically address these best practices, relevant to the lifecycle management of these chemicals.

I. Acquisition Phase

As previously stated, the major DoD programs impacting toxic and hazardous chemicals reduction and management in the acquisition phase include:

1. Systems Acquisition Environment, Safety, and Occupational Health (Systems Acq ESOH)
2. Emerging Contaminants (EC) and
3. Green Procurement (GP).

The best practices identified for the Plan from these programs and initiatives are summarized in Table 2 and examples of best practices by program are provided thereafter.

Table 2. SUMMARY OF BEST PRACTICES IN THE ACQUISITION (ACQ) PHASE OF THE LIFECYCLE

	ESOH Risk Management Framework	Removing Organizational and Program Boundaries	Cross-functional Policy Integration	Information Sharing	Partnerships		
					Joint Service	Federal and State	Industry
Systems Acq ESOH	X	X	X	X	X		X
EC	X	X		X	X	X	X
GP	X	X	X	X	X	X	

1. Examples of Systems Acquisition ESOH Best Practices

- **ESOH Risk Management Framework:** DoD has established ESOH risk management methodologies embedded within the systems engineering process that, together with the DoD systems acquisition oversight process, comprise the Acquisition Program Manager's ESOH management system. All known life cycle ESOH risks associated with the system, including hazardous and toxic materials, are managed in the Acquisition Program Manager's ESOH Management System; appropriate ESOH risk information is provided to testing and receiving Activities.
- **Removing Organizational and Program Boundaries:** Acquisition ESOH removes traditional boundaries between environment, safety and occupational health programs, and integrates the management of ESOH risks into acquisition programs' Systems Engineering processes. The requirement in DoD Acquisition policy for all programs to use Military Standard: MIL-STD-882D, *Standard Practice for System Safety*, is the key to removing these program barriers. MIL-STD-882D contains guidance for applying the system safety risk management methodology to E, S, and OH hazards. This allows E, S, and OH risks to be assessed and managed on an equal, integrated footing within an acquisition program's system safety effort. Because system safety is itself integrated with the program's systems engineering process, a further barrier is removed, allowing ESOH

risks to be integrated and managed with other cost, schedule, and performance risks as a part of the program's overall technical management effort.

- **Cross-Functional Policy Integration**
 - DoD Instruction (DoDI) 5000.2, *Operation of the Defense Acquisition System*, is the overall policy that requires that programs integrate ESOH risk management into the program's Systems Engineering process and document how that is done. DoDI 5000.2 directs that programs use the system safety methodology in MIL-STD-882D, *Standard Practice for System Safety*, to accomplish this integrated ESOH risk management.
 - The Defense Acquisition Guidebook provides additional, more detailed guidance on the planning, processes, and data requirements that acquisition programs need to address to achieve toxic and hazardous chemicals reduction.
- **Information Sharing:** The Defense Acquisition University (DAU) Continuous Learning Course on System Safety in Systems Engineering (CLE009) provides training on how to use the system safety methodology to reduce and manage ESOH risks in an integrated fashion.
- **Partnerships**
 - **Joint level:** The DoD Acquisition ESOH Integrated Process Team (IPT), Chaired by the Office of the Deputy Under Secretary of Defense (Installations & Environment)/Environmental Management (ODUSD(I&E)/EM)) with membership from the Components, is an advocate for integrating ESOH risk management, using a total systems approach into the systems engineering process and the Defense Acquisition System in accordance with the requirements of the DoD 5000 series. The IPT's mission is to improve integration of ESOH considerations in weapon and information systems development.
 - **Industry level:** The Acquisition community has established several mechanisms for sharing ESOH information externally through partnerships with the International System Safety Society and the National Defense Industry Association (NDIA) Systems Engineering Division System Safety Committee.

2. Examples of Green Procurement Best Practices

- **ESOH Risk Management Framework:** The DoD Green Procurement Strategy employs the environmental management system framework, specifically addressing requirements for policy, planning, implementation operations, and evaluation.
- **Removing Organizational and Program Boundaries:** The GP Program (GPP) Workgroup is a partnership among environmental and procurement organizations in OSD and the Component headquarters and secretariats to promote environmental stewardship throughout the Department of Defense. The GPP objective is to educate DoD employees on the requirements of Federal "green" procurement preference program, their roles and responsibilities relevant to this program and the opportunities to purchase green products and services.
- **Cross-Functional Policy Integration:** The current DoD Green Procurement Policy and Strategy were published in August 2004 by the Under Secretary of Defense for Acquisition, Technology and Logistics (AT&L). Policy signature at this level was essential to support green procurement partnership across the environmental and procurement communities.
- **Information Sharing:** Leaders in Green Procurement share information through Defense Environmental Network and Information Exchange (DENIX) and a number of conferences or training programs hosted by Defense Logistics Agency (DLA), OSD or

others in partnership with the military Services and/or the NDIA. Other mechanisms include expos like the Pentagon biobased event held in September 2007 and annual Earth Day celebrations.

