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ACP-EU Cooperation Programme in Higher Education (EDULINK)
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CHE 6105 - ENVIRONMENTAL MANAGEMENT SYSTEMS

Integration of environmental issues on sustainability in businesses, key elements of the Eco-Management and Audit Scheme (EMAS) and ISO 14001, principles and elements of environmental management systems, environmental management and reporting, examples of Environmental Management System (EMS) manuals, developing a 'mock EMS manual' for an organisation developing and implementing an ISO14000 compliant EMS within an organisation.

CONTENTS

1 Environmental Management Tools in Industry

Industry is an important player as it is a major user of raw materials and energy, and a major source of pollutants and waste. More efficient production processes, cleaner technologies and procedures as well as preventive strategies throughout the product life-cycle, can be crucial mechanisms for reducing impacts on resource use and the environment. Nowadays, industry is moving from 'end-of-pipe' reactive strategy to a more holistic approach.

Environmental Management System and ISO 14001 certification is an environmental management tool used in industry. Other environmental management tools include:

Cleaner Production: UNEP defines cleaner production as "the continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase overall efficiency and reduce risks to humans and the environment" Cleaner Production shifts from end-of-pipe treatment to prevention. Prevention frequently reduces costs, risks and identifies new opportunities. Hence, the main purpose of CP is prevention rather than treatment.

Waste Audit: a thorough account of the wastes from an industry, a plant or a process of a unit operation. A waste audit is carried out in three phases: a pre-assessment phase for audit preparation; a data collection phase to derive material balances; finally a synthesis phase whereby the findings from the material balances are translated into a waste reduction action plan.

Life cycle assessment: an objective process to evaluate the environmental burdens associated with a product, process, or activity by identifying and quantifying energy and materials used and wastes released to the environment, to assess the impact of those energy and materials uses and releases on the environment, and to evaluate and implement opportunities to affect environmental improvements.

Environmental Performance Evaluation: EPE (EPE-ISO 14031 definition) is an internal management process that uses indicators to provide information comparing an organisation's past and present environmental performance criteria.

Environmental Auditing: defined as a management tool that comprises of a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing, with the aim of helping to safeguard the environment by: (1) facilitating management control; (2) assessing compliance with company policies, which could include meeting regulatory requirements.

Environmental Accounting: defined as the identification and reporting of information and environmental costs, for example, liability costs or disposal costs. Moreover, the environmental costs can be categorized into conventional costs, hidden costs, contingent costs (liabilities, risks), relationship or image costs (consumer, community and NGO relations) and finally societal costs (environmental and social externalities).

Design for Environment: DfE is a systematic way of integrating environmental attributes into the design of product and process.

Environmental Indicators: Indicator can mean a significant physical, chemical, biological, social or economic variable that can be measured in a defined way for management purposes. Environmental indicators measure the physical, chemical, biological or socioeconomic state of and pressures on the environment. They can also be used on international and national levels as a tool for environmental reporting, measuring environmental performance and showing progress towards sustainable development. Furthermore, environmental indicators are communication tools between the environment and people. Environmental indicators available are: air, water, plant condition, and animal production and soil quality.

Industrial Ecology: an interdisciplinary framework for understanding the impacts of industrial systems on the environment. It seeks to identify and implement strategies to reduce the environmental impacts of products and processes associated with industrial systems.

Public Environmental Reporting (PER), also known as Corporate Environmental Reporting, is a mechanism whereby a company communicates information concerning its environmental performance to a variety of stakeholders.

Performance-based Contracting may be defined as the means to structure all aspects of an acquisition around the purpose of the work to be performed. It emphasizes objective, quantifiable, measurable performance requirements and quality standards in developing statements of work, selecting contractors, determining contract type, incentives as well as performing contract administration.

2   ISO 14000

ISO 14000 is a family of international voluntary standards on various aspects of environmental management, which was developed by ISO (International Organization for Standardization). ISO is a worldwide federation of national standards bodies and its objective is to promote the development of standardization and related activities to facilitate international exchange of goods and services, as well as to develop cooperation in the spheres of intellectual, scientific, technological and economic activity. ISO 14000 series of standards address the following aspects of environmental management: -

•   Environmental Management Systems (ISO 14001, ISO 14004)

•   Environmental Auditing (ISO 14010-14015)

•   Environmental Labels and declaration (ISO 14020-14025)

•   Environment Performance Evaluation (ISO 14031-14032)

•   Life Cycle Assessment (ISO 14040-14043)

•   Terms and Definition (ISO 14050:2002)

The standards in the ISO 14000 series fall into 2 major groups: (1) organization-oriented standards and (2) product-oriented standards. More details are given in Appendix 1.

3   The ISO 14000 model
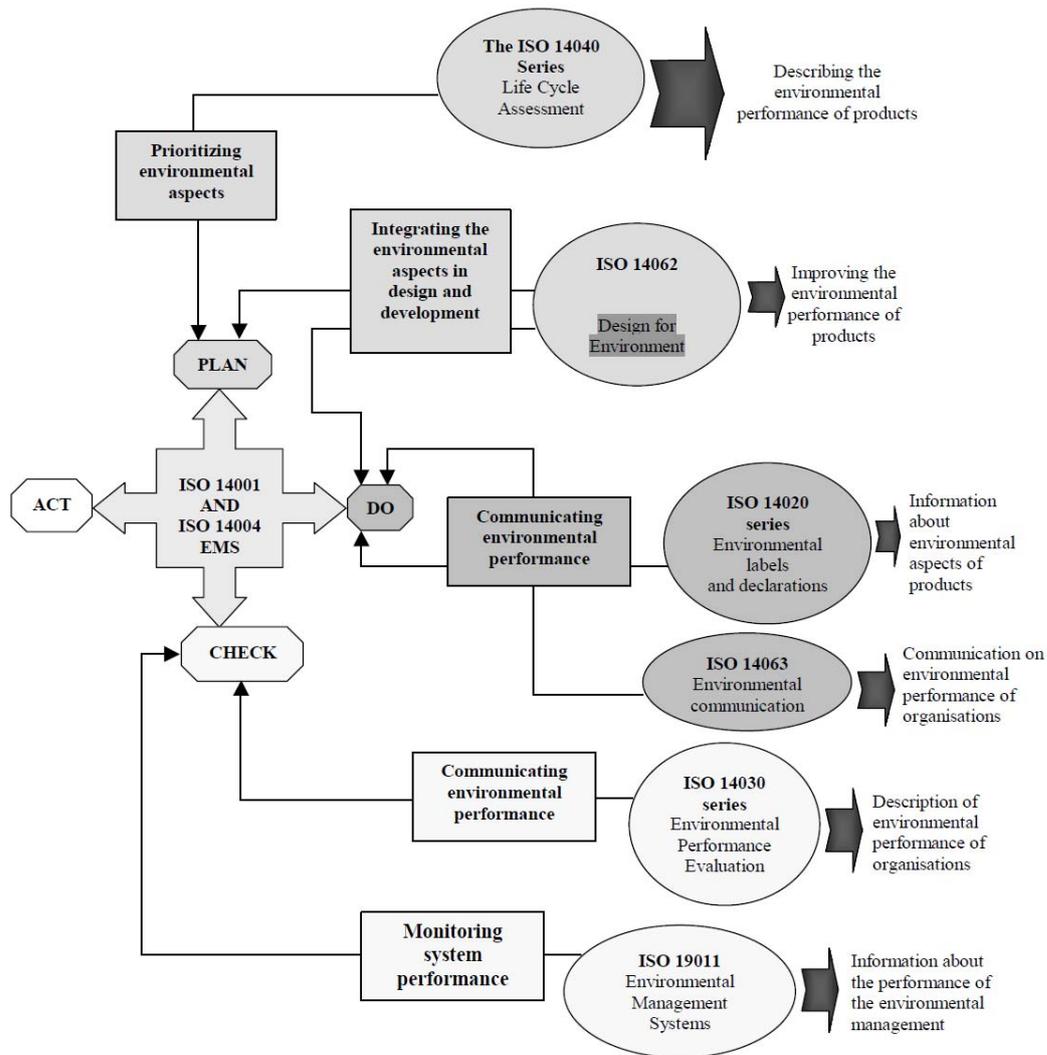
Additional definitions related to ISO 14001 are given in Appendix 2.

