# ENVIRONMENTAL MANAGEMENT SYSTEMS: INSTITUTIONALIZING POLLUTION PREVENTION

**Background:** This is one in a series of Information Briefs produced by EH-41 that discuss Environmental Management Systems (EMS), their implementation, and their relationship to other DOE environmental initiatives. DOE's pollution prevention programs have been an integral part of DOE policy since the early nineties and are also an integral component of EMS philosophy. The Pollution Prevention Act of 1990 establishes as national policy a hierarchy of pollution prevention practices: first, pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated; and disposal or other release into the environment should be employed only as a last resort in an environmentally safe manner. While pollution prevention is defined by EO 12856 and EPA's interpretive guidance as "source reduction," within DOE, pollution prevention reaches beyond source reduction to include recycling, energy efficiency, water conservation, renewable energy resources and more. An EMS can institutionalize and extend DOE's approach to pollution prevention across activities, programs, and facilities.

**References**:

1. ISO 14001, *"Environmental Management Systems -- Specification with guidance for use,"* International Organization for Standardization, 1996.
2. ISO 14004, *"Environmental Management Systems -- General guidance on principles, systems, and supporting techniques,"* International Organization for Standardization, 1996.
3. Pollution Prevention Act of 1990.
4. Executive Order 12856, *"Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements,"* August 1993.
5. DOE Order 5400.1, *"General Environmental Protection Program."*
6. DOE Order 5820.2A, *"Radioactive Waste Management."*
7. *"Waste Minimization/Pollution Prevention Crosscut Plan,"* February 25, 1994.
8. *"United States Department of Energy Pollution Prevention Strategy,"* 1994.
9. *"The Complex-Wide Study on the Successful Integration of Pollution Prevention into the Environmental Restoration Program,"* (2 Volumes), DOE Office of Environmental Restoration (EM-40), October 1996.

## The ISO 14001 Standard talks about "prevention of pollution." Is this the same as pollution prevention?

Not exactly. When ISO 14001 refers to "prevention of pollution," it is defined to include "use of processes, practices, materials or products that avoid, reduce, or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution."

"Pollution prevention" as implied in the Pollution Prevention Act of 1990 (see text box) and defined by a May 28, 1992, memorandum from EPA is essentially equivalent to source reduction. DOE's *Pollution Prevention Strategy* (Reference 8), expands the DOE concept of pollution prevention to include recycling and other environmental quality issues.

The EMS concept of "prevention of pollution" is much broader than simple "source reduction" and DOE's pollution prevention strategy. However, it can be seen from these definitions how source reduction or "pollution prevention" is an integral part of the overall EMS concept.

*"Source reduction means any practice which -*
*(i) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment prior to recycling, treatment, or disposal;*
*(ii) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.*

*The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control.*

***- Section 6603(4)(A), Pollution Prevention Act of 1990***

**How will use of an EMS improve DOE's commitment to pollution prevention?**

Pollution prevention has been recognized for some time as a key part of DOE efforts to ensure environmental protection. In addition to regulatory drivers (such as the Pollution Prevention Act of 1990), DOE policy requires the implementation of site-specific pollution prevention plans and programs (References 5, 6, 7, 8). In the field, pollution prevention has proven to be a technically and fiscally sound practice -- contributing to reduced costs, liability, and environmental impacts (e.g., Reference 9).

Pollution prevention is an important component of any EMS. The over-all objectives of pollution prevention programs already in place at DOE [i.e., to reduce waste generation, protect the environment, reduce future risks and costs associated with managing wastes and pollutants, and improve energy efficiency (Reference 8)] are similar to those of an EMS, but the EMS strives to achieve its objectives in a manner that is both broader, and within a management system framework.

The ISO 14001 EMS framework (i.e., policy, planning, implementation and operation, checking and corrective action, and management review) requires the establishment of a management system dedicated to the prevention of pollution by all practical means imaginable. This is assured by requiring a strong policy commitment to continual improvement and the prevention of pollution (Reference 1 and text box). The ISO standard requires procedures to identify the environmental aspects of an organization's activities, products, or services in order to determine those which have or can have significant environmental impact. This information is used to set environmental objectives that, over the course of time, will change because of changes in activities, products and services; and because continual improvement will force change. The EMS framework includes requirements covering planning, accountability, training, documentation, operating procedures, nonconformance, corrective and preventive action, and more. These are the specific system procedures that ISO 14001 institutionalizes to advance environmental policy.