- **Partnerships**

- **Joint level:** The Joint Group on Pollution Prevention (JG-PP) works to reduce or eliminate hazardous materials or processes within the acquisition and sustainment communities using a validated, six-phase methodology. The first phase includes identifying the target hazardous materials or processes.
- **Federal level:** The Joint Group on Environmental Attributes (JGEvAtt) which determines positive attributes to flag in the Federal Catalog System, is a partnership between the DoD Services, General Services Administration (GSA), Environmental Protection Agency (EPA), Department of Energy (DOE) and OFEE.

3. Examples of Emerging Contaminants Best Practices

- **ESOH Risk Management Framework:** The Emerging Contaminants business process constitutes a three-tiered EMS for the (1) early identification, (2) impact assessment and (3) risk management of chemicals/materials of concern used by DoD. The results of the identification or ‘scanning’ process (e.g., literature review, regulatory updates, databases) is the development of a
 - ‘Watch’ List of chemicals/materials. These materials may be either perceived or real threats to human health or the environment. They may also not have a peer-reviewed health standard, or a standard may be evolving. Insufficient human health data/science, new detection limits and new exposure pathways may likewise be associated with their use. The list of chemicals on the Watch List varies over time; some may be removed if no further action is warranted.

Following an initial impact assessment (Phase I) of a Watch List chemical in five mission-critical areas (see, Cross-Functional Policy Integration) is the development of an

- ‘Action’ List of chemicals/materials. A narrower list of chemicals originating from the Watch List, this list is reserved only for those chemicals or materials whose impacts are deemed significant as a result of this DoD-wide assessment. Depending on available information, a chemical may also be elevated to ‘Action’ status without first being on the Watch List; this allows the Department to act more quickly with regard to its strategic use.

In Phase II, risk management options (RMOs), ranging from better handling methods to chemical substitution, are developed for an Action List material since its continued use and its involvement in new applications are considered high risk. In addition to ESOH, determining factors for the assessment of risk also include cost, material availability, etc.

- **Removing Organizational and Program Boundaries**

- After completion of the above-described chemical ‘scan’ presently conducted by the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM), the EC Steering Committee, composed of members of the military Services, DLA, AT&L and the EC Directorate decides whether to place a material on the Watch List. Based on the results of the Phase I risk assessment, the EC Governance Council, composed of members from the Senior Executive Service (SES), military Officers and key AT&L offices determines whether to approve the elevation of a chemical to the Action List.
- Major EC milestones to date include:

- Completion of 17 chemical impact assessments with the participation of (1) SMEs from across the Department in Phase I as well as (2) material ‘champions’ (that is, peer-recognized authorities) in Phase II.
 - Establishment of MERIT (Materials of Evolving Regulatory Interest Team), a virtual team composed of many DoD employees as well as sponsored contractors with an interest in, or a job function pertaining to, ECs. Currently, over 500 military and industrial members participate in MERIT.
 - Launching of ‘Risk to Ranges’ product, the first environmental project supported by the Range Commanders’ Council and jointly funded by AT&L.
 - Memorandum signed by the Assistant Deputy Under Secretary of Defense for ESOH to the Office of the Director of Defense Research and Engineering (DDR&E) launching an EC research agenda for (1) earlier risk analysis and (2) targeted research to test alternatives and to fill science gaps.
- **Cross-Functional Policy Integration:** In Phase I of an EC risk assessment, SMEs throughout DoD and from all three of the Services rank a chemical as having high-, medium- or low- impacts relative to five key functional areas:
 - ES&H (Environmental Safety and Health)
 - Readiness and Training (training military forces, testing military weapons)
 - Acquisition/RDT&E (Research, Development, Testing and Evaluation)
 - Production, Operations, Maintenance and Disposal of Assets and
 - Cleanup.
- **Information Sharing:** The EC program’s existing plans/strategies relevant to toxic and hazardous chemical reductions presently include informing and educating members of the DoD community via:
 - Partnering with the Strategic Environmental Research and Development (SERDP) and Environmental Security Technology Certification Programs (ESTCP)
 - Distributing the Emerging Contaminants Newsletter and making EC information available on the DoD/DENIX and FedCenter websites
 - Establishment of MERIT website and EC portal that compiles and shares information on ECs and substitute materials for MERIT subscribers.
 - Participating in key conferences such as
 - JSEM (Joint Services Environmental Management)
 - NDIA (National Defense Industrial Association)
- **Partnerships**
 - **Joint level:** ‘MERIT’, as described above
 - **Federal level:** Current material-specific partnerships include nanomaterials, in particular, EPA’s Nanotechnology Stewardship Program
 - **State level:** Current partnerships include ECOS (Environmental Council of the States)
 - **Industry level:** Engaging DoD’s industrial partners in topics such as improved supply chain management with
 - NAEM (formerly the National Association for Environmental Management) and
 - CSIMP (Cleaner Sustainable Industrial Materials and Processes) Workshop

II. Operations and Sustainment Phase

As previously mentioned, the major DoD programs impacting toxic and hazardous chemicals reduction and management in the Operations and Sustainment (O&S) phase include:

1. Environmental Management Systems (EMS)
2. Hazardous Materials Business Transformation (Hazmat BT) and
3. Ozone Depleting Substances Program (ODS).

