

## **IMPACT OF THE INTERNATIONAL ENVIRONMENTAL MANAGEMENT SYSTEM STANDARD – ISO 14001**

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Course/Name: MAN 5203 – Custom Course

Program: Ph.D. Candidate, *International Business*

Submitted: June 13, 2003

Course Start: May 2003

Program Start: May 2003

Course Type: A Practical Paper using US English

Word Count: 4,009

Hours: 80

Advisor: Dr. Laurence Leigh

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Language: US English

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Credits: 3 (three)

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**Target Audience:** Working environmental professionals in various fields of service who are active in the EMS arena.

**Purpose of this Paper:** To provide a comprehensive update on the effects of ISO 14001 in the environmental management field.

**Executive Summary :** ISO 14001 was intended to provide companies worldwide with a level playing field with specific regards to environmental management systems (EMS). Over the past decade, mixed reviews have had an impact on the business community. The US Government has both supported and neglected the standard, industry has adopted the requirements slowly and often grudgingly and the active professional involved with ISO 14001 has had to really “sell” the benefits of the standard. In recent years, these mixed perceptions have finally begun to converge into a comprehensive and strategically beneficial management system for companies.

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## **INTRODUCTION**

The purpose of this paper is to bring information to the environmental professional dealing with environmental management systems (EMS) and the ISO 14000 series of international standards. The scope of this paper is limited only by the availability of formally accepted international standards (IS) at the time of its writing.

The focus of the paper is on the management of environmental projects and programs, with a specific mention of the water professionals and their industry, but will cover a broad range of disciplines.

This paper will specifically address the current issues facing the environmental manager from both the internal company point of view (such as establishing and maintaining an environmental management system) and the external project point of view (defining and implementing an environmental management system).

Care should be exercised by the environmental sub-sectors to ensure that they conform to the requirements of the standard as stated as well as to the intent of the international standards. The ISO 14000 series of international standards, with the exception of ISO 14001, are intended to be used as guideline documents which require no external certification. ISO 14001 is the only standard which makes allowance for either self-declaration of conformity or third-party (external) registration. In other words, ISO 14001 is the only prescriptive standard in the environmental series.

## **GENERAL BACKGROUND ON ISO**

Founded in 1946, in the aftermath of World War II, the International Organization for Standardization (ISO), headquartered in Geneva, Switzerland, has evolved into the decision making body for international standards.

Current membership within ISO is placed at well over 150 nations. Each nation (some are voting members, others are not) has a representative to the ISO, who is responsible for keeping current on all new standards as well as bringing to light any new proposals from that representative's nation.

The United States is represented by the American National Standards Institute (ANSI). ANSI has been diligent in fostering communications among various U. S. industrial sectors whose interests are directed towards the international standards through the TAG. One such sector is the environmental management profession.

Within the ISO structure there is a series of committee level (TC), sub-committee level (SC), and working group level (WG) teams which formulate the essence of the various international standards under ISO.

## **SPECIFIC BACKGROUND ON ISO 14001**

In response to mounting international concern over the environment, and the success of the ISO 9000 QMS standards, ISO established SAGE (the Strategic Action Group on the Environment) to make a recommendation regarding the possibility (viability) of creating a series of international environmental management standards.

Based on the positive input received from SAGE, ISO proceeded forward with the formal establishment of Technical Committee 207, which is to compile and integrate the ISO 14000 series of environmental management systems documents.

TC207 is further broken down into six sub-committees, each with a unique set of guidelines under the ISO 14000 auspices. SC1 is responsible for the ISO 14001 specification standard which interested companies may eventually conform (self-declare) or certify (third party declaration) to depending on their specific interests (see Table 1). The other SCs and WGs are responsible for the principles and guidelines necessary to implement an effective EMS program (see Table 2).

