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| --- | --- | --- | --- |
| |  |  | | --- | --- | |  |  | | **Department of Defense**      **ISO 14001 Environmental Management Systems Pilot Study**        Final Report April 2000 | |

**Table of Contents**

[**Executive Summary**](#exec)[**What is an Environmental Management System?**](#what1.0)[**Types of Environmental Management Systems**](#2.0types)

Private Sector Environmental Management SystemsStandardized Environmental Management Systems  
Trade Association Environmental Management Systems  
Non-Standardized Environmental Management Systems

[**Evolution of Current DoD ISO 14001 EMS Policy**](#3.0evolution)

Executive Order 12856 - Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements  
DoD Inspector General Evaluation Report No. 97-009 - Strategies for Improving DoD Environmental Compliance Assessment Programs  
DoD Inspector General Evaluation Report No. 97-068 - Strategies for Improving Environmental Management Systems in the DoD (January 1997)  
CEMP Development  
DoD EMS Committee  
Interim Guidance on Environmental Management Systems and ISO 14001  
USD(AT) Memorandum on Requiring Processes on Contract  
Other Quality Management Drivers

[**DoD ISO 14001 Environmental Management System Pilot Study**](#4.0dodiso)

Participating Installations  
Quantitative Data  
Qualitative Observations

[**Potential Wider Benefits to DoD from EMS Implementation**](file:///C:\Users\DaltonCarlson\Downloads\finalreport3.html#5.0potential)

Improvements to Internal Planning Processes - Integration with NEPA  
Impacts on Weapons Development and Acquisition  
Application to Range Management and UXO Issues  
Application to the Conservation Program  
Application to Cleanup  
Tracking of Performance Metrics  
OCONUS Implications

[**Appendix A Federal Environmental Management Systems Initiatives and Policy Documents**](file:///C:\Users\DaltonCarlson\Downloads\finalreport4.html)[**Appendix B State Environmental Management System Initiatives**](file:///C:\Users\DaltonCarlson\Downloads\finalreport5.html)[**Appendix C Foreign Military and Government Use of Environmental Management Systems**](file:///C:\Users\DaltonCarlson\Downloads\finalreport6.html)[**Appendix D Private Sector Implementation of Environmental Management Systems**](file:///C:\Users\DaltonCarlson\Downloads\finalreport6.html#appendix-d)[**References**](file:///C:\Users\DaltonCarlson\Downloads\finalreport6.html#references)[**Acronyms**](file:///C:\Users\DaltonCarlson\Downloads\finalreport6.html#acronyms)

**Executive Summary**

As the third largest federal landowner and steward for tens of millions of acres of land, the Department of Defense (DoD) has a vast responsibility to protect the environment. Over the years, DoD has developed mature environmental programs that emphasize compliance, pollution prevention, and conservation. However, a Department of Defense Inspector General (DoDIG) report released shortly after the publication of ISO 14001 concluded that while DoD's traditional compliance-based environmental management programs had resulted in substantial improvements in environmental quality and human health and safety, the existing programs were not effective for assuring continuous improvements in environmental performance. The DoDIG report concluded that the DoD Components needed a more mature, quality-based environmental management system (EMS) in order to improve their compliance posture, minimize compliance costs, decrease regulatory oversight, reduce or eliminate penalties, and more effectively demonstrate environmental achievements.

Viewing ISO 14001 as a potential opportunity to improve existing environmental programs by incorporating best practices being used by the private sector, DoD in 1997 began a voluntary two-year Pilot Study of the ISO 14001 EMS standard at sixteen installations. The objectives of the DoD Environmental Management Systems Pilot Study were to investigate ISO 14001 in order to assess how it might be used in the military sector and to determine if its implementation would add value to the mature, but compliance-based, DoD Environmental Security program.

The extent of implementation of the standard varied across the Pilot Study installations. Several chose an incremental approach that focused on implementation within a single organization rather than across the entire installation. Some installations chose to seek certification to ISO 14001 where they believed a business case supported such a decision, and several others chose to implement a tailored or generic EMS that incorporated select elements of the standard. A majority of the installations did not achieve full implementation of ISO 14001 within the two-year time period.

The Pilot Study installations generally had very strong environmental programs prior to implementing ISO 14001. The installations reported that because existing environmental programs contained strong compliance assurance elements, ISO 14001 implementation typically resulted in only limited improvement in their compliance posture. Risk management was reportedly improved through better record keeping practices, increased awareness by personnel (at all levels) of operational impacts on the environment, and through the introduction of a systematic method for identifying and managing environmental risk. Pollution prevention programs reportedly received increased attention from senior management under ISO 14001, and project prioritization was improved. Most installations also reported that environmental considerations were better integrated into decision-making processes as a result of the EMS process. Most sites report that greater benefits could likely be achieved at installations with weaker environmental programs.

Relationships with regulators were generally reported unchanged, although regulator reaction to ISO 14001 implementation was generally positive. The installations also reported that it was difficult to assign direct economic benefits solely attributable to ISO 14001 implementation. Consistent with the experiences of private sector organizations, the installations feel it will take several years before definitive economic benefits attributable to ISO 14001 implementation become apparent. Based upon the experiences of those installations that made the greatest strides in achieving implementation, the cost of fully implementing an EMS with elements similar to ISO 14001 ranged from $375,000 to $607,000.