The best practices identified for the Plan from these programs and initiatives are summarized in Table 3 and examples of best practices by program are provided thereafter.

Table 3. SUMMARY OF BEST PRACTICES IN THE O&S PHASE OF THE LIFECYCLE

	ESOH Risk Management Framework	Removing Organizational and Program Boundaries	Cross-functional Policy Integration	Information Sharing	Partnerships		
					Joint Service	Federal and State	Industry
EMS	X	X	X				
ODS	X	X	X	X	X	X	X
Hazmat BT	X	X	X	X	X	X	X

1. Examples of EMS Best Practices

- **ESOH Risk Management Framework:** The DoD EMS Framework (see Introduction) provides the management infrastructure used in the Plan to achieve continual improvement in toxic and hazardous chemical management across the Department.
- **Removing Organizational and Program Boundaries:** DoDD 4715.1E, *Environment, Safety and Occupational Health*, requires all organizations whose missions entail ESOH risks to plan, program, budget, and execute as required to manage the ESOH risks effectively.
- **Cross-Functional Policy Integration:** DoDD 4715.1E establishes the management system framework as the basis for managing the ESOH risks inherent in the Defense mission. This Directive encourages coordination across organizational (Army, Navy, Air Force) and functional (environment, installations, logistics) boundaries.

2. Examples of Hazmat Business Transformation Best Practices

- **ESOH Risk Management Framework:** Hazmat Business Transformation implementation plans developed by DoD Components in fiscal year 2007 chart the course of action for integrating hazmat management into the respective Component's EMS framework. The military Departments and DLA now have documented plans for integrating hazmat management into appropriate policies, training programs, metrics (objectives and targets), audit programs, and management review processes in accordance with the requirements of the DoD Business Enterprise Architecture and the Hazmat Business Transformation.
- **Removing Organizational and Program Boundaries:** The DoD Components jointly developed and documented DoD hazardous materials data standards over the past three years through the DoD Hazmat Business Transformation initiative. The military Departments and DLA have developed plans to implement the Hazmat data standards in information technology (IT) systems used to support Hazmat management across environmental, safety, occupational health and logistics organizations. DoD-wide implementation of the data standards will vastly improve accuracy and availability of Hazmat data, which will provide a foundation for improved operational control of

Hazmat-related mission activities. The standards will provide a foundation for an ESOH-based, cross-functional review of DoD processes/activities to ensure adequate ESOH risk controls and reduction.

- **Cross-Functional Policy Integration:** The Hazmat data standards and the reengineered, EMS-based Hazmat business process have been incorporated by reference into the *DoD Hazard Communication Program* (DoDI 6050.05), and the current coordination drafts of DoD 4140.1-R, *Supply Chain Material Management Regulation* and the *Defense Transportation Regulation* (DoD 4500.9-R). Integration of the business process and data standards defined by the Hazmat Business Transformation into safety and logistics policies provides the foundation for cross-functional cooperation at all levels of the Department to improve operational control of mission activities involving toxic and hazardous chemicals.
- **Information Sharing**
 - The most important outcome, to date, of the DoD Hazmat Business Transformation is the establishment of a joint-consensus set of data requirements (data standards) to support the safe and environmentally sound management of hazardous chemicals throughout DoD. Establishing a common language (Hazmat data) is an essential first step to sharing information about hazardous products within DoD.
 - In September 2007, the Department established the Hazardous Materials Master Data Capability to make chemical and regulatory reference data (based on the Hazmat data standards) centrally available to all DoD customers.
- **Partnerships**
 - **Joint level:** The entire Hazmat BT is a joint initiative focused on improving Hazmat management in DoD. The Hazmat BT has been on-going since January of 2005
 - **Federal level:** DoD has initiated discussions with the Department of Homeland Security (DHS), the National Aeronautics and Space Administration (NASA) and DoE through the bi-weekly Federal Regulated Community telecon arranged by the DoD Emerging Contaminants Directorate
 - **Industry level:** DoD is working with a number of groups in manufacturing and retail industry to consider the potential of adopting of common data standards. The most noteworthy initiative to date is a partnership with Wal-Mart and the Consumer Specialty Product Association (CSPA) focused on establishing central visibility of complete and accurate (regulated) chemical data for hazardous materials available in the retail marketplace.

3. Examples of ODS Best Practices

- **ESOH Risk Management Framework:** The Department developed an overall policy to eliminate its dependence on ODSs by being proactive in evaluating, approving, and using safe alternatives. In general, the Services have implemented this policy by applying risk-based management approaches to ODS use, reduction and elimination. This risk-based approach to ODS management, when coupled with the joint leadership review and oversight provided by the DoD ODS Services Steering Committee (ODS SSC), constitutes a management system approach to ODS management.
- **Removing Organizational and Program Boundaries:** The ODS SSC facilitates the development of common and/or coordinated practices and policies on the management and elimination of ODS among the DoD Components. Additionally, the ODS SSC

