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Kansas City Division

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A Comparison of ISO 14001 to Other Related Environmental Management Systems and Tools

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PURPOSE

Efficient environmental management is of increasing priority for the industrial sector. The achievement of ISO 14001 certification will demonstrate that the environmental management system meets or exceeds industry standards since this standard will be the accepted international measure of environmental management. A review of published environmental management systems and tools was conducted to ensure all aspects of environmental management are covered in the establishment or formalization of an environmental management system. The objective of this effort is to compare the ISO 14001 standard with other environmental management systems and tools.

SCOPE

While the benefits of ISO 14001 certification are recognized, there are aspects of other environmental management systems and management tools which, while not components of ISO 14001, could serve to optimize an ISO 14001 based environmental management system. The principles and specifications of ISO 9001, ANSI E4, EPA Environmental Leadership Program, International Chamber of Commerce Global Environmental Management Initiative, and the Chemical Manufacturers Association Responsible Care Program were identified and compared to determine common elements and elements not identified under ISO 14001. Principles common to the various systems reviewed were deemed to be essential elements of any environmental management system.

APPROACH

A multi-disciplined team was established to research various environmental management systems and recommend the most appropriate and comprehensive environmental management system for the Kansas City plant. This team chose to use a benchmarking approach to attempt to identify those characteristics which constitute an effective environmental management system. Initial reviews indicated that environmental management system characteristics are not consistently defined; however, the team believed that characteristics common to the various environmental management systems published were inherently valid.

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The EPA's Environmental Management System Benchmark Report, published by the U.S. EPA Office of Enforcement and Compliance Assurance, December 1994, used several environmental management documents in the benchmark development process (see Appendix 1 for a list of documents reviewed and Appendix 2 for organizations responding to questionnaires). The EPA process relied upon these environmental documents to develop the "Best in Class" benchmark rather than identifying one organization as the benchmark. The documents were reviewed to identify an ideal set of characteristics for the performance of organizational environmental responsibilities.

The elements identified were contained in most, if not all, of the documents reviewed. EPA went on to identify key indicators for each element against which environmental programs can be judged to satisfy the requirements of that particular element.

EPA's study identified six benchmark elements:

- Organizational Structure: gives authority, input, and voice to environmental performance;
- Management Commitment: possess and demonstrate commitment to environmental excellence and insist on integration of environmental awareness and concerns in the business;
- Implementation: carry out daily business operations through integration of environmental protection into business conduct;
- Information Collection/Communication/Management/Follow-up: continually monitor environmental performance through formal tracking and reporting, evaluate and disseminate information, and use information to continually improve;
- Internal and External Communication: foster and use formal and informal channels to communicate environmental commitment and performance;
- Personnel: hire, train, and deploy personnel such that they are capable of developing and implementing environmental initiatives.

In addition to the EPA benchmark study, the team reviewed ISO 14001, ANSI E4, ISO 9001, the International Chamber of Commerce Global Environmental Management Initiative (GEMI), and the Chemical Manufacturers Association Responsible Care. The following discussions summarize each system.

The ISO 14001 standard specifies the core elements deemed essential to an effective environmental management system. It is composed of 17 elements based on the following five management principles:

- Commitment and Policy: top management shall define environmental policy;

- Planning: identify environmental aspects of activities, products, and services; identify and have access to legal and other environmental requirements; document environmental objectives and targets; establish programs for achieving objectives and targets;

- Implementation: define, document, and communicate roles, responsibilities, and authorities; identify training needs and require receipt of training for appropriate personnel; establish procedures for internal communication and receipt of external communication; document core elements of environmental management system; establish control over documents required for environmental management system; identify operations and activities with potential significant environmental impact; establish emergency preparedness and response procedures;

- Measurement and Evaluation: establish procedures to monitor and measure key characteristics of operations and activities; establish procedures for handling and investigating nonconformance; establish procedures for identifying, maintaining, and disposing of environmental records; conduct periodic audits of environmental management system;

- Review and Improvement: top management shall periodically review the environmental management system addressing the possible need for policy changes.