There is only one specification standard within the ISO 14000 series: ISO 14001. Specification standards are the only auditable standards by outside agencies. This unique standard provides companies with a sound environmental framework which, when the standard is implemented effectively, will provide an enhanced EMS within any type of company (either a manufacturing or service sector). Environmental professionals should be meticulous when strategizing the implementation of an EMS and should constantly remind themselves that this standard is designed as a conformance tool, not a compliance tool. There is also one guidance standard within the ISO 14000 series: ISO 14004. Guidance standards are available to companies seeking additional clarification on strategies regarding internal implementation of the requirements.

## **MANAGEMENT PRINCIPLES**

There are five environmental management system (EMS) principles within ISO 14001. Briefly paraphrased below they are:

*Principle 1 - Commitment and Policy*: An organization should focus on what needs to be done – it should ensure commitment to the environmental management system and define the company's policy.

*Principle 2 - Planning*: An organization should formulate a plan on how it will fulfill its stated environmental policy.

*Principle 3 - Implementation*: An organization must develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets if it is to implement the policy effectively.

*Principle 4 - Measurement and Evaluation*: An organization should measure, monitor, and evaluate its environmental performance.

*Principle 5 - Review and Improvement*: An organization should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

An environmental management system following these five principles provides order and consistency, worldwide, in addressing environmental concerns. Organizations need environmental management systems in order to anticipate and meet environmental performance expectations and ensure compliance with requirements, both nationally and internationally.

Environmental management is an essential, integral part of the overall management system. The design of the system must be an ongoing, interactive activity for defining, documenting, and continually improving the required capabilities.

The Standard is especially tailored for small and medium-sized companies although its guidance and elements of management can be used by organizations of any size.

Implementing an ISO registered EMS will give customers, the public, and governments more confidence that environmental objectives and targets are being met. Emphasis is on prevention of incidents, and that the EMS demonstrates that there is evidence of regulatory compliance and continual improvement.

The environmental management system is a framework to allow organizations to link environmental objectives (company goals – strategic) with targets (specific milestones – tactical) with stated company financial performance (returns – ongoing). The relationship between positive environmental interaction and an individual company's financial strength has precedence, thus strengthening the overall benefits of all three activities – objectives, targets and gains – to a given company's overall performance.

(Sayre 1996, multiple)

## **STRATEGIC IMPLEMENTATION STEPS**

The first step is top management's commitment to review and improve environmental performance. Step two is to provide the necessary leadership. Step three; perform a review of the company's environmental performance and performance capabilities.

Preparing an environmental management manual to describe the system is recommended. The manual will serve as a permanent reference for the implementation and maintenance of the system. If selected, this manual should cover the whole organization.

It may be wise for the site emergency plan and the occupational health and safety manuals or documents to incorporate relevant environmental information and instructions.

Other important attributes of the environmental management manual and documentation include dealing with normal as well as abnormal operating conditions, incidents, accidents and potential emergency situations. Methods of dealing with emergencies need to be periodically tested for effectiveness and suitability.

The initial environmental performance review should consider the full range of operating conditions, opportunities for significant environmental impacts (either adverse or beneficial) or damage from emergencies. It is important to identify and document the areas to be reviewed fully, whether an activity, a specific operation, or a specific site.

The environmental performance review may be conducted by questionnaires or interviews, checklists or direct assessments and measurements, records review, but the company should always benchmark its environmental performance by looking inside and outside the organization.

The aim of this preparatory environmental review is to consider all aspects of the organization to identify strengths, weaknesses, risks and opportunities in four areas: legislative and regulatory requirements, evaluation and documentation of significant impacts, examination of existing practices and procedures, and the assessment of feedback from incident investigations and situational nonconformances.

Remember, the goal of an environmental management system is improved performance through documented processes which are always adaptable to the economic circumstances of the organization. The system is simply a tool to achieve and systematically control environmental performance levels. The level of complexity of the system will depend on the size of the organization and the nature of its activities, products, and services.

The policy statement is the basis for environmental objectives and targets. It should be sufficiently clear so that internally and externally interested parties understand it. The policy is a living document that requires periodic review, constant nurturing, and revision to reflect changes in operating conditions or information.