- coordinates mission-critical ODS requirements and recommended changes in operating practices for the DoD Mission-Critical ODS Reserve (stockpile) managed by DLA.
- **Cross-Functional Policy Integration:** The Department generally prohibits the use of Class I ODS in new procurement, based on requirements built into the Defense Federal Acquisition Regulation Supplement (DFARS). The DFARS prohibits the procurement and use of Class I ODS in contracts if a suitable substitute is available. The Department also prohibits the disposal of ODS and use of recovered ODS as a form of payment for the performance of a service contractor's recovery service based upon policies contained in the Defense Material Disposition Manual (DoD 4160.21-M). This manual and all component policies require that excess ODS be turned in to the DoD Mission-Critical ODS Reserve.
- **Information Sharing:** ODS elimination efforts are shared among the various DoD Components via the ODS SSC which first began meeting in 1991.
- **Partnerships**
 - **Joint level:** The ODS SSC has been meeting regularly since 1991. Committee membership includes the Office of the Secretary of Defense, the Services, and DLA. The ODS SSC also interfaces with the Global Climate Change Subcommittee of the Services Clean Air Act Steering Committee on global climate change issues, policy, and regulations as they relate to ODS alternatives. Services RDT&E on ODS alternatives for weapon systems are coordinated through technology development plans managed by DDR&E.
 - **Federal level:** The ODS SSC meets regularly with representatives from the EPA Stratospheric Protection Division, NASA, DoE, and DHS to share information on ODS management and elimination efforts. DLA also operates a small mission-critical ODS reserve (stockpile) for DHS (U.S. Coast Guard) in conjunction with the larger DoD mission-critical ODS Reserve and a separate refrigerant reserve for the U.S. Postal Service. In addition, DoD partners at the international level through numerous organizations including: the European Union Defense Network (DEFNET), assorted North Atlantic Treaty Organization (NATO) working groups, bilateral and multi-lateral defense exchange agreements, the United Nations Environment Program (UNEP) Ozone Action Program, and the UNEP Montreal Protocol Technology and Economic Assessment Panel - Halons Technical Options Committee (HTOC).
 - **Industry level:** DoD participates in the Halon Alternatives Research Corporation (HARC), a non-profit trade association formed in 1989 to promote the development and approval of environmentally acceptable halon alternatives. DoD also participates in the Halon Recycling Corporation (HRC), a non-profit trade association formed by concerned halon users and the fire protection industry to support the goals of the environmental community and the United States EPA.

III. Disposal Phase

The remaining DoD programs and initiatives with major impact to the Disposal phase of toxic and hazardous chemicals reduction and management include:

1. Hazardous Waste (HW) and
2. Toxics Release Inventory (TRI) Program.

The best practices identified for the Plan from these programs and initiatives are summarized in Table 4 and examples of best practices by program are provided thereafter.

Table 4. SUMMARY OF BEST PRACTICES IN THE DISPOSAL PHASE OF THE LIFECYCLE

	ESOH Risk Management Framework	Removing Organizational and Program Boundaries	Cross-functional Policy Integration	Information Sharing	Partnerships		
					Joint Service	Federal and State	Industry
HW	X	X		X			
TRI	X	X		X			

1. Examples of Hazardous Waste Best Practices

- **ESOH Risk Management Framework:** Based on past waste minimization efforts and an installation's assessment of current environmental aspects and impacts, DoD installations may incorporate hazardous waste management into their management system if they determine hazardous waste to be a significant aspect.
- **Removing Organizational and Program Boundaries:** DoDI 4715.4, *Pollution Prevention*, sets a policy to reduce use of hazardous materials through basic management approach that emphasizes pollution prevention as the first choice in achieving compliance, incorporating pollution prevention into the weapons systems life cycle, and sets up an environmental hierarchy (prevention at the source, reuse/recycle, treat, and then disposal.)
- **Cross-Functional Policy Integration:** DoDI4715.4 provides the policy for integrating this across Components. Pollution prevention is the basis to reduce hazardous waste disposal. It requires Components to plan, program, and budget; implement appropriate training; promote partnerships; and implement innovative pollution prevention technologies and business practices.
- **Information Sharing**
 - DENIX for Web-based access to the latest DoD Hazardous Waste program information
 - JSEM conference for formal information sharing
 - DoD Hazardous Waste Subcommittee, chaired by the Army, provide the process to review and address barriers and issues encountered by the Components related to reaching the goal of continuous reduction of hazardous waste disposal.

2. Examples of TRI Program Best Practices

- **ESOH Risk Management Framework:** DoD is diligent in providing guidance and policy to DoD installations to assist in TRI reporting. In 2006, DoD finalized a policy entitled, "Consolidated Emergency Planning and Community Right-to-Know Act (EPCRA) Policy for DoD Installations, Munitions Activities, and Operational Ranges." This policy explains EPCRA policies, goals, and requirements and how they are implemented by DoD installations. While EO 13423 revoked EO 13148, EO 13423 still maintains EPCRA implementation, including TRI reporting, for federal facilities. Since EO 13423 continues EPCRA implementation, as clarified in CEQ's guidance, DoD has instructed the Services to continue reporting TRI information consistent with the 2006 DoD Consolidated EPCRA Policy. In addition, annual TRI releases and waste management activities at DoD installations are reported in the Defense Environmental Programs Annual Report to Congress (DEP ARC). These annual TRI reports could serve as a tracking mechanism and baseline for evaluating further chemical reductions.
- **Removing Organizational and Program Boundaries:** DoD members of each Military Service are actively engaged and work together to set policies, provide guidance to DoD

installations on EPCRA/TRI reporting, and address common reporting issues. These efforts give the DoD installations the necessary information to accurately report.