The results of the Pilot Study indicate that all participating installations gained important insight into the strengths and weaknesses of their existing environmental programs from the experience. Lessons learned include the importance of strong senior management commitment to ISO 14001 implementation, and that DoD installations already have many of the individual elements of the ISO 14001 standard in place in their environmental programs. Most would recommend adoption of an EMS to other DoD installations, although the EMS does not necessarily have to be ISO 14001. The installations agreed that flexibility in determining the type and extent of EMS adoption is a key issue for consideration, and that it is the systematic management framework common to all EMSs that is their most important attribute, not their name or classification.

In addition to discussing the results of the Pilot Study, this report includes several appendices that discuss the extent of other Federal and state agency EMS initiatives, foreign government implementation of EMSs, and a summary of several private sector EMS initiatives. Evaluation of these other initiatives indicate that although there appears to be universal agreement that adoption and use of EMSs will be the next step in environmental management practices, there is no consensus that there is a single right type of EMS

**1.0 What is an Environmental Management System?**

Increasingly stringent environmental regulations, international obligations and agreements, and private sector recognition that potential economic benefits may result from improved environmental performance have contributed to the development of a systematic new tool for dealing with complex environmental problems - the environmental management systems (EMS). The International Organization for Standardization (ISO) published the first worldwide standard for EMS, ISO 14001, in 1996.

An EMS such as ISO 14001 is a formal management framework intended to help an organization achieve its internal environmental goals through repeatable and consistent control of its operations. It is assumed that implementation of an EMS will result in continuous improvement in an organization's environmental performance, increase the efficiency of the organization's operations, and enhance its regulatory compliance status. Conformance with EMS standards may provide a competitive advantage to some organizations if domestic or international customers demand certification as a condition for doing business. An EMS by itself is not prescriptive in that it does not dictate specific levels of environmental performance that must be achieved by an organization. Performance levels are established either by environmental law or organizational management. While the framework of an EMS remains consistent over time, each individual EMS should be tailored to reflect those aspects and environmental impacts that have been deemed significant by the implementing organization, based on its corporate culture and strategic goals. An EMS is not a stagnant system, and provides the mechanisms necessary to continually evolve to meet an organization's ever-changing needs.

An ISO 14001 EMS follows the cyclical process of commitment and policy, planning, implementation, evaluation, and review depicted below.

**Figure 1 - The ISO 14001 Process**

**2.0 Types of Environmental Management Systems**

Over the past decade a number of trade associations and standardizing bodies have developed formal EMSs as a means of achieving superior environmental performance. Common elements include a systematic process to review operations, identify environmental impacts and mitigation measures, a commitment to pollution prevention, and provisions for stakeholder participation.

**2.1 Private Sector Environmental Management Systems**

The most common incentive for private sector organizations to adopt and implement an EMS is the desire to improve a company's profitability. Implementing an EMS can produce benefits in terms of waste reduction, increased operational efficiency, and enhanced public image. Conformance with EMS standards may provide a competitive advantage to some organizations, particularly if customers demand certification as a condition for doing business, as is occurring in some industrial sectors. Private sector EMSs include elements that are easily recognizable and common to other EMSs, such as provisions for the establishment of policy and setting of performance goals, the development of implementation plans, the assignment of responsibilities, monitoring of progress, and regular management reviews. Other provisions common to EMSs include personnel training and corrective action programs.

**2.2 Standardized Environmental Management Systems**

Typical characteristics of standardized EMSs include the establishment of internal environmental performance objectives by management personnel and the use of self-evaluation or independent third party certification to verify conformance to a standard. There are three widely recognized EMS standards that include these characteristics.

**2.2.1 British Standard 7750**

British Standard 7750 (BS 7750) is a specification for an environmental management system developed by the British Standards Institution (BSI). First published in 1992, BS 7750 was the world's first EMS standard. It was subsequently revised in 1994, and superseded by ISO 14001 in March 1997.

BS 7750 was developed as a response to concern about environmental risks and potential liabilities. It is designed to improve the environmental performance of all types and sizes of organizations. It is underpinned by a systematic and integrated managerial approach, by the creation of a corporate environmental policy and objectives, and by the key concept of environmental auditing. BS 7750 does not define or set specific environmental performance criteria, objectives, indicators, targets or timetables. The single level of performance specified is to meet the requirements of the standard. BS 7750 was the basis for the development of both ISO 14001 and the European Union's Eco Management and Audit Scheme (EMAS), although there are differences in the requirements of all three standards.

**2.1.2 ISO 14001**

ISO 14001 - Environmental Management Systems - Specification with Guidance for Use was published in 1996. It was developed by ISO through a process of collaboration by international standards bodies and other expert groups, and is the most widely recognized and implemented EMS standard in the world. ISO 14001 defines an EMS as *the part of an overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining environmental policy*.

ISO 14001 provides an organization with the framework that enables it to move away from the reactive, fragmented responses to environmental issues common to compliance-based environmental programs, and engenders a proactive approach that allows for the early identification of impacts, liabilities, and opportunities. While organizations are instructed to identify and manage all significant environmental impacts of their activities, products or services, ISO 14001 does not specify absolute requirements for environmental performance except to demand a commitment to continual improvement.

The essential elements of an ISO 14001 EMS are the auditable requirements. These are based on the five principles and elements, stated in the ISO 14001 standard, which are listed below:

* **Commitment and Policy** - An organization should define its environmental policy and ensure commitment to its EMS.
* **Planning** - An organization should formulate a plan to fulfill its environmental policy.
* **Implementation** - An organization should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives, and targets.
* **Measurement and Evaluation** - An organization should measure, monitor, and evaluate its environmental performance.
* **Review and Improvement** - An organization should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

Formal certification to ISO 14001 can be achieved by either by means of a third-party audit or a self-declaration of conformance with the standard. Of course it is also possible to implement ISO 14001 without seeking formal certification. Third-party auditors must be registered with the Registrar Accreditation Board in order to conduct official ISO 14001 EMS audits with the goal of awarding certification.