4   EMS

4.1   Definition of EMS

An environmental management system is a systematic approach for the identification of risks and it deals mainly with the environmental aspects of an organization. It is a 'management tool' that enables an organization of any size or type to control the impact of its activities, products or services on the environment. According to ISO 14000, Environmental Management System (EMS) is part of the overall management system that includes organizational structure, planned activities, responsibilities, procedures, processes,

practices and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

4.2   EMS Model

Figure 1 shows the EMS model. However it should be noted that there is no fixed approach for establishing an EMS.
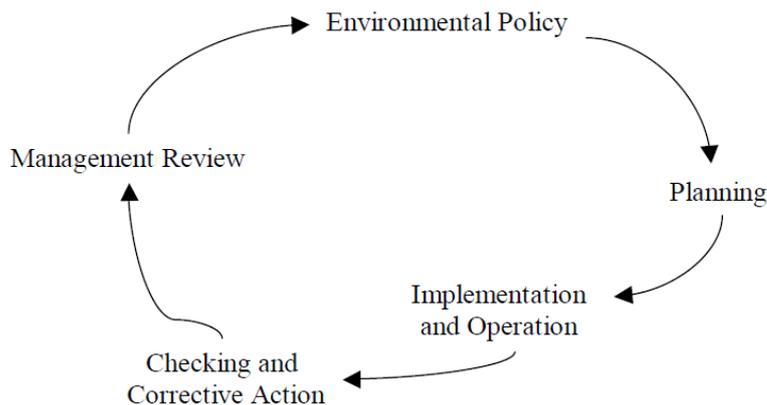
Figure 1: EMS model

The process of developing, implementing, and maintaining an EMS based on ISO 14001 consists of the following five phases:

Planning:
- Environmental Policy
- Environmental Aspects
- Legal and Other Requirements
- Environmental Objectives and Targets
- Environmental Management Programs

Implementation and Operation:
- Organization Structure and responsibility
- Training, awareness, and competence
- Communication
- EMS documentation
- Document control
- Operational control
- Emergency preparedness and response

Checking and Corrective Action:
- Monitoring and measurement

- Non-conformance and corrective and preventive action
- Records
- EMS audit

Management Review and Continual Improvement
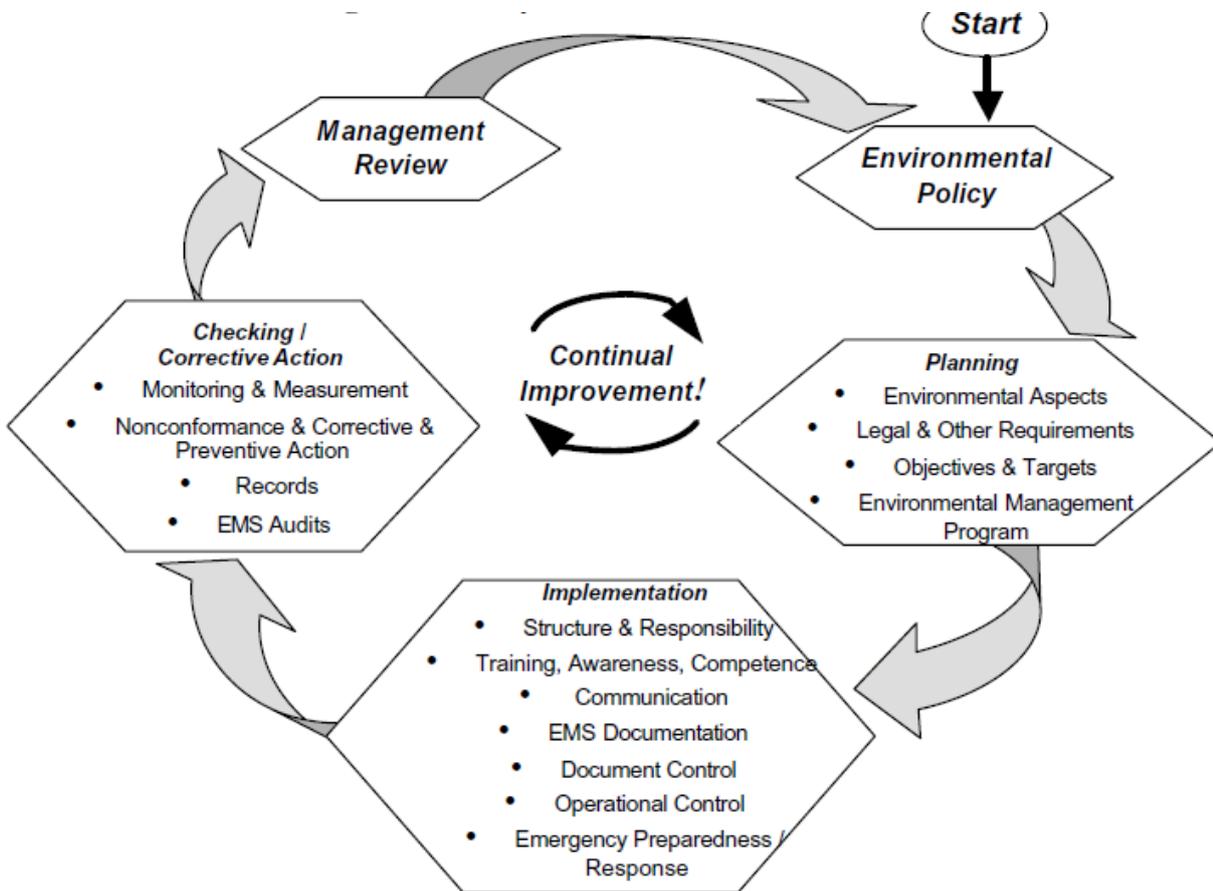
4.3   EMS Key Elements

4.3.1   Environmental Policy

An environmental policy is a statement by an organization of its principles and intentions in relation to its overall environmental performance. This policy should also be appropriate to the nature, scale and environmental impacts of its activities, products and services it should be committed to continual improvement and should comply with relevant laws and regulations. This policy should be well documented, implemented and communicated to all its employees, and should be available to the public.

4.3.2 Planning

- ✓ Environmental aspects: identify the organisation's environmental aspects of its activities, products and services. Aspects are identified with respect to normal, abnormal and emergency conditions of an activity. Also, determining the significance of the impacts on the environment.
- ✓ Legal and other requirements: identifying and ensuring access to legal and other requirements to which the organization subscribes.
- ✓ Objectives and targets: establishing documented environmental goals for the organization, in line with its policy, environmental impacts, and the views of interested parties. For instance, in a textile industry, the objective can be to reduce energy use, and the corresponding target can be to reduce electricity use by 10% in one year's time.
- ✓ Environmental management program (EMP): this is the final piece in the establishment of EMS. It also designates responsibilities to achieve goals, define means and time frame and identify specific action step

Box 1: Example of an Environmental Policy in a Hotel

Box 6.1: Example of an Environmental Policy in a Hotel

An environmentally conscious hotel should not only aim at providing quality services for its guests, but should also be committed to taking appropriate measures for pollution prevention and resources conservation. In order to fulfill the requirements of ISO 14001 standard, the environmental policy statement for a hotel should be as follows:

1) To meet the environment requirements, rules and regulations.
2) To optimise the use of energy, water and materials.
3) To reduce waste, and promote recycling when possible
4) To decrease the use of harmful materials.
5) To encourage suppliers and guests to contribute to the reduction of the environment load.
6) To share knowledge and experience with other companies in the hospitality industry.
7) To communicate the hotel staffs the information and means to reach the Green Objectives.
8) To evaluate and adjust the measures taken to lead to an acceptable environment load.
9) To carry out regular internal programmes of education and training to encourage environment awareness among staff