- **Information Sharing:** DoD maintains EPCRA and TRI program information on DoD's DENIX for Web-based access.

Potential Barriers Identified by Lifecycle Phases

The following challenges to toxic and hazardous chemicals reduction were also identified by the leaders of the eight DoD programs and initiatives discussed in the Plan.

I. Acquisition Phase

- Reduced performance and increased cost frequently associated with the use of less toxic materials is the biggest barrier to reduction of toxic and hazardous chemicals in the weapon systems acquisition process.
- A significant barrier to green procurement is that purchases are often dictated by the Technical Manuals supporting the related systems, and not under control of the purchasers.
- In order to change purchasing behavior, a “market pull” needs to be developed for green products. This market pull should originate from the requirements generation process. Purchasers need easy access to proven and cheaper alternatives before changing vendors or habits.

II. Operations and Sustainment Phase

- Federal sources of supply (DLA and GSA) do not provide sufficient visibility into the actual hazardous product (down to the specific manufacturer, product lot/batch and container size) that will be supplied to the requesting organization.
- The majority of the federal, military and industrial specifications, and commercial item descriptions, are performance based, not formula based. Even if using a sole source National Stock Number (NSN), it may still be linked to a performance based specification. This creates a higher probability of Hazmat that DoD is trying to reduce, ending up in the supply system.
- The NSN is not unique to a specific product; therefore, ordering hazardous products by NSN often results in receipt of products (from DLA or GSA) with significantly different chemical hazards. It is not possible to define effective operational controls for an industrial process when the chemical identity and hazard characteristics are not known.
- Federal procurement systems do not provide capability for ESOH personnel in the field to provide feedback to the procurement personnel.
- The lack of standard hazardous materials data requirements across regulatory agencies e.g., Occupational Safety and Health Administration (OSHA), EPA and the Department of Transportation (DOT) drives unnecessary costs throughout the regulated community – both government and industry – and results in unnecessary risk being incurred by regulated entities due to lack of complete and accurate data. Lack of regulatory requirements for specific, unique and objective association of hazardous products and materials safety data sheets (MSDSs). The process of associating a specific hazardous product with the correct MSDS is highly subjective and prone to error, which results in increased risk of improper use, release and disposal of hazardous chemicals across the Federal government and industry.

III. Disposal Phase

- The large infrastructure investments required to reduce, or to change, toxic chemical use or waste management operations associated with: open burn/open detonation (OB/OD), coal combustion, geothermal plants, water/wastewater treatment and disposal of construction materials and weapon systems are significant barriers to further chemical reductions.
- Reductions in hazardous waste disposal appear to have leveled out. Many major pollution prevention efforts have been implemented with success. While improvements to chemical tracking and measurement may prove otherwise, increased reductions of hazardous waste will require innovation. This must include implementation of new technologies, process redesign, and introducing chemical reduction or substitution early into the design and acquisition process.

NEXT STEPS

The overall DoD goals for implementation of EO 13423 are two-fold:

- Improve communication, coordination and integration within and among DoD programs, for the purpose of advancing their collective impact on toxic and hazardous chemicals reduction and management –
 - *With* maximum utilization of existing tools, for example, programs or models by DLA or others, in order to increase efficiency and minimize duplication of efforts and
 - *Without* the establishment of additional, that is, new workgroups or sub/committees, in order to streamline efforts and minimize bureaucracy.
- Provide a foundation for *future* work and progress by the Department, under the auspices of the EO –
 - In particular, while greenhouse gases and emissions are not expressly mentioned in OFEE's checklist, no toxic and hazardous chemicals reduction plan would be complete without inclusion of these energy-related materials in DoD's strategic approach to their use and management.

Specific Agency-level initiatives include:

- Collective evaluation of DoD chemical management programs for gaps (gap analysis), overlaps and opportunities to identify additional actions to improve performance in terms of reducing toxic and hazardous chemical procurement, use, release and disposal:
 - By February 29, 2008, DoD senior leadership will direct the initiation of a lifecycle chemical management gap analysis across relevant programs and organizations.
- Establishment of a centralized OSD policy for chemical management activities to provide a basis for coherent and effective lifecycle management and control of chemicals across DoD:
 - By March 31, 2008, DoD senior leadership will issue a charter institutionalizing the EO 13423 Executive Committee as a permanent, cross-functional, OSD-level body responsible for oversight and management review of the Department's ESOH policy and performance. The Deputy Under Secretary of Defense for I&E, DUSD(I&E) is the designated Chair of the Executive Committee.
 - By May 30, 2008, the Executive Committee will draft goals, roles and responsibilities for lifecycle chemical management to lead the Department toward deliberate and systematic reductions in the procurement, use, release and disposal of toxic and hazardous chemicals.
 - By August 29, 2008, the Executive Committee will issue an interim final policy memo launching a lifecycle chemical management program addressing, at a minimum, goals, roles and responsibilities for the organizations represented on the EO 13423 Executive Committee.
- Take steps to ensure the continuation of the work necessary for the Department of Defense's successful implementation of the toxic and hazardous chemical reduction goals set forth in Executive Order 13423:
 - By November 28, 2008, DoD will submit to the Office of the Federal Environmental Executive an update to the Plan documenting progress to date and actions proposed to address gaps, overlaps and barriers to effective lifecycle chemical management.