To manage effectively and control the influence on the environment, work processes need to be performed according to approved procedures. When work is supervised directly or is within the skill set of the individual and of no imminent safety concern, step-by-step procedures may be unnecessary.

In planning, the company must require coordination among all employees. Define the scope, objectives, and desired results of the work processes. Identify the affected employees. Identify the documents or data within their areas required to achieve the stated goals. Identify the requirements and controls. Address any special skills needed. Be systematic in planning and make provision for reporting deviations/waivers/allowances to top management.

Before an organization can establish its policies and prioritize its environmental objectives and targets, it needs to identify the environmental aspects and significant environmental impacts associated with its activities, products, and services, and ensure they are taken into account in setting environmental objectives and associated targets. Identifying environmental aspects to determine the past, present, and potential positive and negative impacts on the environment is an ongoing process. It also includes identifying potential impacts on regulatory, legal, and business incidents and may include identifying impacts on the health and safety of people or the environment.

The policy will generate environmental performance goals, or objectives, that the organization sets out to achieve. The results of the initial environmental review need to be taken into consideration as well as any environmental aspects or impacts identified. Measurable performance indicators need to be developed as a basis for the objectives as well as to monitor performance against the objectives.

Environmental targets for the identified objectives should be set within a specified time frame. Targets need to be specific and measurable. Both the objectives and the targets can apply across the organization or to narrower, site-specific or individual activities.

The environmental management program inside the environmental management plan identifies the specific action steps, the schedules, and the resources and responsibilities required to reach the targets. It does so in the order of their priority, which is set by top management.

Environmental management plans and programs need to be dynamic and revised regularly to reflect changes in environmental objectives and targets. Remember, the plan is long-term and the program is short-term. The long-term planning helps in mapping out the process for continual improvement in environmental performance.

Top management is required by ISO 14001 to appoint a specific management representative who has defined roles, responsibilities and authority over the EMS, as well as reporting on the environmental performance to top management for review.

An organization's capabilities and support mechanisms must evolve in response to changes in the requirements of interested parties, a dynamic business environment, and the process of continual improvement. An organization needs to focus on the EMS and organize its people, systems, strategy, resources and structure.

Ensuring the environmental management capability of the organization will involve a concentrated effort on the part of upper and middle management. Input from every employee is also needed to enable managers to define the necessary resources and allocate them effectively.

Appropriate training needs to be arranged for each person in the organization involved in environmental management to ensure their competency and understanding.

ISO 14004 recommends that a common set of environmental values be developed and reinforced, taking into account the views of interested parties.

Top management plays a key role in communicating values and in motivating employees to perform to the stated requirements, but it is the commitment of individual people that transforms the environmental management system from just paperwork into an effective process, especially in the context of shared values and company vision.

All members of the organization should understand, and be encouraged to accept accountability for achieving, the environmental objectives and targets. In turn, each individual should encourage others to participate in a similar manner.

The results from monitoring the performance, audits, and management reviews of the EMS should be communicated to all affected parties. Appropriate information should also be provided to employees to motivate them and to external interested parties to encourage public understanding and acceptance of the organization's efforts to improve its environmental performance.

The ISO 14000 series recommends that operational processes and procedures of EMS be defined, documented, and updated when necessary. The various types of documents that establish and specify effective operational procedures and control should be clearly defined.

Documentation keeps employees aware of what is required to achieve the company's environmental objectives. Documentation also enables the organization to evaluate the environmental management system and its environmental performance.

There must be an appropriate balance between the extent of documentation and the extent of skills and training needed to keep the amount of documentation to a reasonable level.

Effective management of records is one of the keys to successful implementation of an environmental management system. Information management involves nine basic features: identification, collection, indexing, filing, storage, maintenance, retrieval, retention, and disposition.

The company should limit records to the extent pertinent to their application. Company records need to be kept in logical order and designed to allow assessment of conformance with the environmental policy and the achievement of environmental objectives and targets.

As many potential emergency situations and risks as possible should be identified and procedures and emergency plans put in place to respond appropriately to accidents or crises.