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Box 2: Evaluating the aspects and impacts of a traffic center under normal, abnormal and emergency conditions

Box 6.2: Evaluating the aspects and impacts of a traffic center under normal, abnormal and emergency conditions

	Activities	Aspects	Impacts

Normal	**Moving buses**
	  - **Burning of fuel**
	  - **Engine on**
		- **Use of fuel**
		- **Emissions of CO_2, NO**
		- **Vibration and noise produced**
			- **Air emissions**
			- **Natural resources consumption**
			- **Health effects**

	Stationary buses
	  - **Engine off**
	
	  - **Engine on**
		- **Use of space**
		- **Visual aspect**
		
		- **Air emissions**
		- **Noise**
			- **Landscape degradation**
			- **Air pollution**
			- **Noise pollution**

Abnormal	**Moving buses** - **Traffic center users**	- **Oil leakage** - **Emissions to air** - **Throwing of solid wastes** - **Leakage of toilets**	- **Soil and groundwater contamination** - **Noise pollution** - **Landscape degradation** - **Land and ground water contamination**

Emergency	**1. Moving buses**
	  - **Brake failure**
	  - **Accident**
	  - **Fire**
		- **Air emissions**
		- **Water usage**
		- **Safety of people**
			- **Health hazards**
			- **Natural resource consumption**

	2. Cyclones	**Damage of equipment**	- **Landscape degradation** - **Visual**
	3. Riots	**Damage of equipment**	- **Landscape degradation** - **Visual, social**

4.3.3   Activity 1

Evaluate the environmental aspects and impacts for the activities of a hotel.

4.3.4   Implementation and Operation

- ✓ Structure and responsibility: establishing roles, responsibility and authorities for environmental management and providing appropriate resources.
- ✓ Training, awareness and competence: ensuring that appropriate training is given to all personnel, whose work may create a significant environmental impact.
- ✓ Communication: establishing processes for internal and external communications between various levels and functions of the organization, on environmental issues.
- ✓ EMS documentation: describing the core elements of the organisation's EMS and related documents, for example, EMS manual, training matrix, procedures and forms, master document list, master records list, work practices and references.
- ✓ Document control: ensuring effective management of procedures and other system documents. The followings are important to control documents: -
    a) They can be located
    b) They can be reviewed, revised and approved.
    c) The current versions are available.
    d) Obsolete documents are properly handled.
    e) Documents are legible, dated, identifiable and maintained.
- ✓ Operational control: identifying, planning and managing operations and activities associated with the organisation's policy, objectives and targets.
- ✓ Emergency preparedness and response: establishing and maintaining potential emergencies and developing procedures in case of accidents and emergency situations, as well as preventing and mitigating the environmental impacts that are associated with them.

4.3.5   Checking and corrective action

- ✓ Monitoring and measurement: monitoring and measuring on a regular basis the key activities and tracking performance.
- ✓ Non-conformance and corrective and preventive action: identifying and correcting problems, as well as preventing their recurrence.
- ✓ Records: procedures for the identification, maintenance and disposition of environmental records.
- ✓ Environmental Management System Audit: periodically verifying that the organisation's EMS is operating as intended.

4.3.6   Management Review

Reviewing periodically the environmental management system of the organization to ensure continual improvement.

5   Typical Cost estimates

Putting a cost to EMS implementation is quite difficult as it depends on varied factors like the size of the organization, nature of operations, level of environmentally sound practices already initiated, etc.

5.1   Types of cost

The types of costs are: -

1) Significant Costs include:

- Staff time plus actual
- Consulting fees where external expertise is required
- Travel, EMS auditor training and software
- Cost of certification

2) Additional costs include:
- EMS registration and Baseline Assessments
- Assessment every two years by external audit
- Audit every six months

6   Benefits of EMS

?? Assuring customers of commitment to demonstrate environmental management

?? Maintaining good public/community relations

?? Satisfying investor criteria and improving access to capital

?? Obtaining assurance at a reasonable cost

?? Enhancing image and market share

?? Meeting vendor certification criteria

?? Improving cost control

?? Reducing incidents that result in liability and demonstrating reasonable care

?? Facilitating the attainment of permits and authorization

?? Conserving input materials and energy

?? Fostering development and sharing environmental solutions

?? Improving industry-government relations

7 EMS Framework
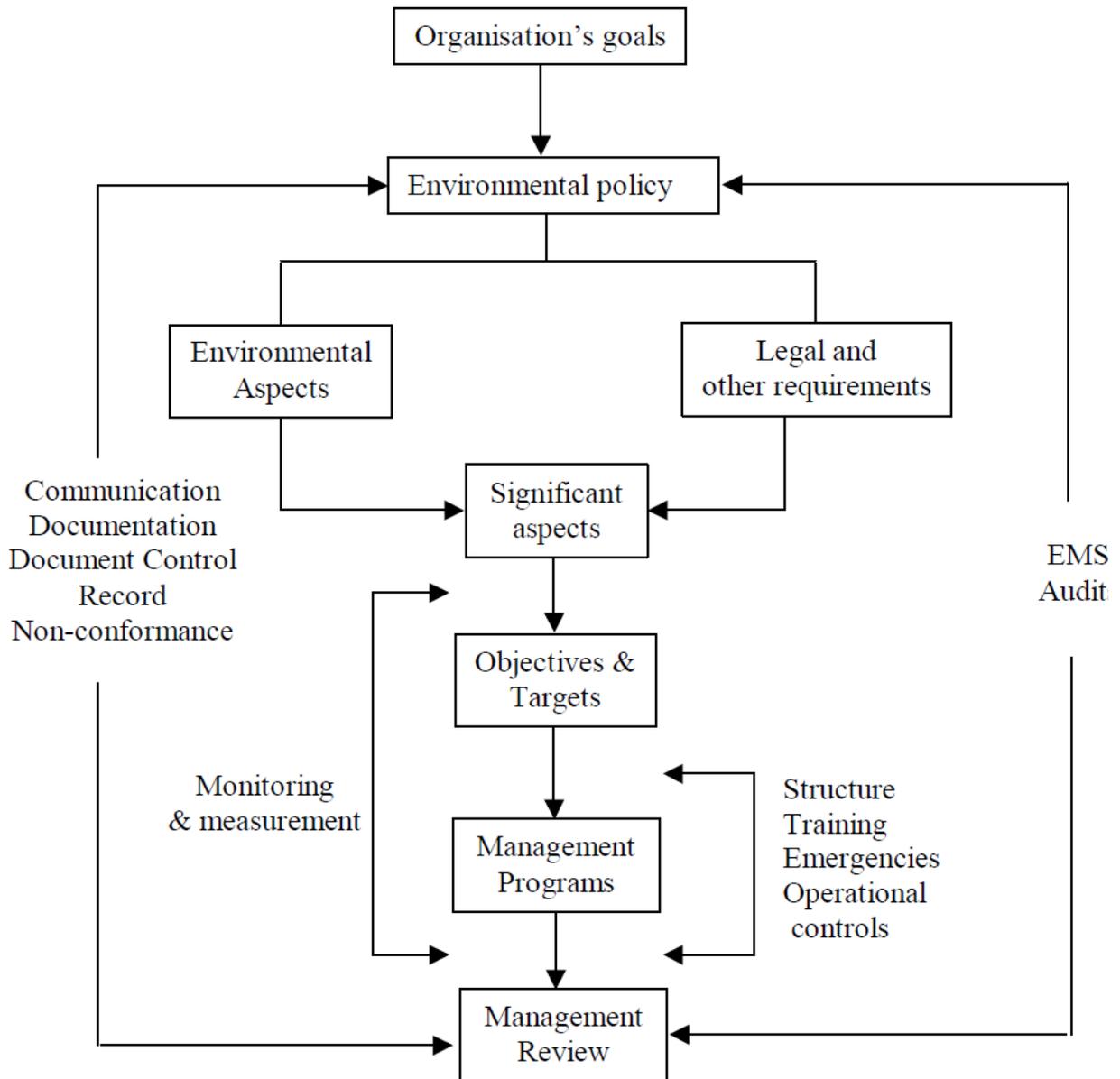
8 Implementation of EMS in organisation

8.1 Management commitment

A meeting should be launched to provide an understanding of benefits, requirements and effort. The Environmental Management Representative (EMR) is clearly the identified EMS team leader who has

responsibility of implementing the EMS from start to finish. The EMR is the Project Manager and has the designated authority of senior managers to get the job done. The EMR responsibilities are to: -

a) Build and lead the EMS Core Team
b) Plan the EMS project and implementation schedule
c) Be the "internal consultant"
d) Report to top management
e) Gather, organize, and disseminate information
f) Delegate tasks and establish deadlines
g) Collect and evaluate work
h) Organize training
i) Facilitate top management visibility and involvement
j) Obtain cross-functional support