Following the acceptance of this *initial* Plan by OFEE/OMB, DoD practices and procedures will be further examined within seven (7) months. Specifically, this work will entail the:

- Prioritization of actions and the identification of their inter-departmental leads
- Determination of deliverables (objectives and targets) and
- Establishment of timeframes for those deliverables.

Finally, each of these vetted recommendations and planned actions will be re-evaluated periodically as to their progress/status under the ‘plan,’ ‘do,’ ‘check,’ and ‘act’ process, integral to DoD’s internal EMS framework and in accordance with the Defense Installation Strategic Plan (DISP), in particular:

- Objective 2.2 concerning the sustainability of energy-efficient, safe infrastructure
- Objective 3 concerning the protection of personnel/mission capabilities through informed risk decisions at the appropriate leadership level and
- Objective 5.5 concerning the continuous improvement of management systems.

CONCLUSION

The advantages of pursuing a robust chemical management program at DoD are numerous. It will assist the Department in determining *what chemicals are being used and for what purpose* as well as *where they are being used and by whom*. This visibility into DoD's systems will

- Advance the identification and prioritization of mission-critical chemicals
- Reduce potential occupational health hazards by better risk management practices and
- Improve program/process efficiencies.

Furthermore, implementation of the Plan will inform future policy decisions on

- DoD chemical stockpiles
- DoD's research agenda in the search for environmentally friendlier, benign chemicals and
- Positively influencing
 - The responsiveness of the U.S. industrial/chemical base to the Department's needs and
 - These industries' competitiveness, in light of global market and regulatory trends.

DoD has an excellent record supporting the War Fighter's combat safety and medical needs. The Plan's adoption will help to extend this protection over the long term, with an eye on the War Fighter's eventual, healthy return.

APPENDICES

Appendix A

Glossary of Terms and Acronyms

Term or Acronym

Term or Acronym	Definition
1. Acq; A&T; AT&L	Acquisition; Acquisition and Technology; Acquisition, Technology and Logistics From DoDI 50002, "Operation of the Defense Acquisition System": Applied to the acquisition of weapon systems, the term "Systems Acquisition" actually refers to two discrete phases in the Defense Acquisition Management Framework: the System Development and Demonstration phase and the Production and Deployment phase System Development and Demonstration includes activities necessary to develop a system; reduce integration and manufacturing risk, ensure operational supportability, and demonstrate system integration, interoperability, safety, and utility The purpose of the Production and Deployment phase is to achieve an operational capability that satisfies mission needs
2. Acquisition 'Phase'	Council on Environmental Quality
3. CEQ	Center for Health Promotion and Preventive Medicine
4. CHPPM	Continuous Learning Course on System Safety in Systems Engineering
5. CLE009	Another term used to connote the Services (Army, Navy, Air Force)
6. Component	Cleaner Sustainable Industrial Materials and Processes (Workshop)
7. CSIMP	Consumer Specialty Products Association
8. CSPA	Defense Acquisition University
9. DAU	Director of Defense Research and Engineering
10. DDR&E	Defense Network
11. DEFNET	Defense Environmental Network and Information Exchange
12. DENIX	Defense Environmental Programs Annual Report to Congress
13. DEP ARC	Defense Federal Acquisition Regulation Supplement
14. DFARS	Department of Homeland Security
15. DHS	Defense Installation Strategic Plan
16. DISP	As applied to weapon systems only, disposal is formally a part of the Operations and Support Phase However, for weapon systems, disposal refers to the demilitarization and disposal of systems in accordance with all legal and regulatory requirements and policy relating to safety (including explosives safety), security, and the environment
17. Disposal 'Phase'	Defense Logistics Agency
18. DLA	Department of Defense
19. DoD	Recent defense acquisition policy series (similar construct to ISO standards)
20. DoD 5000	Department of Defense Directive
21. DoDD	Department of Defense Instruction
22. DoDI	Department of Energy
23. DOE	Department of Transportation
24. DOT	Deputy Under Secretary of Defense
25. DUSD	Emerging Contaminants
26. EC	Environmental Council of the States
27. ECOS	Executive Order
28. EO	Emergency Planning and Community Right-to-Know Act
29. EPCRA	Environmental Management (System)
30. EM(S)	Environmental Protection Agency
31. EPA	Environmental Attribute Code
32. ENAC	Environment, Safety and Occupational Health
33. ESOH	Environmental Security Technology Certification Program
34. ESTCP	In an EMS framework, for example, ISO 14001, term refers to those specific points that must be set to implement an environmental policy See also, Objective
35. Goal	Green Procurement (Program)
36. GP(P)	General Services Administration
37. GSA	Halon Alternatives Research Corporation
38. HARC	Hazardous Material Business Transformation
39. Hazmat BT	Halon Recycling Corporation
40. HRC	Halons Technical Options Committee
41. HTOC	