These procedures and controls need to cover accidental emissions into the atmosphere, accidental discharges to water or land, and the specific environmental effects from accidental releases of chemicals or pollutants resulting from abnormal operating conditions. Records of every emergency situation must be kept.

The environmental management system needs to include provision for measuring and monitoring actual environmental performance and effectiveness. The results then need to be analyzed to identify any need for improvement by preventive or corrective action. The collected data must be reliable, so test equipment calibration and software quality assurance must be built into the system.

The organization needs to identify appropriate environmental performance indicators that are objective, verifiable, and reproducible. This will be an ongoing process as technology and practices change, as indicators need to be relevant to the activities they are used to measure or monitor as well as being practical, cost-effective, and technologically viable.

Periodic audits of the system need to be conducted to determine conformance to requirements and agreements. The frequency of audits will be guided by the results of previous evaluations and the significance of potential environmental impacts. Audits may be performed by internal personnel or selected external parties as long as the auditors are properly trained and can perform their duties objectively and impartially.

Audit results must be reported to those individuals within and outside the organization who are responsible for responding to adverse findings or are obligated by regulation or requirement of contract to review the reports.

“Management needs to review the suitability and effectiveness of the system at appropriate intervals in sufficient breadth and depth to address all environmental dimensions of operations, the impact of operations on financial performance, and the impact of operations on the competitive position of the organization”.

(Sayre 1996, Pg. 178)

Records of both the company’s internal audits and management reviews need to be kept as objective evidence of the EMS’s efficiency and effectiveness. This objective evidence can be used internally, for self-declaration, or externally, for registration, depending on the direction of the company. Frequency of either the audits or management reviews depends on the environmental function and its associated past performance results.

## **ANALYTICAL CONCLUSION**

Increasingly stringent legislation, the development of economic policies and measures to foster environmental protection, and the growing concern of interested parties about unsustainable development – all are causing organizations to control the impact of their activities.

Reviews and audits to assess environmental performance may be less than sufficient if conducted in isolation. Customers and other stakeholders want assurance the organization will continue to meet regulatory requirements. To be effective, the company needs to work inside a standardized environmental management system, which is integrated into the overall management structure.

“International environmental management system standard requirements are intended to provide the outline of effective management systems in order to assist in achieving stated environmental and economic goals without creating additional non-tariff trade barriers or interfering with an organization's legal obligations”.

(Sayre 1996, Pg. 11)

ISO 14001 specifies environmental management system elements that are applicable to all types and sizes of organizations under diverse geographical, cultural, and social conditions. Success in meeting the ISO standards depends on commitment from all levels of the organization. There must be demonstrated dedication to establishing and assessing the effectiveness of environmental policy, objectives, and procedures, and conformance. The aim of ISO 14001 is to balance environmental protection with the socio-economic needs of the company.

The important distinction between ISO 14001 and ISO 14004 is that ISO 14001 is the specification standard, describing the core elements for certification or self-declaration of an environmental management system, while ISO 14004 is a non-certifiable guidance standard. The specification is written in prescriptive language and contains only those system elements that may be audited objectively.

Internal environmental auditing will follow an integrated process which dovetails nicely with the quality management system standard (ISO 9001:2000) especially with the introduction of the combined internal auditing standard (ISO 19011:2002).

This specification, however, establishes no enforceable requirements for environmental performance beyond individual company commitment.

Embracing the ISO 14000 series of international standards will provide top management with a structured approach to improved profitability through a consistent set of beneficial procedures which direct the actions of the company. Once a strong foundation has been laid, through the EMS, companies around the world will benefit long-term from improved environmental performance and thus improved economic performance.