The potential members of Cross Functional Team members include: -

- o Material handling
- o Environment
- o Quality
- o Maintenance
- o Service

- o Controller's office
- o Engineering
- o Training
- o Human resources
- o Production

8.2   EMS team

This team consists of a group of people who develop EMS, review aspects, impacts and procedures, as well as train people.

9   Example of an EMS manual

The Environmental Management System provides a mechanism for environmental management throughout all areas and departments in an organization. The Environmental Management System is designed to cover Environmental Aspects which a facility can control and manage and those it does not control or manage. The purpose of the Environmental Management System Manual is to establish specific programs and procedures, assign responsibility, measure accountability and provide instructions for maintaining procedures to support the Environmental Management System. An example is given on how Thomason Company has implemented EMS in its oraganisation.

ENVIRONMENTAL POLICY

Thomason Company is committed to conducting business in an environmentally responsible manner in order to protect our employees, the Environment and the communities where we operate. Achieving this

commitment is a primary management objective and the responsibility of all Thomason Company employees. Thomason Company will constantly strive to:

1) Operate in conformance with applicable government requirements and good management practices while striving for continual improvement in environmental performance.
2) Design, construct and operate facilities in a manner to avoid circumstances that could have adverse impacts on employees or the Environment.
3) Integrate Environmental Aspects into business plans and decisions.
4) Train and motivate employees to take personal accountability for environmental commitments.
5) Transport products and dispose of waste in a safe and environmentally acceptable manner.

Thomason Company has adopted the above principles to promote accountability for environmental performance at all levels of our company. Environmental values will be pursued with the same intensity that we pursue other business values.

ENVIRONMENTAL MANAGEMENT SYSTEM REQUIREMENTS

DEFINITIONS AND ABBREVIATIONS

The following definitions are the intended meanings of selected terms and abbreviations as used in the Environmental Management System manual.

- ❖ Adverse Environmental Impact – Having a harmful effect to the environment
- ❖ ASTM – American Society of Testing and Materials
- ❖ CAR – Corrective action request that addresses observed non-conformances and actions to correct on a permanent basis.
- ❖ Corporate Management – Can include any of the following: President, VP Manufacturing & Engineering, VP Research & Development, Director EHS & Project Manager.
- ❖ Emergency Response and Preparedness Plan – Procedures to identify the potential for and response to emergency situations and for preventing and mitigating the Environmental Impacts that may be associated with them.
- ❖ Environment – Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation.
- ❖ Environmental Aspect – Element of an organization's activities, products or services that can interact with the Environment.
- ❖ Environmental Impact – Any change to the Environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.
- ❖ Environmental Management System – that part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the Environmental Policy.
- ❖ Environmental Management System Audit – A systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether Thomason Company's

Environmental Management System conforms to the Environmental Management System Audit criteria set by Thomason Company, and for communication of the results of this process to plant and Fort Worth management.

- ❖ Environmental Objective – Overall environmental goal, arising from the Environmental Policy that Thomason Company sets to achieve, and which is quantified where practicable.
- ❖ Environmental Policy – Statement by Thomason Company of its intentions and principles in relation to its overall environmental performance, which provides a framework for action and for the setting of Environmental Objectives.
- ❖ Management Representative – Has the primary direct responsibility and authority to implement and maintain the Environmental Management System. There will be a facility Management Representative and a corporate Management Representative.
- ❖ Non-conformance – The non-fulfillment of specified system requirements.
- ❖ PAR – Preventative action request that addresses potential non-conformance and actions to correct on a permanent basis.
- ❖ Permit – Permit, licenses, certifications or other authorizations issued by a governmental regulatory body.
- ❖ Records – Documented information that: (a) is evidence of an environmental activity or event that has been or is being performed, or (b) is required to be retained for future reference.
- ❖ Regulatory Agency – governmental unit delegated authority for implementing regulations related to ambient air quality, waste management and/or water discharge quality.

ENVIRONMENTAL MANAGEMENT SYSTEM

General Requirements

Thomason Company shall establish and maintain an Environmental Management System which addresses (1) planning for environmental management, (2) implementation and operation of the Environmental Management System, (3) checking the Environmental Management Records and practices, then responding to Non-conformance (or potential Non-conformance) through corrective or preventive actions, and (4) conducting management reviews of the system on a regular basis.

Planning

Environmental Aspects

1) Thomason Company shall establish and maintain procedures to identify the Environmental Aspects of its activities, products and services that it can reasonably be expected to control. Thomason Company shall ensure that the aspects related to these significant impacts are considered in setting its Environmental Objectives.

2) Maintain a regulatory notification system to include items such as:

a. Permit renewals

b. Due dates for reports to regulatory agencies

c. Planned agency inspections

d. Internal audits

e. Agency responses

f. Submittals from consultants

g. Any other appropriate items

Legal and Other Requirements

The Director of Environment shall establish and maintain practices to identify and have access to legal and other requirements to which Thomason Company subscribes, that are applicable to the Environmental Aspects of its activities, products and services.

Objectives

1.   Corporate Management shall establish and maintain documented Environmental Objectives for Thomason Company. When establishing and reviewing its objectives, Thomason Company shall consider the legal and other requirements, its significant Environmental Aspects, its technological options, its financial, operational and business plans, and the views of interested parties.

2.   The objectives shall be consistent with the Environmental Policy.

Environmental Management Programs

1.   Thomason Company shall establish and maintain programs for achieving its objectives. It shall include:

a. Designation of responsibility for achieving objectives; and

b. The means and time frame by which they are to be achieved.

2.   If a project relates to new developments and new or modified activities, products or services, programs shall be amended where relevant to ensure that environmental management principles apply to such projects.

Implementation and Operation

Structure and Responsibility

A. Responsibility, Authority and Organization

The responsibility, authority, and interrelation of personnel who are accountable to manage, perform, and verify work affecting the Environment is defined below.

B. Environmental responsibility of positions.

Corporate Management

1. Provide leadership, commitment and resources.

2. Establish and disseminate Environmental Policy.

3. Assignment of responsibility and accountability.

4. Formulate appropriate objectives.

Environmental Health & Safety Department

1)   The Director of Environment shall serve as the Environmental Management System corporate Management Representative.

2)   Development and implementation of the Environmental policy, procedures and programs that assist facilities in implementing the requirement of the Environmental Management System.

a. Compliance with company environmental regulations

b. Regulatory notification

c. Standard environmental guidelines

d. Document Control

3)   Develop and provide training material to assist in training and raising awareness of employees in environmental issues.

4)   Develop systems to assist facilities in tracking and complying with Environmental Management System requirements. Assure that periodic audits of facilities are conducted to identify environmental compliance.

5)   6. Responsible to approve all projects or contracts related to environmental affairs.

6)   Coordinate with Engineering and Operations on preparing and distributing applicable environmental documents to regulatory agencies or third parties.

Engineering

1) Oversee and approve all applicable documents and calculations before submittal to the regulatory agencies or third parties.