Term or Acronym (cont.)	Definition
42. HW	Hazardous Waste
43. I&E	Installations and Environment
44. IPT	Integrated Product or Process Team
45. ISO	International Organization for Standardization
46. IT	Information Technology
47. JGEnvAtt	Joint Group on Environmental Attributes
48. JG-PP	Joint Group on Pollution Prevention
49. JSEM	Joint Services Environmental Management
50. L&MR	Logistics & Material Readiness
51. MERIT	Materials of Evolving Regulatory Interest Team
52. Mil Std	Military Standard
53. MSDS(s)	Material Safety Data Sheet(s)
54. NAEM	National Association for Environmental Management (formerly)
55. NAICS	North American Industrial Classification System
56. NASA	National Aeronautics and Space Administration
57. NATO	North Atlantic Treaty Organization
58. NDIA	National Defense Industrial Association
59. NSN	National Stock Number
60. OB/OD	open burn/open detonation
61. Objective	In an EMS framework, for example, ISO 14001, an objective refers to an “overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantifiable where practicable” (Section 37)
62. ODS(s)	Ozone Depleting Substance(s)
63. ODS SSC	Ozone Depleting Substances Services Steering Committee
64. OFEE	Office of the Federal Environmental Executive
65. OMB	Office of Management and Budget
66. ODUSD	Office of the Deputy Under Secretary of Defense
67. Operations & Sustainment ‘Phase’	As applied to weapon systems, the term "Operations and Support Phase" (similar to "Operations and Sustainment") refers to the execution of a support program that meets operational support performance requirements and sustains the system in the most cost-effective manner over its total life cycle. When applied to weapon systems, the "Operations and Support Phase" includes disposal of the system at the end of its service life. From Joint Publication 1-02, "DoD Dictionary of Military & Associated Terms": Sustainment is the provision of logistics and personnel services required to maintain and prolong operations until successful mission accomplishment
68. OSD	Office of the Secretary of Defense
69. OSHA	Occupational Safety and Health Administration
70. P2	Pollution Prevention
71. RDT&E	Research, Development, Testing and Evaluation
72. RMO(s)	Risk Management Option(s)
73. SERDP	Strategic Environmental Research and Development Program
74. SES	Senior Executive Service
75. SIC	Standard Industrial Classification
76. SME(s)	Subject Matter Expert(s)
77. SSC	Services Steering Committee
78. Systems Acq ESOH	Systems Acquisition Environment Safety and Occupational Health
79. Target	In an EMS framework, for example, ISO 14001, a target refers to a “detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives” (Section 310)
80. TRI	Toxics Release Inventory
81. UNEP	United Nations Environment Programme

Appendix B.

Brief Descriptions of DoD Participating Programs and Initiatives

DoD Program or Initiative	Description
Systems Acquisition Environment Safety and Occupational Health (Systems Acq ESOH)	The mission of Systems Acq ESOH is to Integrate ESOH considerations into the systems engineering process and standardize risk assessment methodology for environment, safety, and occupational health in acquisition to design in consideration of ESOH rather than managing as an operational consideration.
Emerging Contaminants Directorate (EC)	The Office of the Deputy Under Secretary of Defense for Installations & Environment established this Directorate in 2006 to help DoD proactively address mission impacts associated with ECs. ECs are chemicals or materials that are characterized by a perceived or real threat to human health or the environment, or a lack of published health standard, or an evolving standard.
Environmental Management Systems (EMS)	An EMS is a set of processes and practices that enable an organization to increase its operating efficiency, continually improve overall environmental performance and better manage and reduce its environmental impacts, including those environmental aspects related to energy and transportation functions. EMS implementation reflects accepted quality management principles based on the “Plan, Do, Check, Act,” found in the ISO 14001:2004(E) International Standard and using a standard process to identify and prioritize current activities, establish goals, implement plans to meet the goals, evaluate progress, and make improvements to ensure continual improvement. DoD is implementing EMS as a management tool for reducing environmental risks, impacts and costs arising from mission activities, while improving mission performance. A DoD-wide work group consisting of representatives from the DoD staff, various DoD agencies, and the Military Services oversee the implementation and operation of EMS in the Department. EMS is being institutionalized in Strategic plans, DoD Directives, training programs, and daily DoD business practices.
Green Procurement (GP)	Green procurement is the purchase of products and services in accordance with one or more of the established Federal “green” procurement preference programs, typically products with a lesser or reduced effect on human health and the environment compared to similar products. Within DOD, the green procurement program applies to all acquisitions from major systems programs to individual unit supply and service requisitions, and its purpose is to enhance and sustain mission readiness through cost effective acquisition that reduces resource consumption and waste generation.
Hazardous Material Business Transformation (Hazmat BT)	The Hazmat BPR provides a foundation for continual improvement in DoD performance across all DoD Military Services and Defense Agencies. Integrated into the DoD Business Enterprise Architecture < http://www.defenselink.mil/dbt/products/2007_BEA_ETP/index.html > in 2006, the Hazmat BPR established requirements for reliable Hazmat information and a common business process for Hazmat management—within a rigorous environmental management system framework.
Hazardous Waste (HW)	The DoD HW Program incorporates the principal to reduce the use of hazardous materials, the generation or release of pollutants, and the adverse impacts on human health and the environment caused by human activities. The Army chairs a subcommittee to oversee compliance with RCRA hazardous waste laws and regulations.