The worldwide growth of ISO 14001 registrations continues to be strong, with registration increasing from over 7,800 in December 1998 to nearly 13,400 as of 31 December 1999. Europe and the Far East continue to account for the majority of ISO 14001 registrations, with over 2,700 Japanese, 1,800 German, 1,000 UK and 850 Swedish organizations registered to ISO 14001; by comparison, approximately 700 registrations have been reported within the United States.

**2.1.3 Eco-Management and Audit Scheme**

The Eco-Management and Audit Scheme (EMAS) was developed under the European Union's Fifth Environmental Action Program to encourage the private-sector to improve its environmental performance. It was adopted in June 1993 by the Council of Ministers as a regulation to become effective in April 1995. European Union member states are obliged to implement the regulation although it remains voluntary for implementing organizations. Although initially designed to apply to private sector organizations, EMAS has since been extended to some local government operations within the European Union. Registration to EMAS is on an individual, site-specific basis only, not by company.

The essential elements of EMAS are identified below. The EMAS regulation requires organizations to:

* **Policy** - Adopt an environmental policy.
* **Commitment** - Commit to the concept of continuous improvement.
* **EMS Implementation** - Define and implement an EMS.
* **Compliance Monitoring** - Develop procedures for monitoring and verifying compliance
* **Environmental Audits** - Conduct environmental audits at the sites concerned (minimum audit cycle is once every three years);
* **Formal Environmental Statement** - Prepare a periodic site-based environmental statement;
* **Independent Verification** - Receive independent verification of the information and claims made in the environmental statement;
* **Public Access** - Ensure the public has access to the verified statement; and
* **Review and Improvement** - Develop quantified improvement targets set at the highest management level.

By 31 December 1999, over 3,100 organizations had been registered to EMAS. 2,300 of these were in Germany.

**2.2 Trade Association Environmental Management Systems**

Trade association EMSs are characterized by attributes intended to improve the environmental and economic performance of member companies and to enhance their relationship with consumers, regulators, and local communities. Examples of common trade association attributes include a commitment to pollution prevention, a life cycle approach to product stewardship, and stakeholder participation. Trade association EMSs typically rely on peer pressure to ensure that member companies implement requirements.

The most widely recognized trade association EMS is the Chemical Manufacturing Association's (CMA) Responsible Careâ initiative. CMA represents nearly 200 domestic chemical manufacturers who account for nearly 90% of the basic chemical production in the United States. Responsible Careâ is a voluntary set of guiding principles developed by the chemical industry to improve the environmental, safety, and health performance of member companies, and to promote more open communication about industry activities and achievements. Although Responsible Careâ is voluntary in nature, membership in CMA is contingent upon member companies participating in the program. Participating companies make a public commitment to continually improving the production, use, and distribution of chemical products in a manner that is safe and responsive to the public.

**2.3 Non-Standardized Environmental Management Systems**

**2.3.1 Code of Environmental Management Principles**

The Code of Environmental Management Principles for Federal Agencies (CEMP) is a set of five management principles and associated performance objectives that are intended to help agencies improve upon their environmental performance and level of environmental protection. Incorporating critical common elements of existing EMSs and other quality management initiatives, CEMP was developed by EPA in coordination with fifteen other federal agencies.

CEMP seeks to assist agencies in moving beyond compliance and the traditional short-term focus on regulatory requirements to a broader, more inclusive view of the interrelated nature of environmental activities. Although it differs from most EMS standards in its emphasis on ensuring regulatory compliance, CEMP embraces classic quality management elements such as policy formulation, planning, implementation and operation, checking and corrective action, and management review. CEMP is not prescriptive with regard to federal agency use, adoption, or adaptation of a particular type of EMS. The introduction to CEMP acknowledges that implementation of an EMS that is consistent with CEMP will, in time, lead to continuous improvements in environmental performance while maintaining compliance. Please refer to [Section 3.4](#3.4) and [Appendix A Section 2.9](file:///C:\Users\DaltonCarlson\Downloads\finalreport4.html#2.9) for a more detailed discussion of CEMP.

**2.3.2 "Public Policy" Environmental Management System**

Within the United States both regulators and public interest groups have expressed fundamental misgivings about ISO 14001 that are centered on the absence of language to specifically address compliance assurance, public communication, and pollution prevention. Most organizations participating in the Multi State Working Group on Environmental Management Systems (MSWG) (a group of thirteen states, EPA, non-governmental organizations and industry representatives studying EMSs) have concluded that while the international standard is effective at meeting the internal needs of private sector organizations, it fails to meet the needs of public sector organizations with legislative mandates to protect the environment. There is general agreement among interested parties that:

* Additional language clarifying the need to achieve and document legal compliance would substantially increase the credibility of ISO 14001.
* Additional clarity about the form and extent of public communication related to setting goals and reporting environmental performance would serve to strengthen the link between the organization and its external stakeholders.
* More precise guidance on pollution prevention methodologies (with an emphasis on a waste management hierarchy that emphasizes product and process changes) would increase the return on investment realized by implementing organizations.

ISO 14001 is perceived by members of the MSWG to be failing to meet the environmental performance needs of public sector organizations. This has given rise to the evolving concept of a Public Policy EMS that more completely addresses compliance assurance, pollution prevention, and public communication. Additional information about the MSWG and the Public Policy EMS can be found in Appendix B Section 1.