2) Coordinate with Environment department when designing all capital and major maintenance projects to verify all environmental concerns are addressed. Maintain a separate repository of drawings, plot plans, quadrangle maps, deed records, property boundaries and surveys, emission points, etc. in electronic and/or paper format for use in preparing various documents.

3) Determine who will be the Thomason Company field construction representative for administering contractors on environmental construction projects.

4) Award contracts on environmental projects upon competitive bids or comparative qualifications.

Plant Manager

1. Serve as the facility Management Representative.

2. Implement the Environmental Management System in their facility.

3. Ensure environmental compliance status with applicable Permits.

4. Work with plant personnel to audit and improve the system

5 Review/approve documents for operational constraints.

Environmental Coordinator

1. Serve as Facility Management Representative in the absence of the plant manager.

2. Facilitate training to ensure all plant employees are qualified to perform environmental tasks.

3. Ensure suppliers and contractors are educated on the environmental requirements of Thomason Company.

4. Encourage and monitor environmental awareness of employees.

5. Conduct periodic facility audits and advise facility management of potential environmental concerns.

Plant Supervisors

1. Direct responsibility for ensuring that the Environmental Management System is fully executed:

    a. Assure Environmental Management System procedures are followed.

    b. Monitor and encourage good employee work practices.

    c. Inspect facilities

    d. Encourage environmental awareness of employees.

Employees

For the Environmental Management System to be a success each employee is responsible to:

1. Comply with company Environmental Policy.

2. Use and maintain equipment and facilities provided in the correct manner.

3. Direct questions regarding environmental concerns of a specific job to a supervisor.

4. Report any observed Adverse Environmental Conditions to plant supervision.

5. Participate and offer suggestions to improve the environmental system.

Training, Awareness and Competence

1. It is the policy of Thomason Company that appropriate employees shall be trained and qualified to perform environmental tasks determined to be necessary by management.

2. Corporate Management shall identify training needs and establish training objectives with facility input.

3. The Management Representatives shall make employees aware of:

    a. Importance of conformance with the Environmental Policy and the Environmental Management System.

    b. Environmental Impacts, actual or potential of their work activities and the environmental benefits of improved performance.

    c. Their roles and responsibilities in achieving conformance with the Environmental Policy and with requirements of Environmental Management System, including emergency preparedness and response requirements.

    d. The potential consequences to the company and/or environment by departure from specified operating procedures.

Communication

1. With regard to its Environmental Aspects and Environmental Management System, Thomason Company shall establish and maintain procedures for:

    a. Internal communication between the various levels and functions of Thomason Company;

b. Receiving, documenting and responding to relevant communication from external interested parties.

A. Internal Communications

1. Internal communications shall be implemented to ensure that personnel at each relevant level and function are aware of the following:

   a. The Environmental policy

   b. The Environmental Management System;

   c. The importance of conformance with the Environmental Policy, and Environmental Management System

   d. The potential consequences of system Non-conformance;

   e. Individual roles and responsibilities in achieving conformance with procedures, including emergency preparedness; and

   f. The significant Environmental Aspects associated with work activities and the environmental benefits of improved performance

2. Internal communication may be accomplished by the use of:

   a. Personal Interactions;

   b. Notice Boards;

   c. Awareness of facility personnel, as appropriate in line with job function;

   d. Environmental training as appropriate;

   e. Newsletters;

   f. Electronic notes;

   g. Group meetings and meeting minutes;

   h. Management reviews and meeting minutes;

   i. Corrective or Preventive Action Requests

3. Facility Management Representatives:

   a. Shall keep Corporate Management advised of necessary revisions/additions to the system and shall bring to the attention of appropriate management any conflicts between Environmental Management System requirements and actual practice as they become known.

   b. Shall use all available resources to work through the appropriate management to resolve conflicts within the system. Conflicts, which cannot be resolved by working through appropriate management, shall be brought to the attention of the President.

   c. Shall promote the awareness of environmental requirements to their locations and throughout the organization.

4. Corporate Management Representative:

   a. Shall also serve as chairperson of the Management Review Committee to ensure that appropriate information on Environmental Management System performance is taken into consideration and used as a basis for improvement to the system.

B. External Communications

> 1. External communications concerning the Environmental Aspects of the company shall be routed to the Director of Environment who is responsible for responding to inquiries from interested parties and regulatory agencies.

> 2. External communications concerning the Environmental Aspects of an individual facility should be directed either to the Director of Environment or to the facility Management Representative as appropriate.

Document Control

1. It is the policy of Thomason Company that sufficient documentation be available to effectively operate and maintain the Environmental Management System and that a control procedure be provided to ensure that the latest revision to documentation is maintained in a legible and readily identifiable condition at all locations where needed.

2. The Director Environment shall be responsible to develop, document, and maintain procedures for controlling documentation pertinent to the Environmental Management System. Documentation is defined as both procedure and the applicable forms and data pertinent to performing the procedure.

3. Methods provided to control the issue of new documentation and revision/reissue of existing documentation shall be adequate to preclude the use of invalid and/or obsolete documents and shall require:

> a. Procedures to be written in a standard format where appropriate. The recommended format shall be provided by the Director of EHS.

> b. All procedures to contain a title, procedure number, revision number, date authorized for use, and approval signatures.

> c. Procedures to be reviewed for adequacy and approved prior to issue. Subsequent revisions shall be approved by the same authority who approved the original or by equal authority having access to all pertinent background information.

> d. All documents to be issued with a cover letter to identify the changes and name the recipients.

> e. Revisions to a procedure to be identified by marking the affected paragraphs with an asterisk in the left hand margin next to the paragraph number.

4. Corporate office shall maintain a master list of all current corporate-wide documents showing the procedure number, revision number, date, and the person responsible for maintenance. Each location manager shall maintain a similar list of documents developed for local use only.

5. All pertinent and appropriate documentation dealing with environmental requirements, regulations or issues shall be maintained at both the facility and corporate office.

6. Any change to the content of a document or to the described procedure shall require that the document be reissued.

7. Documents of external origin, which are required and officially authorized for use, shall be identified, provided, and controlled in a manner so as to ensure their proper use.

8. Obsolete documents (manuals, etc.) may be retained for reference and informational purposes provided they are marked "OBSOLETE" in a conspicuous manner and maintained in a location separate from documents being used to do the work.

Operational Control

1. The facility Management Representative, with assistance from the Director of Environment, is responsible for identifying operations and activities associated with Environmental Aspects that may require operational controls in procedures, work practices, or environmental management programs. If required, the Director of Environment has the responsibility to ensure proper environmental controls are put in place and it is the responsibility of the facility Management Representative to manage such controls.

2. This manual defines the mechanisms for the establishment, implementation and maintenance of the Environmental Management System and ensure that the system is maintained in accordance with Environmental Policy and objectives and targets and is also communicated to suppliers and contractors.

3. Additional supporting documents are either in the form of (1) a system procedure that cover the management and control of both the Environmental Management System and Environmental Aspects, or (2) written work practices that cover the environmental control of specific operational activities and are usually activity specific in their application.

Emergency Response and Preparedness

1. Thomason Company shall establish and maintain procedures to identify the potential for and response to emergency situations, and for preventing and mitigating the Adverse Environmental Impacts that may be associated with them. The Director of Environment will coordinate the establishment and maintenance of these with the facility Management Representative.

2. The facility will have an Emergency Response and Preparedness plan to identify potential facility environmental emergencies. This plan shall address:

    a. Methods to respond to, mitigate and prevent identified potential environmental emergencies.

    b. Roles and responsibilities for communications within the facility.

    c. Responsibilities for obtaining outside support services.

3. The facility Management Representative shall review and revise, where necessary, its emergency preparedness and response procedures, in particular, after the occurrence of emergency situations or significant changes.