DoD Program or Initiative (cont.)	Description
Ozone Depleting Substances (ODS)	The ODS Management & Elimination Program has a goal to eliminate DoD dependence on ODS by being proactive in evaluating, approving, and using safe alternatives. To accomplish this goal, a comprehensive approach to ODS management and elimination was developed. This approach included conservation of existing supplies of ODSs; establishment of a mission-critical reserve (stockpile) of Class I ODSs that would support weapon systems until individual systems were converted or retired from service; development of next-generation, ozone-friendly systems designed for new acquisition programs; and conversion of existing systems using Class I ODSs to environmentally preferable alternatives when technically and economically feasible. Since 1990, this comprehensive program has reduced the DoD's annual consumption of Class I ODSs by over 97 percent while still maintaining readiness of our combat forces.
Toxics Release Inventory (TRI)	The TRI Program is focused on providing policy and guidance to DoD installations on TRI reporting, and addressing common reporting issues. DoD installations that manufacture, process, or otherwise use a TRI toxic chemical in quantities greater than the established threshold over the course of a calendar year, regardless of their Standard Industrial Classification (SIC) or North American Industrial Classification System (NAICS) delineations, will report their releases and waste management activities on chemical inventory forms. These TRI releases and waste management activities are reported annually to EPA, are summarized in the DEP ARC, and are publicly accessible on DENIX.

Appendix C.

SUMMARY OF DEPARTMENTAL RESPONSES (X) TO OFEE 'CHECKLIST' ITEMS AS GUIDANCE FOR TOXIC AND HAZARDOUS CHEMICALS COVERAGE OF EO REQUIREMENTS

	Systems Acq ESOH	EC	EMS	GP	Haz- mat BT	HW	ODS	TRI
1. Goals for reduction or elimination of toxic and hazardous chemicals.	X	X	X	X		X	X	
2. Where appropriate, how goals, policies, and actions will be implemented as part of an environmental management system(s).	X	X	X	X	X	X		
3. Existing, draft, or planned agency policy statements, directives, or guidance for facilities and other levels of the organization regarding the toxic and hazardous chemicals reduction goals set forth in section 2(e)(i) of E.O.	X	X	X	X	X	X		
4. Existing plans or strategies that meet, address or are related to the toxic and hazardous chemicals reduction goals of the E.O., including the level (agency, organizational, or facility) responsible for implementation of various actions.	X	X		X		X		
5. Individual chemicals or groups of chemicals that the agency currently is addressing and other chemicals that may be addressed, including the proposed process used to identify and prioritize those chemicals and how they relate to existing environmental hazard lists or regional priorities.	X	X		X		X		
6. New or different activities planned or implemented to meet the E.O. toxic and hazardous chemical reduction goals, including any unique agency goals as well as actions to support the new activities.	X	X		X	X			
7. Individuals or organizations identified as responsible for implementation, tracking, monitoring, and reporting of the toxic and hazardous chemical reduction plan or initiatives.	X	X	X	X	X	X		X
8. Strategies for replacement and management of ODSs per section VIII.B of the March 2007 E.O. implementing instructions.				X			X	
9. Monitoring, metrics, and schedule(s) for measuring progress of both the toxic and hazardous chemicals reduction plan and the goals at each appropriate organizational level.	X	X		X			X	X
10. Existing agency reporting mechanisms created to comply with toxic and hazardous chemicals, hazardous substances, ozone-depleting substances, and other regulatory requirements, including state reporting requirements.	X	X		X		X	X	X
11. Plans to support continued TRI reporting and ensure reporting by all covered facilities and operations.								X
12. Plans to continue existing TRI release reductions efforts including any new efforts to focus on reducing the use of TRI chemicals.					X			X
13. The process for revising and re-evaluating toxic and hazardous chemicals reduction implementation plans.	X	X						
14. Potential barriers and proposed solutions.	X	X		X		X		X
15. Information-sharing mechanisms, including training, for sharing best management practices and successes internally and externally.	X	X		X		X	X	
16. Where appropriate, partnerships that are or will be joined or formed, such as EPA's National Partnership for Environmental Priorities, or regional partnerships.		X		X	X			

Legend: Acq ESOH=Acquisition Environment, Safety and Occupational Health, EC=Emerging Contaminants, EMS=Environmental Management Systems, GP=Green Procurement, HW=Hazardous Waste, Hazmat BT=Hazardous Materials Business Transformation, ODS=Ozone Depleting Substances Program and TRI=Toxics Release Inventory Program