The standard does not establish absolute requirements for environmental performance beyond commitment, in the policy, to compliance with applicable legislation and regulations and to continual improvement.

The ANSI E4 standard is divided into three parts: Part A, Management Systems; Part B, Collection and Evaluation of Environmental Data; and Part C, Design, Construction, and Operation of Environmental Technology. The standard incorporates relevant criteria from existing standards and guidelines, including ASME NQA-1 and the ANSI Q9000 series, and presents them from an environmental perspective. Each part consists of elements or functions which are defined by specifications, requirements which must be met, and guidelines, recommended or optional requirements. The specifications utilized in this effort are the Part A Management Systems Specifications, with the following elements:

- Management and Organization: establish environmental quality policy defining organizations, responsibilities, accountability, and authority; ensure elements of standard are understood and provide adequate resources to plan, implement, and improve the system; regularly assess the system, defining objectives and measures of assessments and implementing corrective actions;

- Quality System and Description: quality system established as an integral part of management system; quality system to ensure products and results are quality and type needed; quality system documented in a quality plan or manual and define the environmental management system; quality system reviewed and updated regularly;

- Personnel and Qualifications: personnel trained and qualified for their work; need for certifications reviewed; training performed and documented; training re-evaluated when job requirements change; resources for training provided;

- Procurement of Items and Services: procurement of items and services for environmental management controlled; procurement documents contain specific descriptions and quality requirements; procurement documents reviewed initially and after changes for accuracy and completeness;

- Documents and Records: procedures established for controlling and maintaining quality documentation and records; controlled documents identified; documents reviewed initially and after revisions; documents used to perform work kept current; users understand documents; obsolete documents marked or other measures taken to preclude their use; records maintained to demonstrate completion of required work; records retention requirements established for all records;

- Computer Hardware and Software: computer hardware and software controlled to the established standards; computer configurations tested and maintained; changes to computer configurations assessed and documented; changes to program requirements cause computer configurations to be tested and documented;

- Planning: systematic planning process established and documented; planning documentation reviewed and approved;

- Implementation of Work Processes: work performed according to approved plans and documents; management oversight and inspection based on level of importance of work; procedures developed for work processes and sufficient to obtain desired results; procedures reviewed and approved; work performance routinely evaluated;

- Assessment and Response: assessments planned, scheduled, and conducted and their results evaluated; management determines the type of assessment(s) to be conducted; assessments include technical aspects to determine technical not just procedural compliance; assessment protocols documented; assessment results reviewed and appropriate actions taken; personnel conducting assessments qualified and provided resources and opportunities to perform assessments appropriately; assessment responses prompt and documented;

- Quality Improvement: develop and implement a quality improvement process; establish procedures to detect and correct problems with system; determine cause and effect and root cause of problems identified.

Under the International Chamber of Commerce Global Environmental Management Initiative, there is a list of 16 principles for environmental management grouped into four business activity categories: Policy Setting; Systems and Procedures; Implementation and Education; and

Monitoring and Reporting. Implementation of these principles is through the use of an annual environmental self-assessment program. The 16 principles are as follows:

- Corporate Priority: recognize environmental management as among highest corporate priorities; establish policies, programs, and practices for environmental management;
- Integrated Management: integrate policies, programs, and practices into business functions;
- Process of Improvement: continue to improve corporate policies, programs, and environmental performance starting with legal requirements and building upon consumer and community needs and expectations; apply the same standards internationally;
- Employee Education: educate, train, and motivate employees to conduct their activities in an environmentally responsible manner;
- Prior Assessment: assess environmental impacts prior to starting new activities or projects;
- Products and Services: develop and provide products and services considering environment;
- Customer Advice: advise and educate customers and distributors in safe handling of products;
- Facilities and Operations: design and operate facilities to minimize environmental impacts;
- Research: conduct or support research on environmental impacts of raw materials, products, processes, and wastes and means of minimizing wastes;
- Precautionary Approach: modify the manufacture, marketing, or use of products to prevent significant adverse environmental impacts;
- Contractors and Suppliers: promote adoption of these principles by contractors and suppliers;
- Emergency Preparedness: develop emergency preparedness plans involving local authorities, emergency services, and community;
- Transfer of Technology: contribute to the transfer of environmentally sound technology;
- Contributing to the Common Effort: contribute to the development of public policy, local business and government programs, and educational initiatives that enhance environmental awareness;
- Openness to Concerns: foster openness and dialogue with employees and the public regarding potential hazards and impacts;

- Compliance and Reporting: conduct regular environmental audits and assessments of compliance with regulatory requirements, company policies, and these principles.