**3.0 Evolution of Current DoD ISO 14001 EMS Policy**

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

Executive Order (EO) 12856 was issued to ensure federal facility compliance with the chemical reporting requirements of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and the pollution prevention requirements of the Pollution Prevention Act of 1990 (PPA). The overall objectives of EO 12856 can briefly be summarized as:

* Ensuring that all federal facilities conduct their facility management and acquisition practices in such a manner as to reduce the amount of toxic chemicals entering any waste stream through source reduction and recycling activities;
* Requiring federal agencies to report and make available to the public information on any toxic chemicals entering any waste stream at their facility, and to improve local emergency planning, response, and accident notification; and
* Encouraging markets for clean technologies and safe alternatives to toxic chemicals and hazardous substances. This is to be accomplished through revisions to the standards and practices of the federal procurement process and through testing of innovative pollution prevention technologies at these facilities.

Section 4-405 of EO 12856 requires the Administrator of the Environmental Protection Agency (EPA), in cooperation with other federal agencies, to establish a Federal Government Environmental Challenge Program. Under the program, federal agencies, including DoD, were challenged to agree to a code of environmental principles that emphasizes pollution prevention, sustainable development, and state­of­the­art environmental management programs.

**3.2 DoD Inspector General Evaluation Report No. 97-009 - Strategies for Improving DoD Environmental Compliance Assessment Programs**

In October 1996, the DoD Office of the Inspector General (DoDIG) issued Evaluation Report No. 97-009, "Strategies for Improving DoD Environmental Compliance Assessment Programs." The report concluded that weaknesses in DoD's existing environmental management programs were the most common causes of compliance violations, especially recurring violations. DoDIG found that the absence of an adequate root cause analysis often results in failure to identify, understand, and correct the real cause of compliance deficiencies. The report suggested that management, funding, and training improvements might prevent recurring violations. Based on these findings, DoDIG undertook an evaluation of existing DoD EMSs and other innovative approaches used by other federal agencies, the private sector, and the international community. The goal of this effort was to identify environmental management practices that could be used to improve the performance of DoD systems.

**3.3 DoD Inspector General Evaluation Report No. 97-068 - Strategies for Improving Environmental Management Systems in the DoD (January 1997)**

In Evaluation Report No. 97-068, "Strategies for Improving Environmental Management Systems in the DoD," DoDIG concluded that the Department's compliance-based EMSs are reactive, regulatory driven, and designed to deal with requirements that are programmatic and operational in nature. It noted that that while traditional compliance-based systems have resulted in substantial improvements in environmental quality and human health and safety, they are not effective for assuring continuous improvements in environmental performance or for demonstrating environmental achievements. DoDIG concluded that the DoD Components need more mature, quality-based EMSs in order to improve their compliance posture, minimize compliance costs, decrease regulatory oversight, reduce or eliminate penalties, and more effectively demonstrate environmental achievements. The report recommended that DoD:

* Select a uniform, DoD-wide EMS that incorporates continuous improvement and environmental stewardship processes;
* Evaluate the adequacy of current EMSs and procedures;
* Develop environmental policy, goals, and an implementation plan for achieving new environmental management responsibilities, goals, and system improvements; and
* Incorporate the selected EMS into DoD guidance.

The report concluded that such a system must contain provisions for conducting regulatory compliance assessments, periodic reviews and improvements to the EMS, and management reviews by top-level officials.

**3.4 CEMP Development**

In September 1995, the Interagency Pollution Prevention Task Force was established to meet the challenges of Section 4-405 of EO 12856. Among the objectives of the Task Force was a commitment to ensure active agency and facility participation in both the Federal Government Environmental Challenge Program, and in the development of an agency CEMP. The Task Force subsequently formed a subcommittee of agency representatives to work with EPA in developing CEMP. In September 1996, the EPA Assistant Administrator for Enforcement and Compliance Assurance forwarded the resulting CEMP document to task force participants and requested a written commitment to the CEMP Principles and a description of their plans for implementation of CEMP at the facility level. CEMP was published in the Federal Register in October 1996. The Office of the Deputy Under Secretary of Defense (Environmental Security) (ODUSD(ES)) responded by endorsing the CEMP principles, and provided the only agency response that addressed all of the objectives of each CEMP principle. ODUSD(ES) also referenced the DoD ISO 14001 Pilot Study, informing EPA that DoD was evaluating the potential adoption of ISO 14001 as a management system for the entire Environmental Security program. ODUSD(ES) recognized several advantages in adopting ISO 14001 over CEMP, on a pilot basis, in a 13 February 1996 memorandum entitled "Voluntary Adoption of ISO 14001." The stated advantages included:

* ISO 14001 is broader in scope and more readily adaptable to DoD's diverse operations,
* ISO 14001 has less of a compliance focus and more of a quality management approach,
* ISO 14001 is better known and has international as well as support from the private sector, including DoD contractors,
* Voluntary adoption of ISO 14001 on a pilot basis would place participating installations in the forefront of environmental management.

**3.5 DoD EMS Committee**

In response to the requirements of EO 12856, the conclusions of DoDIG Report 97-068, DoD commitment to the principles of CEMP, and general widespread interest in investigating the potential benefits of implementing ISO 14001, a DoD EMS Committee was established in the fall of 1996. The EMS Committee, composed of representatives of the Components and the Defense Logistics Agency (DLA), was established to collect as much information as possible about the lessons learned from private and public sector organizations that have implemented EMSs. The EMS Committee has met periodically during the course of the DoD EMS Pilot Study, and has hosted several Face-to-Face meetings where participating installations discuss implementation experiences and share lessons learned.