4. The facility Management Representative shall also test such procedures, where practicable, on a periodic basis.

Checking and Corrective Action

Monitoring and Measurement

1. It is the policy of Thomason Company that plant operations be controlled in such a manner as to minimize impact on the Environment and operate within regulatory compliance. To assure satisfactory environmental compliance, documented procedures shall be established and maintained to monitor and measure the key characteristics of the operation and activities that have a significant impact on the Environment. Procedures shall include the recording of information to track performance, relevant operational controls and conformance with Thomason's Environmental Objectives.

2. The facility Management Representative shall be responsible to ensure that appropriate facility personnel are provided with the necessary instructions, schedules, and forms to perform and document inspection and monitoring of the process for environmental compliance purposes. Instructions shall, at a minimum, include the following:

> a. Environmental compliance requirements if appropriate.

> b. What equipment or process variable/condition to inspect.

> c. Where to inspect, how often, and what information to record.

> d. What is acceptable/unacceptable and what to do when a Nonconforming condition is found.

3. Control of applicable equipment shall include provisions to ensure that:

> a. Calibrated equipment in use, such as the sulfur test machine, shall be identified by a sticker, tag, or other visible means of assessing calibration status. All calibration stickers, tags, and other Records of calibration status must show date last calibrated, next date due, and who performed the calibration.

> b. Except for certified stack readers, only calibrated equipment shall be used to verify environmental compliance to Permit requirements and shall be used in such a manner that the test measurement error is known and is consistent with ASTM and/or SRCC precision/accuracy statements. Measurement and test equipment not clearly identified as to calibration status (i.e., stickered or tagged) shall not be used for compliance testing.

> c. The accuracy and precision of calibration results shall be traceable to nationally recognized standards where such standards exist. In the absence of such standards, the calibration procedure or the equipment log shall specify the basis for ensuring accuracy/precision of the calibration equipment used.

> d. Measurement and test equipment shall be protected from unauthorized adjustments, which would invalidate calibration.

> e. Test hardware or test software, if used for environmental compliance testing, shall be subject to the same requirements as other listed measurement and test equipment.

4. Calculations required by Thomason Company's procedures and regulatory compliance requirements shall be reviewed by the facility Management Representative and corporate Engineering Department.

> a. The Engineering Department will be responsible for overseeing and approving all applicable documents and calculations to present required documentation to the regulatory agencies.

> b. The facility Management Representative will be responsible to see that applicable documents are properly and timely completed to meet obligations of regulatory compliance and Thomason Company procedures.

> c. The Director of Environment will be responsible for reporting required Records and documents to the Regulatory agencies

> d. No changes in above referenced calculations shall be made unless approved in writing by corporate engineering and Environment.

5. The facility Management Representative shall be responsible to identify restorative/preventive maintenance requirements for processing equipment, and shall see to it that suitable maintenance is performed to ensure the continuing capability of the process to maintain the plant within environmental compliance.

6. The Facility/QC Lab Manager at each applicable location shall be responsible to identify and maintain a list of equipment requiring calibration and control, and shall ensure that calibration is performed and documented on listed equipment before it is put into service and at regularly scheduled intervals thereafter.

7. Acceptable calibration methods may be as recommended by any of the following authority:

a. Equipment manufacturers.

b. Recognized standards organizations such as ASTM.

c. Thomason Comapny operating experience.

8. Facility Management Representatives and/or the respective department heads are responsible to document the procedures used to calibrate listed equipment. Each calibration procedure shall include or reference the following information:

a. Identification and function of equipment covered by the procedure.

b. Who is authorized to do the calibration.

c. Calibration frequency.

d. Calibrating equipment/standard to be used.

e. Environmental conditions required for the calibration.

f. Measurements to be made to assure calibration over the expected range of use.

g. Method for taking the measurements.

h. Acceptable limits for each measurement taken.

i. Action to be taken if calibration results are unsatisfactory.

j. How equipment is to be stored/handled to maintain accuracy and fitness for use.

k. Documentation requirements.

9. Outside services may be used for calibration as deemed appropriate by the responsible manager. When outside service is used, the manager is responsible to ensure that the service conforms to the requirements of this section.

10. A separate log to document calibration and maintenance shall be maintained for each piece of listed equipment. At a minimum, the log shall include the following:

a. Identification to Permit traceability.

b. Current location of equipment.

c. Standard used.

d. Required accuracy expressed as acceptable limits.

e. Date calibrated.

f. Date next calibration due.

g. "As found" versus "as left" for each calibration.

h. Corrective action taken.

i. Maintenance history.

j. Person who performed the calibration or maintenance.

11. When equipment used to verify environmental compliance is found to be out of calibration, the facility Management Representative shall be responsible to:

a. Assess the validity of test results previously produced by the faulty equipment.

b. Resample/retest as appropriate to reevaluate quality status of any suspect data.

c. Notify the Director of EHS of suspect data, which have already been given to governmental agencies.

d. Document all decisions/actions.

12. Calibration Records shall be made available to auditors who wish to review them.

Non-conformance and Corrective/Preventive Action

1. It is the policy of Thomason Company to take corrective and/or preventive action as necessary to investigate and address environmental nonconformity. Applicable situations for corrective/preventive action may involve any problem or potential problem, which can have Adverse Environmental Impact.

   a. Valid neighbor complaints.

   b. Nonconforming operations resulting in environmental concerns.

   c. Environmental Management System issues arising from internal audits.

2. Thomason Company shall develop and maintain company-wide procedures for responding to internal requests for corrective/preventive actions. The procedures shall provide for:

   a. Applicable problems to be brought to the attention of management.

   b. The use of appropriate sources of information (e.g., environmental Records, complaints, audit results, processes, work operations, Thomason Company objectives, etc.) to detect, analyze, and eliminate potential causes of Non-conformance.

   c. Assignment of responsibility for investigating and taking appropriate action.

   d. Maintenance of documentation indicating what was found to be wrong, the action taken, and the results of those actions.

   e. Follow up to verify that the action taken was effective and that any procedural changes and/or training made necessary as a result of the action is completed before closeout.

   f. Records of preventive action, which may have wider application to be submitted to appropriate management for further review.

Control of Records

1. It is the policy of Thomason Company that sufficient Records shall be maintained to demonstrate conformity to requirements and to verify effective operation of the Environmental Management System. Maintenance requirements shall also be applicable to supplier Records pertinent to the system.

2. Records shall be stored in an Environment so as to minimize damage or deterioration and prevent loss. Storage conditions shall be maintained to ensure that each record remains identifiable, legible, and easily retrievable during the required storage period.

3. All pertinent and appropriate records dealing with environmental requirements, regulations or issues shall be maintained at both the facility and corporate office.

4. The facility Management Representative shall maintain an Environmental Records List. Corporate Environment shall maintain a Master Environmental Records list for all facilities.

5. The Records list, as appropriate, shall provide for:

   a. Identification of the record by type and/or name.

   b. Location where the record is to be filed/stored and how it is to be protected.

   c. Minimum retention time which shall be no less than three years for environmental Records unless required differently by corporate procedure or regulatory permit.

   d. Responsibility for collecting and/or maintaining the record.

e. The disposal method for obsolete Records.

f. Other information as appropriate

Environmental Management System Audit

1. It is the policy of Thomason Company to verify by internal environmental audits that the Environmental Management System is adequate to serve the company's needs and that it is being applied as intended by management.

2. Scheduled Internal audits shall be performed periodically at each applicable location by qualified auditors.

3. The corporate Management Representative shall be responsible for:

a. Qualifying and assigning auditors to ensure objectivity and impartiality.

b. Scheduling and planning for audits to ensure that the audit criteria, scope, frequency and methods are defined.

c. Conducting meaningful audits and reporting results.

4. The corporate Management Representative shall ensure that the audit process considers:

a. Compliance with the Environmental Management System.

b. Necessary procedures are properly documented and available where needed.

c. Work is being done according to procedures.

d. The working Environment is satisfactory to achieve objectives.

e. Records are being maintained as required.

f. The system is effective to produce the expected results.