The Chemical Manufacturers Association Responsible Care has defined ten key elements which member organizations must adopt. These elements are designed to enhance the public perception of chemical handling by the member organizations. The elements are as follows:

- Guiding Principles: outline commitment to environmental, safety and health responsibility in managing chemicals;

- Codes of Management Practices: six practices which cover virtually every aspect of chemical manufacturing, handling, and transportation;

- National Public Advisory Board: provides the public perspective on Responsible Care and its activities;

- Self Evaluations: measures member company's progress in implementation;

- Performance Measures: shows, through external measures, progress of Responsible Care;

- Management Systems Verification: include appropriate third party involvement;

- Executive Leadership Groups: key executives share experiences and review progress;

- Mutual Assistance Network: provide assistance in implementation through networking;

- Partnership Program: provides opportunity for organizations not involved in CMA to participate in Responsible Care;

- Obligation of Membership in CMA: all the elements must be satisfied to become and remain a member of the CMA.

The ISO 9001 standard was reviewed for the purpose of identifying areas of common ground which could be built upon for the ISO 14001 Environmental Management System. ISO 9001 is a quality management standard made up of 20 elements: Management Responsibility; Quality System; Contract Review; Design Control; Document and Data Control; Purchasing; Control of Customer-Supplied Product; Product Identification and Traceability; Process Control; Inspection and Testing; Inspection, Measuring, and Test Equipment; Inspection and Test Status; Control of Nonconforming Product; Corrective and Preventive Action; Handling, Storage, Packaging, Preservation, and Delivery; Quality Records; Internal Quality Audits; Training; Servicing; and Statistical Techniques. Systems developed to meet ISO 9001 elements such as records management, training, and corrective action can be used to meet identical elements under ISO 14001.

RESULTS

All the pertinent characteristics of the environmental management systems and tools were extracted, summarized, and compiled in Table 1. Each system was compared to the summarized characteristics and the results documented in Table 1.

The review and comparison of various environmental management systems and management tools concluded that ISO 14001 is the most comprehensive of the environmental management systems reviewed. Elements were identified in other environmental management systems which are not specifically covered under ISO 14001 and could be incorporated into an organization's environmental management system. Some of these elements include involvement of subcontractors and suppliers, inclusion of computer-related quality elements, management commitment beyond environmental compliance, advising customers on environmental issues related to products or services, and research into environmental aspects of business.

At a high level, these systems appear equal, containing very similar guiding principles. Only when viewed from the lower levels of the implementing principles or elements is a distinction apparent. The approach taken in preparing each of these systems is unique, the principles or elements are presented in differing formats, and the details become very difficult to compare. Therefore, any organization establishing or formalizing an environmental management system should review these in more detail for their own needs.