**3.6 Interim Guidance on Environmental Management Systems and ISO 14001**

ODUSD(ES) issued interim guidance on EMS and ISO 14001 in June 1997, to provide a consistent framework for evaluating how the adoption of ISO 14001 could help DoD reduce environmental risk, improve its compliance posture, enhance environmental stewardship, contain costs, and meet new and emerging regulatory requirements.

The interim guidance focuses on issues related to third party certification and becoming a registrar, the establishment of pilot studies, the need for open communication, and the importance of the Department speaking with a single voice with regard to ISO 14001.

* **Third-Party Certification** - The guidance explicitly states that DoD does not currently endorse, nor support, payment for third-party certification to ISO 14001, except where it can be demonstrated to the respective Component Headquarters that the benefits exceed the costs. It also states that DoD does not endorse efforts by DoD entities to become accredited registrars who perform third-party certifications.
* **Pilot Studies and Information Sharing** - Components are encouraged to conduct pilot studies of ISO 14001 implementation and to openly share information on lessons learned as a result of the studies within the military community.
* **Unified ISO 14001 Policy** - Finally, the guidance emphasizes the importance of consistently expressing a single point of view with regard to ISO 14001, especially when communicating with regulators and members of the international community.

In September 1997, ODUSD(ES) initiated a DoD ISO 14001 Pilot Study program to collect the information needed to evaluate the costs and benefits of ISO 14001 implementation in the military sector and make an informed policy decision. The study was jointly developed with the assistance of the DoD Components and seeks to evaluate how ISO 14001 affects the environmental performance and compliance posture of participating installations, and whether implementation of ISO 14001 can be expected to enhance relationships with regulators and more effectively demonstrate environmental achievements.

**3.7 USD(AT) Memorandum on Requiring Processes on Contract**

In a September 1997 memorandum to Component acquisition executives, the Under Secretary of Defense (Acquisition and Technology) reiterated the DoD policy of prohibiting any requirements for standard management approaches or manufacturing processes in solicitations or contracts, stating that performance-based requirements should be used whenever possible.

This approach has been proven effective in DoD acquisition programs such as those that require Program Managers to use a hazardous materials management plan (HMMP). An HMMP similar to that described by National Aerospace Standard (NAS) 411 ensures that adequate consideration is given to the elimination or reduction of hazardous materials used or generated by the system being analyzed, throughout all its life cycle phases.

**3.8 Other Quality Management Drivers**

**3.8.1 The National Technology Transfer and Advancement Act of 1995**

The National Technology Transfer and Advancement Act of 1995 (NTTA) requires Federal agencies and departments to use voluntary consensus standards in certain activities as a means of carrying out policy objectives unless the use of the standards would be inconsistent with applicable law or otherwise impractical. The Act encourages Federal agencies to increase reliance on voluntary standards (including business practices and management systems) and reduce dependence on in-house standards, and to compare standards used in manufacturing, commerce, industry, and educational institutions with standards developed by the Federal Government. In regulations implementing NTTA, the Office of Management and Budget (OMB) Circular A119 - Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities concludes that many standards developed by voluntary consensus standards bodies are appropriate or adaptable for the Government's purposes. Each Federal agency is required to submit an annual report to Congress, through the National Institute of Standards and Technology (NIST) documenting their use, or non-use, of voluntary standards.

**3.8.2 The Defense Reform Initiative**

DoD has recognized that its business practices are antiquated and at least a generation out of step compared to corporate America. The Defense Reform Initiative addresses the DoD corporate vision of igniting a Revolution in Business Affairs within the Department that will bring its management techniques and business practices into line with those that have made American corporations world leaders. The adoption of best business practices is the theme of the Department's Revolution in Business Affairs, which aims to radically reengineer DoD infrastructure and support activities that were developed during the Cold War. Applying the lessons of the business world to DoD represents an opportunity to replicate some of the success demonstrated by the private sector. The widespread international acceptance of ISO 14001 and other EMSs by the private sector, as a method of managing environmental responsibilities, is one best business practice that warrants attention from DoD.

**3.8.3 Secretary of Defense Memorandum on Quality Management**

In August 1997, Secretary of Defense William Cohen issued a memorandum to DoD management that recognized the many successes of Quality Management implementation initiatives within the Department. The memorandum noted that during the previous decade, a difficult period of downsizing and budget cuts, the implementation of Quality Management initiatives had helped DoD continually improve its processes and systems. Secretary Cohen urged everyone in the Department to support Quality Management initiatives, to practice these proven methods, and to encourage the shared use of Best Practices to achieve a more efficient and effective organization.

**4.0 DoD ISO 14001 Environmental Management System Pilot Study**

**4.1 Participating Installations**

A military installation has many of the same amenities and infrastructure characteristics as a small community, and has many of the same environmental concerns. For instance, most installations have a Post or Base Exchange (PX or BX) that provides merchandise and services to military personnel and their families, a commissary that provides food items, service stations to provide fuel and vehicle repairs, and a power generating or distribution infrastructure.

In addition, however, military installations also have unique environmental impacts related to their particular mission within the Department of Defense. To help assess how an EMS fits within the military sector, sixteen DoD installations, with representation from each of the military services, volunteered to participate in an ISO 14001 Pilot Study. Table 1 identifies Pilot Study installations, their Component affiliation, the extent of ISO 14001 implementation, installation plans regarding certification, and one time implementation costs.