5. Audit preparation shall include a review of previous audit results, inspection/test Records, and other management concerns as applicable. A checklist, if used, shall be specific to the individual audit and shall be prepared by the corporate Management Representative and/or the audit team.

6. Auditors shall review the findings and observations with facility management during the audit and determine items to discuss with the Director Environment in preparation for a closing meeting with facility management. Once a consensus is reached, any noncompliance shall be conveyed to the responsible management for implementing corrective action. The responsible manager shall use the Thomason Company corrective action system to address such audit findings if required. Confirmation of the implementation and effectiveness of the corrective action must be provided to the appropriate department head and to the facility Management Representative, who shall ensure that the corrective action is revaluated at the next scheduled internal audit.

Management Review

The corporate Management Representative shall be responsible to schedule an annual review of the entire environmental system by Corporate Management. Each review shall include a preliminary review with management at each Thomason Company facility and a final review by a corporate level committee. The purpose of the review shall be to evaluate the continuing adequacy, suitability and effectiveness of the system in satisfying the Thomason Company Environmental Policy and Objectives.

1. Review Input

A written agenda for conducting the management review shall be provided by the corporate Management Representative to ensure that the following items are taken into account in evaluating environmental management system performance.

> a. Environmental Policy & Objectives
>
> b. Environmental Management System Manual and supporting procedures
>
> c. Legal and other requirements
>
> d. Training, Awareness and Competence
>
> e. Operational Control Issues
>
> f. Emergency Response and Preparedness
>
> g. Monitoring and Measurement
>
> h. Non-conformance and Corrective and Preventive Action
>
> i. Internal Environmental System Audits
>
> j. Regulatory Compliance Audits
>
> k. Supplier, Contractor, and or Consultant Performance
>
> l. Updates of open action items from previous reviews

2. Review Output

Output from the annual reviews shall be documented and include decisions and actions related to:

> a. Improvement of the effectiveness of the Environmental Management System.
>
> b. Improvement of Environmental Aspects as related to regulatory or other requirements.
>
> c. Resource needs.
>
> d. Corrective and Preventive Actions to be taken.
>
> e. Assignments of responsibility to appropriate local or corporate individuals.

10 Eco-Management Audit Scheme (EMAS)

EMAS is a management tool for companies to evaluate, report and improve their environmental performance. It is also a voluntary initiative designed to improve company's environmental performance. Its aim is to reward those companies that go beyond the 'minimum legal compliance' and continuous improvement of their environmental performance.

The main stages of EMAS:

- To conduct an initial environmental review considering the environmental aspects of the organisation's activities, products and services, methods to assess these and its legal and regulatory framework and existing environmental management practices and procedures.
- In the light of the results of the review, implementing an effective environmental management system which aimed at achieving organisation's policy defined by top management. The management system need to sets responsibilities, means, operational procedures, training needs, communication systems and monitoring.
- Perform an internal audit of the management system in place and conformity with the organisation's policy as well as compliance with relevant environmental regulatory requirements.

- Prepare the environmental statement (i.e. a statement of its environmental performance) which lays down the results achieved, against the environmental objectives and future steps to be undertaken to continuously improve the organisation's environmental performance.
- The environmental review, EMS, audit and environmental statements must be validated (approved) by an accredited EMAS verifier.
- The validated statement should be sent to an EMAS competent body for registration and made publicly available before an organisation can use the EMAS logo.

Differences between EMAS and ISO 14001

EMAS	ISO 14001
- Regional standard	- International standard
- More stringent	- Quite lenient
- Applies to a single site/multiple sites	- Applies to a single unit
- Requires an initial review	- No need of an initial review
- Requires an environmental statement	- Do not require an environmental statement but an environmental policy is required

The similarities between EMAS and ISO 14001 are:
- No limits and time scale objectives
- Based on BS 7750
- Provide framework for sound EMS

11   ISO 14001 Certification

11.1   Certification

Certification is a written assurance in the form of a certificate that a conformity assessment provider gives, certifying that a product, services, process or material conforms to specific requirements. In some countries, certification is also known as "registration", while the providers of these services are known as 'certification bodies', 'registrars' or 'registration bodies'. Common examples are certification of ISO 9000 (quality management system) and ISO 14000 (environmental management system).

11.2   Accreditation

The process by which an authority body gives formal recognition that a body is competent to carry out specific tasks, is known as 'accreditation'. The main functions of the authoritative body are: to accredit testing and calibration laboratories and to accredit certification bodies.

11.3   Requirements for initial certification

The application of the company is evaluated based on the competitiveness required for an effective audit of EMS.

11.4   Step by step process to ISO 14001 certification

The steps to be followed to obtain ISO 14001 certification are: -

1.   An initial review of impacts and influences on the environment is carried out
2.   The environmental policy aspects are evaluated
3.   Environmental objectives and targets are set up
4.   An environmental management programme is set up
5.   Promulgation of an Environmental Policy

The First Provisional Audit of steps completed

1.   Staff and other personnel are trained
2.   Environmental aspects are communicated and documented
3.   Operation and management control
4.   Emergency preparedness and response (including satisfying building/fire control laws)
5.   Monitoring and evaluation
6.   Non-performance and corrective action
7.   Documentation and recording
8.   Internal auditing
9.   Management review

Second Provisional Review taken

1.   Corrective action
2.   Final Audit Report and Certification

The entire above process can take from a year to two years to reach completion.

11.4.1   Duration of certification

Certification is awarded for a period of two complete calendar years if the application is successful. The certification period is this two-year period. After each certification period, an organisation should renew the certification for a period of two more years. At the end of the first year of certification, the organization may remain certified by paying the annual certification fee and by compliance with the Code of Conduct. At the end of these two years, all the certified auditors are requested to complete the renewal of the certification process.

11.4.2   Enforcement of Certification

If an organization has not met the certification criteria, the certification body has the right to withdraw the certification. Usually, withdrawal may be preceded by a period during which the organization is given the opportunity to meet the requirements and to be reinstated to the grade it originally held. If the organization has acted against the Code of Conduct, the certification body has the right to undertake action against the certification. The notices of withdrawal of the certification are published within the public domain.

11.4.3   Requirements for Certification renewal

To obtain renewal of the certification process the followings are required: -

  1. Continuing Professional Development (CPD) during the two-year period

  2. Audit experience on audit log sheets

3. Declaration of complaints

4. Compliance with the Accreditation Body Code of Conduct

5. Payment of annual fee

12   Frequently Asked Questions

a)   If a compliance program is already available, why do we need an EMS?

An EMS can help your plant comply with regulations more consistently and effectively. It also can help your plant identify and capitalize on environmental opportunities that go beyond compliance.

b)   How much should an EMS of a plant be detailed?

When working your way through the process of creating your plant's EMS, strive for simplicity. There is no point in creating an overly burdensome management system that your plant cannot sustain.

c)   Is the implementation of EMS affected by the size of an organization?

EMS' have been implemented by organizations ranging in size from a dozen employees to many thousands of employees. The elements of an EMS are flexible by design to accommodate a wide range of organizational types and sizes.

d)   Does an EMS help in preventing pollution?

A commitment to preventing pollution is a cornerstone of an effective EMS and should be reflected in your plant's policy, objectives and other EMS elements.

e)   Should an EMS be started from scratch?

Much of what your plant has in place now for environmental management and other programs such as health and safety should be incorporated into the EMS. There is no need to "start over".

f)   How will an EMS affect the existing compliance obligations of an organization?

An EMS will not result in more or less stringent legal compliance obligations. However an EMS should improve your plant's ability to comply with legal obligations, and, in some cases, may lead to more flexible compliance requirements.

g)   Do we need to be in 100% compliance in order to have an EMS?

No. The concept of continual improvement assumes that no organization is perfect. While an EMS should help your plant improve compliance and other measures of performance, this does not mean that problems will never occur. However, an effective EMS should help your plant find and fix these problems and prevent their recurrence.