Table 1. Characteristics of Environmental Management Systems and Tools

CHARACTERISTIC	EPA	ANSI	14001	GEMI	CMA	19001
Organizational Structure						
Mission/Policy statement	Yes	Yes	Yes	Yes	Yes	No
Authority, responsibility and accountability	Yes	Yes	Yes	No	Yes	No
Formal system for requirements tracking	Yes	No	Yes	No	No	No
Environmental management functions at high level	Yes	Yes	Yes	Yes	Yes	No
Subcontractor coverage	No	Yes	No	Yes	No	No
Management Commitment						
Environmental risks/costs integrated into business planning	Yes	Yes	Yes	Yes	Yes	No
Environmental considered in all business decisions	Yes	No	Yes	Yes	Yes	No
Management commits going beyond compliance	Yes	No	No	No	No	No
Environmental criteria used in vendor/subcontractor selection	Yes	Yes	No	No	No	No
Environmental risks assessed for all activities	Yes	Yes	Yes	Yes	No	No
Capital budgeting allows for environmental resources	Yes	No	Yes	No	No	No
Implementation and Operations						
Goals/Objectives are established	Yes	Yes	Yes	No	Yes	No
Programs implemented to meet goals	Yes	Yes	Yes	No	Yes	No
Management assigned to ensure implementation	No	Yes	Yes	No	No	No
Document control mechanisms	No	Yes	Yes	No	No	Yes
Operational control mechanisms	Yes	No	Yes	No	No	No
Emergency preparedness plans	No	No	Yes	Yes	Yes	No
Guidance provided to line operations	No	Yes	Yes	No	No	No
Management review	No	Yes	Yes	No	Yes	No
Research environmental aspects of products	No	Yes	No	No	No	No
Computer hardware and software	No	Yes	No	No	No	No
Monitoring						
Control baselines established	Yes	Yes	Yes	No	No	No
Performance metrics established	Yes	Yes	Yes	No	Yes	No
Performance communicated to appropriate organizations	Yes	Yes	Yes	No	No	No
Corrective actions are tracked and verified	Yes	Yes	Yes	No	No	Yes
"Lessons learned" used to identify improvement areas	Yes	Yes	Yes	Yes	No	Yes
Trend analyses are performed to identify concerns	Yes	Yes	Yes	No	No	No
Continuous quality improvement	Yes	Yes	Yes	Yes	Yes	No
Communication						
Channels exist for communicating concerns	Yes	No	Yes	Yes	No	No
Environmental awareness communicated throughout organization	Yes	No	Yes	Yes	No	No
Input regarding environmental solicited from external parties	Yes	No	Yes	Yes	Yes	No
Advise customers on environmental issues	No	No	No	Yes	No	No
Personnel						
Sufficient staff available and trained	Yes	Yes	Yes	No	No	No
All employees receive initial and ongoing training	Yes	Yes	Yes	Yes	No	No
Environmental criteria part of employee's performance measure	Yes	No	Yes	No	No	No

Appendix 1

EPA's Benchmark Study -- Development Documents List

Guideline for a Voluntary Environmental Management system, Revision 8.1, Canadian Standards Association, March 1, 1994

Request for Environmental Leadership Program Pilot Project Proposals, United States Environmental Protection Agency, Federal Register Notice 58 FR 4802, January 15, 1993

Proposed American National Standard, NSF International Standard for Environmental Management Systems -- Guidelines for Environmental Auditing -- Principles and General Practices, NSF 100-1994. Draft 3.5, February 1994

Proposed American National Standard, NSF International Standard for Environmental Management Systems -- Guiding Principles and Generic Requirements for Environmental Management Systems, NSF 110-1994. Draft 5.1, May 1994

Protocols for Conducting Environmental Management Assessments of DOE Organizations, United States Department of Energy, DOE/EH-0326, June 1993

A Guideline for Voluntary Management System, NSF International, Revision 5.0, April 12, 1993

Appendix 2

EPA's Benchmark Study -- Responding Organizations

Defense-Related Agencies: Sent out four questionnaires and received four responses.

- Department of Energy
- Department of the Army
- Department of the Air Force
- Department of the Navy

Private Companies: Sent out five questionnaires and received three responses.

- Chevron Corporation
- 3M Corporation
- Xerox Corporation

Civilian Federal Agencies: Sent out 28 questionnaires and received 17 responses.

- Department of the Treasury
- United States Postal Service
- Federal Aviation Administration
- Department of Commerce
- National Oceanic and Atmospheric Administration
- National Security Administration
- Department of Agriculture
- Department of Agriculture/Agricultural Research Service
- Department of Agriculture/Grain Inspection Service
- Department of Agriculture/Animal and Plant Health Inspection Service
- Department of Agriculture/Soil Conservation Service
- Department of Justice
- Department of Commerce
- Environmental Protection Agency/Office of Administration and Resources
- Three anonymous Civilian Federal Agencies

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