**Table 1 - DoD ISO 14001 Pilot Study Implementation Matrix**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Installation** | **ISO 14001** | **Other EMS** | **Extent of Implementation** | **Implementation Progress** | | | | | **Certification Plans** | **Implementation Cost** |
| **Commitment and Policy** | **Planning** | **Implementation and Operation** | **Checking and Corrective Action** | **Management Review** |
| **NADEP  North Island** | 4 |  | Four Organizational Units | 100% | 100% | 100% | 100% | 100% | Third-Party  May 1999 | $409,300 |
| **Radford  AAP** | 4 |  | Rolled Powder, Powerhouse, Bioplant | 100% | 95% | 85% | 75% | 90% | Self-Declare, but are uncertain | $347,500 |
| **NAES Lakehurst** | 4 |  | Fence-to- Fence | 100% | 100% | 85% | 80% | 100% | Self-Declare/ EMR Summer 2000 | $169,540 |
| **Tobyhanna AD** | 4 |  | Fence-to- Fence | 100% | 100% | 100% | Not Provided | Not Provided | Self-Declare Sept 2000 | Not  Provided |
| **Letterkenny AD**[**\*\***](#**) | 4 |  | Fence-to- Fence | 100% | 90% | 25% | 25% | 25% | Self-Declare Dec 2000 | $160,500 |
| **Eglin AFB** |  | 4 | Air Armament Center | 100% | 100% | 100% | 100% | 100% | No | $309,049 |
| **NUWC Newport** | 4 |  | Fence-to- Fence | 100% | 100% | 100% | 100% | 100% | Third-Party  Spring 2000 | $375,000 |
| **Yuma PG** |  | 4 | Environmental Management Department | 100% | 100% | 15% | 0% | 0% | No | $101,246 |
| **NUWC Keyport** | 4 |  | Environmental Division | 100% | 25% | 20% | 20% | 20% | No | Est $121,200 |
| **MCB Camp Lejeune** |  | 4 | Env.  Management Department | 100% | 100% | 100% | 95% | 100% | No | $263,492 |
| **Sheppard  AFB** | 4 |  | Fence-to- Fence | 100% | 100% | 30% | 80% | 100% | No | $237,500 |
| **Fort  Lewis** | 4 |  | Public  Works | 100% | 100% | 95% | 100% | 100% | Third-Party Aug 2000 | $395,625 |
| **Robins  AFB** | 4 |  | All Orgs  Except DRMO & Commercial  Act | 100% | 100% | 90% | 90% | 100% | No | $607,200 |
| **Fort Bliss**[**\***](#*) |  | 4 | Garrison  Wide | 100% | 100% | 100% | 100% | 100% | No | $76,700 |
| **NAS  Whidbey Island** | 4 |  | Fence-to- Fence | 100% | 40% | 30% | 30% | 25% | No | $187,000 |
| **NS Mayport** |  | 4 | Aircraft Intermediate Maintenance Facility | 100% | 25% | 0% | 0% | 0% | No | Actual $20,000 Est $100,000 |

\*After initial development of ISO policy and initial planning stages, Ft. Bliss dropped out of Pilot Study and chose to implement Army APIC - costs shown are for limited ISO 14001 Pilot Study Participation

\*\*Does Not Include Labor Costs

**Pilot Study Implementation Gaps**

Although representatives from CINCUSNAVEUR participated on an informal basis by marking presentations at the last two Pilot Study Face-to-Face meetings, no OCONUS facilities formally participated in the Pilot Study.

The Pilot Study evaluated EMS implementation at DoD installations only. As a consequence, it did not evaluate the potential impacts of EMS implementation on environmental performance in "spaces and places" such as remote ranges, exercises, and onboard Navy vessels.

**4.1.1 Industrial Operations**

DoD industrial operations are the infrastructure that produce munitions and weapon systems, and provide a full range of maintenance, service, and support activities throughout their life cycle. These highly industrialized operations have the potential to generate significant varieties and amounts of hazardous and regulated materials with multimedia impacts. Industrial operations include depots, arsenals, ammunition plants, and shipyards.

Military depots provide for the receipt, storage, maintenance, overhaul, distribution, and demilitarization of conventional ammunition and missiles, artillery pieces, aircraft and combat vehicles, associated spare parts and sub-assemblies, and other serviceable and unserviceable commodities. Depot operations may involve painting, degreasing, plating, and demilitarization of excess or obsolete ammunition.

Military arsenals provide for the procurement, fabrication, industrial engineering, and product assurance for weapons systems and components, including manufacturing of tank, cannon, and mortar barrels and mounts, and tool set assemblies. Arsenal operations may involve the production of chemical, smoke, incendiary, illumination, and other pyrotechnic munitions, agents, and mixes.

Ammunition plants provide for the manufacture, load, assemble and pack (LAP), quality assurance, receipt and shipment, and demilitarization of munition items. Plant operations may also entail the synthesis of the industrial chemicals and acids needed as precursors for the production of munitions items.

Shipyard facilities provide services to repair, overhaul, and maintain Navy ships, including nuclear-powered ships. Drydocks, cranes, waste-handling facilities, and offices are usually located at shipyards.

**4.1.1.1 Naval Aviation Depot, North Island, CA -** The Naval Aviation Depot (NADEP) North Island provides a wide range of engineering, calibration, manufacturing, overhaul, and repair services for F/A-18, E-2, C-2 and S-3 aircraft and for ships. The Depot's Primary Standards Laboratory provides primary calibration standards for the Navy and other DoD agencies. NADEP North Island is also the site of a Composite Repair Facility, the first of its kind in the DoD, designed to play a major role in the future of Naval aviation technology and maintenance. NADEP North Island implemented their EMS in four organizational units - the Environmental Program Office, the Manufacturing and Processing Center, the Materials Engineering Laboratory, and the Primary Standards Laboratory.