Appendix 1

Organization-Oriented Standards

ISO 14001:1996	Environmental management systems - Specification with guidance for use. Provides framework to develop and implement EMS for certification purposes. Applicable to all organizations/ locations.	
ISO 14004:1996	EMS - general guidelines on principles, systems and supporting techniques for for certification. Provides assistance to organisations who are setting up and/or developing their EMS.	
ISO 14010: 1996.	Guidelines for environmental auditing. General principles.	
ISO 14011: 1996	Guidelines for environmental auditing - Audit procedures - auditing of EMS. (composition, criteria for selection of audit teams).	
ISO 14012: 1996	Guidelines for environmental auditing - Qualification criteria for environmental auditors (internal, external & lead auditors).	
ISO 14013: 1996.	Management of environmental Audit Programme.	
ISO 14014: 1996.	Initial Review.	
ISO 140 15: 2001	Environmental management - Environmental assessment of sites and organizations (identify & assess enviro aspects & associated business)	

Product-Oriented Standards

ISO 14020: 2000	Environmental labels and declarations - General principles (goals & principles).
ISO 14091 : 1999.	Environmental labels and declarations - Self - declared environmental claims (Type II environmental labelling). - terminology, symbols, testing and verification methodologies.
ISO 14024 : 1999	Environmental labels and declarations - Type I environmental labelling - Principles and procedures (for 3rd party - environmental labelling certification).
ISO/TR 14025: 2000 ↑ Technical Report.	Environmental labels and declarations - Type III environmental declarations (identifies and describes elements and issues for consideration when making declaration of quantified product information based on LCI).

ISO 14031 : 1999	Environmental Management - Environmental Performance Evaluation - guidelines.
ISO/TR 14032 :1999.	Environmental Management - Examples of EPE.
ISO 14040 : 1997	Environmental management - life Cycle assessment - Principles and framework.
ISO 14041 : 1998	Environmental management - LCA LCA - Goal and Scope definition and inventory analysis.
ISO 14042 ; 2000	EM - LCA - Life cycle impact assessment.
ISO 14043 : 2000	EM - LCA - Life Cycle Interpretation.
ISO/WD TR 14047 ↑ working draft	EM - LCA - Examples of application of ISO 14042.

ISO/TS 14048 : 2002	EM - LCA - Data documentation format. (under publication).
ISO/TR 14049 : 2000	EM - LCA - Examples of application of ISO 14041 to goal and scope definition and inventory analysis.
ISO 14050 : 2002.	EM - Vocabulary (Terms and Definitions in ~~ISO 1400~~ ISO 14000 series).
ISO 14060	ISO guide to 14064 - guide to write standard.
ISO/TR 14061 : 1998	Information to assist forestry organizations in the use of EMS standards ~~ISO~~ ISO 14001 and ISO 14004.
ISO/TR 14062 : 2002.	EM - Integrating environmental aspects into product design and development.
ISO/WD 14063	Guidance on environmental communication (communicating results) (PER: Public Environmental Reporting)

Appendix 2

(ISO 14001 Requirements, 1998)

ISO 14001 Definitions

Continual Improvement

ISO 14001 **DEFINITION**	*"Process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy. NOTE: The process need not take place in all areas of activity simultaneously."*
COMMENTS	It is interesting to note that the definition of continual improvement focuses the improvement process on enhancement of the environmental management system rather than the environmental performance itself. Improvement of environmental performance is the intended outcome, but not a strict requirement. To be sure, the environmental performance must show improvement to meet the stated objectives and targets, including compliance with regulatory requirements. However, once the objectives are met there is no obligation to set new, higher standards in all attained areas.

Environment

ISO 14001 **DEFINITION**	*"Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation. NOTE: Surroundings in this context extend from within an organization to the global system."*
COMMENTS	This definition is central to understanding the scope of application of the standard. There are two issues that emerge from this definition: conservation of natural resources and the workplace environment.
	Regarding the first, note that in addition to the physical environment — air, water, land, flora, fauna, and humans — the natural resources are also included. Consequently, energy and raw material use must be considered, even when their extraction or production does not impact the physical environment.

Environmental Aspect

ISO 14001 **DEFINITION**	*"Element of an organization's activities, products or services which can interact with the environment. NOTE: A significant environmental aspect is an environmental aspect which has or can have a significant environmental impact."*
COMMENTS	The concept of an environmental aspect is fundamental to the ISO 14001 approach. If an organization does not correctly identify its relevant environmental aspects, it will not be able to successfully implement the standard.

Environmental Impact

ISO 14001 **DEFINITION**	*"Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services."*
COMMENTS	The definition of environmental impact is also very broad. *Any* change to the environment is an impact. Every identified environmental aspect should be reviewed for present and potential impacts. Not all aspects can be associated with specific impacts, but most can. Again, at this stage the importance of an impact should not be considered. Association of environmental aspects and their corresponding impacts is an important first step in determining the significance of an aspect.

Environmental management system audit

ISO 14001 **DEFINITION**	*"Systematic and documented verification process to objectively obtain and evaluate evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria set by the organization, and communication of the results of this process to management."*
COMMENTS	For those experienced with quality management system auditing (ISO 9000, for example) the definition is strait forward and does not merit any comments. However, without such experience this definition does not help to visualize what a system audit is.

Environmental Objective

ISO 14001 DEFINITION	*"Overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable."*
COMMENTS	Environmental objectives translate the general commitments of the environmental policy into a number of specific goals that need to be achieved in order to implement and fulfill the policy. For example, when the environmental policy states a general commitment to reduce the consumption of natural resources, the corresponding objectives may be to reduce waste and consumption of materials; reduce energy required in manufacturing; and reduce vehicle miles. In particular, specific objectives should be established to fulfill the policy commitments; where there has been, or will be a difficulty in meeting regulatory or other requirements; and where there is lack of consistent, reliable control in any area.

Environmental performance

ISO 14001 DEFINITION	*"Measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets."*
COMMENTS	The definition is quite strait forward and intuitive. It highlights the need to express environmental objectives, targets and significant aspects in terms that can be measured.

Environmental Policy

ISO 14001 DEFINITION	*"Statement by the organization of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets."*
COMMENTS	Environmental policy in ISO 14001 has a special role. When further developed into objectives and targets, it becomes in fact a specification for the desired environmental outcome or even specific performance. The whole management system is designed and implemented to achieve the policy, and the effectiveness and suitability of the system is assessed on the basis of its ability to fulfill this mission.

Environmental target

ISO 14001 **DEFINITION**	*"Detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives."*
COMMENTS	An environmental target is a specific milestone in the process of achieving an environmental objective. For example, when the objective is to reduce vehicle miles, there may be a target to reduce personnel commuting miles per person by 10 percent in the first year and five percent in the following year (by carpooling, for example); and a target to reduce transportation miles per manufactured unit by five percent per year for the following five years.

Interested party

ISO 14001 **DEFINITION**	*"Individual or group concerned with or affected by the environmental performance of an organization."*
COMMENTS	It is intuitively clear in most cases who is *affected* by environmental performance of an organization, and that interests of affected individuals and groups should be considered. However, who exactly should be *concerned* with an organization's environmental performance seems to be a political matter. ISO 14001 auditors will not engage in the debate. They will expect the organization to have a system for communicating with the public and to consider, in balance with its financial, operational and business requirements, the views and interests of at least those individuals or groups directly affected by its environmental performance.

Organization

ISO 14001 DEFINITION

"Company, corporation, firm, enterprise or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration. NOTE: For organizations with more than one operating unit, a single operating unit may be defined as an organization."

Prevention of Pollution

ISO 14001 DEFINITION

"Use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process change, control mechanisms, efficient use of resources and material substitution. NOTE: The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs."

COMMENTS

The definition provides valuable information on how to implement the ISO 14001 requirement that an organization commit itself in its environmental policy to prevention of pollution. To satisfy this requirement, the environmental objectives and targets and the programs for achieving them should include specific commitments to employ relevant methods for prevention of pollution listed in the definition.