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## ACRONYMS

ANSI - American National Standards Institute  
CAR - Corrective Action Request  
CEQA - Certified Environmental Quality Auditor  
CQA - Certified Quality Auditor  
DIS- Draft International Standard  
EA - Environmental Auditing  
EA in PS - Environmental Aspects in Product Standards  
EARA- Environmental Auditors Registration Association  
EL - Environmental Labeling  
EMS - Environmental Management Systems  
EPE - Environmental Performance Evaluation  
IRCA- International Register of Certificated Auditors  
IS- International Standard  
ISO- International Organization for Standardization  
LCA - Life Cycle Analysis  
PAR - Preventive Action Request  
QMS- Quality Management Systems  
RAB- Registrar Accreditation Board  
REP - Registered Environmental Professional  
SC - Sub-Committee  
TAG - Tactical Advisory Group  
TC - Technical Committee  
T&D - Terms & Definitions  
WG - Working Group

**TABLE 1 – INFORMATIONAL SYNOPSIS**

ISO 14001:1996 - An Informational Synopsis and Elemental Review:		
Element Number	Sub-Element Number	Summary
4.1 General Requirements		The organization shall establish an EMS.
4.2 Environmental Policy		Management shall define an EMS policy.
4.3 Planning		The organization shall identify the environmental aspects of its activities, products or services - either beneficial or negative. The organization shall have access to relevant legal information. The organization shall set objectives and targets with relation to its aspects. The organization shall establish a program to meet its objectives and targets.
	4.3.1 Environmental aspects	
	4.3.2 Legal & other requirements	
	4.3.3 Objectives and targets	
	4.3.4 Environmental management programs	
4.4 Implementation and operation		Management shall define the roles, responsibilities and authorities for the organization. The organization shall identify relevant EMS personnel training needs. The organization shall establish procedures for both internal and external communication with regards to the EMS. The organization shall establish an information system, either electronically or in paper form, which describes the core and direction of the EMS. The organization shall control the EMS documentation system to ensure its currency and effectiveness.

ISO 14001:1996 - An Informational Synopsis and Elemental Review:		
		The organization shall identify those operations with regards to the EMS. The organization shall establish and maintain procedures for an effective system which covers emergency situations.
	4.4.1 Structure and responsibility	
	4.4.2 Training, awareness and competence	
	4.4.3 Communication	
	4.4.4 EMS documentation	
	4.4.5 Document control	
	4.4.6 Operational control	
	4.4.7 Emergency preparedness and response	
4.5 Checking and corrective action		The organization shall establish procedures to monitor and measure its operations with regards to the EMS. The organization shall define authority over CAR and PAR situations. The organization shall retain environmental records pertaining to the EMS in a safe and retrievable manner. The organization shall perform internal audits of the EMS.
	4.5.1 Monitoring and measurement	
	4.5.2 Nonconformance and corrective and preventive action	
	4.5.3 Records	
	4.5.4 EMS audit	
4.6 Management Review (ISO 1996, multiple)		Management shall review the EMS.

**TABLE 2 - STRUCTURE**

ISO/TC207 - Environmental Management Structure:						
Secretariat: Canada						
SC1 EMS UK	SC2 EA Holland	SC3 EL Australia	SC4 EPE US	SC5 LCA France	SC6 T&D Norway	WG1 EA in PS Germany
WG1 Specification	WG1 Auditing Principles	WG1 General Principles for Practitioner Programs	WG1 EPE for Management Systems	WG1 LCA General Principles & Procedures		
WG2 Guidance	WG2 Auditing Procedures	WG2 Self- Declaration Claims	WG2 EPE for Operational Systems	WG2 Life Cycle Inventory Analysis (General)		
	WG3 Auditor Qualification s	WG3 Guiding Principles for Env. Labeling Programs		WG3 Life Cycle Inventory Analysis (Specific)		
	WG4 Environment al Site Assessments			WG4 Life Cycle Impact Analysis		
				WG5 Life Cycle Improvement Assessment		
ISO 14001 ISO 14004	ISO 14010 ISO 14011 ISO 14012 ISO 14015	ISO 14024 ISO 14021 ISO 14022 ISO 14020	ISO 14031	ISO 14040 ISO 14041	ISO 14050	ISO 14060

(Tibor & Feldman 1996, multiple)