**4.1.1.2 Radford Army Ammunition Plant, VA -** The primary mission of the Radford Army Ammunition Plant (RFAAP) is the manufacture of propellants and explosives. Products include single-base, double-base, triple-base solvent and solventless propellants, cast propellants, high-energy propellant grains, and other ordnance-related items. Radford AAP implemented its EMS in three areas - the rolled powder production area, the powerhouse, and the bioplant.

**4.1.1.3 Naval Undersea Warfare Center, Division Keyport, WA -** NUWC, Division Keyport is the principal provider of full spectrum undersea warfare test, training, and evaluation services. NUWC Keyport responsibilities include the test, analysis, and evaluation of undersea warfare systems in both surrogate and real war-fighting environments; in-service engineering, maintenance, and repair; fleet readiness; and industrial-base support for undersea warfare systems, countermeasures, and sonar systems. NUWC Keyport implemented its EMS in the environmental office.

**4.1.1.4 Tobyhanna Army Depot, PA -** Tobyhanna Army Depot is DoD's largest communications-electronics repair, overhaul and fabrication facility. The depot's mission includes the design, manufacture, repair and overhaul of hundreds of communications and electronics systems, including communications, command and control, surveillance and target acquisition, airborne electronics, intelligence and electronic warfare, electronic support equipment, and power systems. Tobyhanna implemented its EMS fence-to-fence.

**4.1.1.5 Letterkenny Army Depot, PA -** The Letterkenny Army Depot operates a maintenance and ammunition depot for the modification, receipt, storage, test, maintenance, and demilitarization of a broad array of missile systems. In addition to equipment maintenance, the depot has an ammunition directorate that provides a full array of conventional ammunition and missile support to Army, inter-Service, and foreign customers. Letterkenny implemented its EMS fence-to-fence.

**4.1.2 Research, Development, Test, and Evaluation Facilities**

DoD RDT&E facilities plan, conduct, analyze, and report the results of research, development, production, and acquisition phase tests and evaluation for military equipment, processes, and materiel. Test and evaluation facilities also provide technical support, guidance, and services to DoD and other federal agencies. Operations at these facilities often involve contractors and private companies. Functional categories of RDT&E operations can be broadly classified as laboratories, proving grounds, and ranges.

Laboratories provide RDT&E prototyping, fleet support, and in-service engineering to support military missions and acquisitions. The roots of research are in the application of scientific and engineering disciplines, for example aeronautics, acoustics, biology, chemistry, communications, electronics, fluid dynamics, geosciences, mathematics, mechanics, metallurgy, and physics.

Proving grounds and ranges provide the wide open spaces needed for the testing and evaluation of munitions, weapon systems, tanks, armored and wheeled vehicles, artillery, combat aircraft, aircraft target acquisition equipment and armaments, and missiles. Testing is conducted to determine performance in a variety of climates, for example deserts, tropics, and cold regions.

**4.1.2.1 Eglin Air Force Base, FL -** Eglin Air Force Base is a part of the Air Force Materiel Command, and belongs to the Air Armament Center (AAC). The AAC is responsible for the development, acquisition, testing, deployment, and maintenance of non-nuclear, air-delivered weapons. It plans, directs, and conducts test and evaluation of U.S. and allied air armament, navigation/guidance systems, and Command and Control (C2) systems. It operates two air bases, providing host support to Eglin and Kirtland AFBs, and supports the largest single-base mobility commitment in the Air Force. AAC accomplishes its mission through four components: The Armament Product Directorate (Eglin), 46th Test Wing (Eglin), 96th Air Base Wing (Eglin), and 377th Air Base Wing (Kirtland). Eglin AFB implemented its EMS within the AAC.

**4.1.2.2 Naval Undersea Warfare Center, Division Newport, RI -** The Naval Undersea Warfare Center (NUWC), Division Newport provides the technical foundation for the conceptualization, research, development, fielding, modernization, and maintenance of submarines, autonomous underwater systems, and offensive and defensive weapons systems that ensure the Navy's undersea superiority. NUWC Newport implemented its EMS fence-to-fence.

**4.1.2.3 Yuma Proving Ground, AZ -** Yuma Proving Ground conducts tests on medium and long-range artillery, aircraft target acquisition equipment and armament, armored and wheeled vehicles, a variety of munitions, and personnel and supply parachute systems. Yuma Proving Ground possesses an infrastructure that allows for full and realistic testing of weapons systems in the ground combat arena. It is the Army's center for desert natural environment testing and manages cold weather testing at the Cold Regions Test Center, Alaska. Yuma implemented its EMS in the environmental office.

**4.1.2.4 Naval Air Engineering Station, Lakehurst, NJ -** The Naval Air Engineering Station (NAES) Lakehurst provides cradle-to-grave technical support for aircraft launch and recovery equipment, and other aviation support equipment. NAES Lakehurst programs are related to technology development, engineering, developmental evaluation and verification, systems integration, limited manufacturing, procurement, integrated logistics support management, and fleet engineering support for Aircraft Platform Interface systems. NAES Lakehurst implemented its EMS fence-to-fence.

**4.1.3 Training Facilities**

To maintain a high state of operational readiness, DoD personnel are required to regularly train with their weapons systems. Training activities occur on the land, in the air, or at sea, and include the deployment, use, and operation of hand-held weapons and munitions; artillery pieces; tanks and other combat vehicles; conventional on-road vehicles; non-road vehicles; aircraft; amphibious vehicles and landing craft; ships; and air-, sea-, and land-launched weapons systems.