***"Top management shall define the organization's environmental policy and ensure that it includes a commitment to continual improvement and prevention of pollution."***

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***" The organization shall establish and maintain (a) procedure(s) to identify the environmental aspects of its activities, products, or services ... in order to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects related to these significant impacts are considered in setting its environmental objectives."***

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***"(the) organization shall establish and maintain documented environmental objectives and targets...objectives and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution."***

***- ISO 14001 EMS Standard***

The EMS policy commitment to prevention of pollution and continual improvement requires the use of any and all tools at DOE's disposal. As shown by the affirmative experience DOE sites have had to date, the pollution prevention program will be an essential tool for achieving policy goals for any site that adopts an EMS.

**What are some specific ways that an EMS can improve DOE's pollution prevention efforts?**

Although much of the DOE Pollution Prevention Program is founded on sound management principles that fit right into the EMS framework, there are areas where the EMS is more demanding. For example, the EMS's policy commitment to continual improvement and keeping environmental aspects and impacts up-to-date requires the periodic reevaluation of *all* environmental aspects and impacts of *all* activities, products, or services, and the review of associated environmental objectives. Such reviews, institutionalized within a management system, afford new opportunities for the application of source reduction (and other environmental impact-lessening) initiatives on a periodic basis.

Another way an EMS can enhance pollution prevention is by spreading the best pollution prevention (and other) practices currently in use into all on-going activities, whatever their nature. An EMS can enhance communications between site organizations that historically have operated separately.

Additional specific ways an EMS can improve pollution prevention include, but are not limited to:

- Environmental Aspects and Impacts - DOE can identify points of waste generation, and known or potential releases, using a systems approach that gives a unified, interconnected view of opportunities for reducing environmental impacts through pollution prevention.

- Procurement - the EMS can help ensure the performance, availability, and inventory of "green" materials.

- Process Design - the EMS can help manage procedures to incorporate pollution prevention concepts into projects at the earliest stages.

- Environmental Management Programs - the EMS can help address environmental impacts not addressed by laws and regulations, perhaps extending pollution prevention beyond regulatory requirements. An EMS can help to ensure that all DOE pollution prevention activities are conducted on a consistent basis across site organizations.

- Monitoring and Measurement - an EMS can facilitate gathering and disseminating case studies and other information on pollution prevention. This feedback can help focus continuous improvement efforts within an EMS.

What these areas will have in common is a focus on continuously improving management. An EMS focuses on the management system -- continuously looking for cost-effective ways to prevent pollution.

**What benefits are associated with a strong pollution prevention program?**

Both the EMS and pollution prevention programs share the philosophy that future gains in environmental protection are more likely to come from avoiding and minimizing risks and problems than by reacting to them. This philosophy promotes practices that increase the cost- and mission-effectiveness of DOE operations. For example, Reference 9 describes a number of environmental restoration (ER) projects in which pollution prevention concepts have been successfully applied to save money and reduce waste volumes. Page 4 of the Executive Summary of the report recommends that DOE, "Integrate pollution prevention principles into all ER projects at the planning/negotiation phase and evaluate pollution prevention implications during subsequent project phases." Although this study focused on restoration projects, other DOE activities could also benefit from early adoption of pollution prevention concepts. DOE experience has shown that a successful pollution prevention program can reduce acquisition costs, utilize materials more efficiently, reduce treatment and disposal costs, reduce pollutant releases, and reduce health and environmental risks. Within an EMS, pollution prevention concepts are routinely integrated at the earliest project stages and periodically reevaluated to discover opportunities for improvement.

**Many sites have established pollution prevention programs. Will they have to redesign them?**

No. One valuable characteristic of an EMS is that it emphasizes using what has already been developed and proven effective. A "culture" of pollution prevention is currently in place at many DOE facilities and laboratories. Adopting an EMS would not change that. However, an EMS could assist DOE staff, managers, and contractors in taking a more systematic approach to building source reduction into all projects from their outset. Facilities and laboratories may find that their current programs easily fit within an EMS structure. In fact, facilities with strong pollution prevention programs may find that an EMS simply helps to institutionalize the existing program, getting more value from what has already been developed.

How can I get more information?

EH-41 is providing technical assistance on EMS issues to facilities, labs, and programs. For further information, contact Larry Stirling at (202) 586-2417.

For information on pollution prevention, contact Jane Powers at (202) 586-7301.

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