**4.1.3.1 Marine Corps Base Camp Lejeune, NC -** The Marine Corps Base (MCB) Camp Lejeune is the home of Marine Corps Expeditionary Forces in Readiness. MCB Camp Lejeune has 11 miles of beach capable of supporting amphibious operations, 54 live-fire ranges, 89 maneuver areas, 33 gun positions, 25 tactical landing zones and a state of the art Military Operations in Urban Terrain training facility. 38,000 Marines and sailors are stationed at MCB Camp Lejeune. In addition, military forces from around the world come to Camp Lejeune on a regular basis for bilateral and NATO-sponsored exercises. Camp Lejeune implemented its EMS within the environmental office.

**4.1.3.2 Sheppard Air Force Base, TX -** Sheppard AFB operates under the Air Education and Training Command (AETC). Officers, airmen, and noncommissioned officers come to Sheppard AFB to receive basic and advanced training in areas that include pharmacy, aerospace propulsion, aircraft maintenance (fixed wing and helicopter), aircraft structural maintenance, civil engineering, comptroller, electronics, fuels, and telecommunications. Major organizations on the base include the 82nd Training Wing, and the 80th Flying Training Wing. The 80th Flying Training Wing is the home of the Euro-NATO Joint Jet Pilot Training program, a unique multinational endeavor to train pilots from 12 NATO nations. Sheppard AFB implemented its EMS fence-to-fence.

**4.1.4 Operating Bases**

The function of operating bases is to directly support DoD's national security mission. In order to fulfill this function, there are a large range of direct support facilities at operating bases, including maintenance depots, supply depots, fuel depots, offices, and transport facilities.

**4.1.4.1 Fort Lewis, WA -** Fort Lewis is the home of the U. S. Army's I Corps. Major elements of I Corps that are stationed and train at Fort Lewis include the 1st Brigade, 25th Infantry Division and the 3rd Brigade, 2nd Infantry Division (both of which are reorganizing as part of the Army's Initial Brigade concept); an Engineer Group; a Medical Group; a Military Intelligence Brigade, a Corps Support Group and a Military Police Brigade. Tenant units include a Special Forces Group, a Ranger Battalion, and a Medical Center. The military population of approximately 18,000 is supported by a workforce of about 5,000 civilians. The U.S. Army Garrison comprises the bulk of the civilian workforce and provides the majority of the installation infrastructure and essential services. Public Works (a Directorate of the Garrison consisting of about 500 civilians) provides facility maintenance and repair, utilities, fire and emergency services, and manages 3,500 sets of family quarters for soldiers and their families. Public Works is also responsible for the environmental management program for Fort Lewis. The EMS was implemented in Public Works.

**4.1.4.2 Robins Air Force Base, GA -** Robins Air Force Base is home of the Warner Robins Air Logistics Center (WR-ALC). WR-ALC is one of five air logistics centers in the U.S. Air Force and currently the largest industrial complex in the state of Georgia. It is tasked with providing worldwide logistics management, engineering, and organic depot maintenance for the C-5, F-15, C-141 and C-130 aircraft and is host to over 40 tenant organizations. As an integral member of the Air Force Materiel Command, WR-ALC's number one goal is to help maintain the combat capability of the Air Force. Robins AFB implemented its EMS in all organizations except the Defense Reutilization Marketing Organization and commercial activities.

**4.1.4.3 Fort Bliss, TX -** Fort Bliss is home to the U.S. Army Air Defense Artillery Center. Fort Bliss supports several of the Army's premier warfighting units and numerous training and support commands. The majority of the soldiers stationed at Fort Bliss are responsible for air defense artillery training of U.S. soldiers and various allied nation soldiers. With 1.1 million acres, Fort Bliss is larger than the state of Rhode Island. Portions of the installation are surrounded by lands administered by the Bureau of Land Management and U.S. Forrest Service (to the north and west), with pockets of privately owned lands used for ranching to the east. To maintain a high state of operational readiness, annual military training exercises occur here, including the largest joint training exercise in the world, Roving Sands.

**4.1.4.4 Naval Air Station, Whidbey Island, WA -** Naval Air Station Whidbey Island (NAS Whidbey Island) is an operational Navy base that provides facilities, services, and products in support of the naval aviation community and fleet operations. Aircraft supported include the EA-6B Prowler and P3C Orion. Services provided include: aircraft and air field inspection, maintenance and repair; air traffic control for restricted use air space; ground support equipment and electronics; weapons storage and a weapons system training complex; and training facilities for surveillance aircraft, shipboard and flight/hangar deck fires. The station also supports two explosive ordnance detachments with both land-based and in-water training ranges. NAS Whidbey Island implemented its EMS fence-to-fence.

**4.1.4.5 Naval Station Mayport, FL -** Naval Station (NS) Mayport in Jacksonville, Florida serves as a home base for Navy ships and helicopters, as well as a training and repair station for the Navy's Atlantic Fleet. Within NS Mayport, the Aircraft Intermediate Maintenance Department (AIMD) maintains and repairs SH-60B Seahawk helicopters. NS Mayport planned to implement its EMS in AIMD.

[**Go To Top**](file:///C:\Users\DaltonCarlson\Downloads\finalreport1.html)[**Go to Table of Contents**](#toc)[**Next**](file:///C:\Users\DaltonCarlson\Downloads\finalreport2.html)