

Environmental management system (EMS)

Environmental management system

- Shifting from pollution control at the discharge points (**end-of-the pipe**) to **Environmental management system (EMS)**

Environmental management system

- **An Environmental Management System (EMS) is a framework that helps a company to achieve its environmental goals through consistent control of its operations.**
- **Management of an organization's environmental programs in a comprehensive, systematic, planned and documented manner.**
- **Includes the organisational structure, planning and resources for developing, implementing and maintaining policy for environmental protection.**

Environmental Management System (EMS)

- **Serves as a tool to improve environmental performance**
- **Gives order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes**
- **Focuses on continual improvement of the system**

Basic Elements of an EMS

- Reviewing the company's environmental goals
- Analyzing its environmental impacts and legal requirements
- Setting environmental objectives and targets to reduce environmental impacts and comply with legal requirements
- Establishing programs to meet these objectives and targets
- Monitoring and measuring progress in achieving the objectives
- Ensuring employees' environmental awareness and competence
- Reviewing progress of the EMS and making improvements

History of environmental management systems

- 1972: the United Nations organised a Conference on the Human Environment in Stockholm and the United Nations Environment Programme (UNEP) was launched
- Early initiatives led to the establishment of the World Commission on Environment and Development (WCED) and the adoption of the Montreal Protocol (1987) and Basel Convention (1989).

History of environmental management systems

- 1992: the first Earth Summit, in Rio-de-Janeiro which served to generate a **global commitment to the environment**.
- 1992: **British Standards Institution (BSI)** Group published the world's first environmental management systems standard, BS 7750.
- BS 7750 supplied the template for the development of the **ISO 14000** series in 1996 by ISO.

International Organization for Standardization

- An international standard-setting body composed of representatives from various national standards organizations
- The organization promulgates worldwide proprietary, industrial, and commercial standards

Environmental management standards

- The ISO 14000 environmental management standards exist to help organizations
 - (a) to understand how their operations (processes etc.) negatively affect the environment;
 - (b) comply with applicable laws, regulations, and other environmentally oriented requirements, and
 - (c) continually improve in the above.

ISO 14000 series

- Pertain to the process of how a product is produced, rather than to the product itself.
- certification is performed by third-party organizations rather than being awarded by ISO directly

ISO 14000 Family

- A series of guidance documents and standards to help organizations address environmental issues.
 - 14001: Environmental Management Systems
 - 14004: EMS general guidelines
 - 14010: Guidelines for Environmental Auditing
 - 14011: Guidelines for Auditing of an EMS
 - 14012: Auditing - Qualification criteria
- **ISO 19011 :2011** which specifies one audit protocol for both 14000 and 9000 series standards together.

ISO 14000 series

- **ISO 14001** Environmental management systems—Requirements with guidance for use
- **ISO 14004** Environmental management systems—General guidelines on principles, systems and support techniques
- **ISO 14015** Environmental assessment of sites and organizations
- **ISO 14020** series (14020 to 14025) Environmental labels and declarations
- **ISO 14030** discusses post production environmental assessment
- **ISO 14031** Environmental performance evaluation—Guidelines

ISO 14000 series

- **ISO 14040** series (14040 to 14049), Life Cycle Assessment (LCA), discusses pre-production planning and environment goal setting.
- **ISO 14050** terms and definitions.
- **ISO 14062** discusses making improvements to environmental impact goals.
- **ISO 14063** Environmental communication—Guidelines and examples
- **ISO 14064** Measuring, quantifying, and reducing **Greenhouse Gas** emissions.
- **ISO 19011** which specifies one audit protocol for both 14000 and 9000 series standards together.

ISO 14001 standard

- Represents the core set of standards used by organizations for designing and implementing an effective EMS.
- Prescribes controls for those activities that have an effect on the environment e.g. use of natural resources, handling and treatment of waste and energy consumption.

ISO 14001 standard

- The standard does not dictate absolute environmental performance requirements, but serves instead as a framework to assist organizations in developing their own environmental management system
- Can be integrated with other management functions and assists companies in meeting their environmental and economic goals.

ISO 14001 standard

- ISO 14001, as with other ISO 14000 standards, is **voluntary with its main aim to assist companies in continually improving their environmental performance**, whilst complying with any applicable legislation
- Organizations are responsible for setting their own targets and performance measures, with the standard serving to assist them in meeting objectives and goals and the subsequent monitoring and measurement of these
- This means that **two organizations that have completely different measures and standards of environmental performance, can both comply with ISO 14001 requirements**

ISO 14001 standard

- The standard **can be applied to a variety of levels in the business**, from organizational level, right down to the product and service level.
- Rather than focusing on exact measures and goals of environmental performance, the **standard highlights what an organization needs to do to meet these goals**.
- **Success of the system is very dependant on commitment from all levels of the organization**, especially top management, who need to be actively involved in the development, implementation and maintenance of the EMS.

ISO 14001 standard

- Generic management system standard
 - Applicable to any size and type of organisation, product or service, in any sector of activity and can accommodate diverse socio-cultural and geographic conditions

The spirit of ISO 14001

*Control and reduce impact
on the environment.*

Plan Do Check Act Cycle

- **“Plan”** what you will Do
- **“Do”** according to your Plan
- **“Check”** to see if you did what you planned
- **“Act”**, change or improve the part of your Plan or Do that did not give you the results you intended

Key Concept of ISO 14001

“Say what you do and do what you say!”

Major elements of ISO 14001

Requirements and Guidance

ISO 14001 Requirements

PLAN

4.2 Environmental Policy
4.3.1 Environmental Aspects
4.3.2 Legal and Other Requirements
4.3.3 Objectives, Targets and Programs

DO

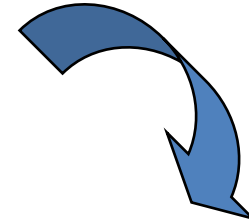
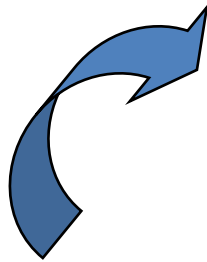
4.4.1 Resources, Roles, Responsibility and Authority
4.4.2 Competence, Training and Awareness
4.4.3 Communication
4.4.4 Documentation
4.4.5 Control of Documents
4.4.6 Operational Control
4.4.7 Emergency Preparedness and Response

CHECK

4.5.1 Monitoring and Measurement
4.5.2 Evaluation of Compliance
4.5.3 Nonconformity, Corrective Action and Preventive Action
4.5.4 Control of Records
4.5.5 Internal Audit

ACT

4.6 Management Review



ISO 14001 Standard

- 4.1 is the General Requirement – “shall establish, document, implement, maintain and continually improve an EMS”
- Followed by 17 clauses that contain requirements that must be “established, implemented and maintained”

4.2 Environmental Policy

- Top Management defines an “appropriate” environmental policy. It will be used in setting and reviewing objectives and targets
- **Main Elements (Big 3) of Environmental Policy**
 - **Commitment to Compliance**
 - **Commitment to Prevention of Pollution, and**
 - **Commitment to Continual Improvement**
- Documented, implemented and maintained
- Communicated to “all persons working for or on its behalf” (e.g., employees, contractors, volunteers, etc.)
- Available to Public

4.3 Planning

4.3.1 Aspects and Impacts

- **Environmental Aspect** - element of an organization's activities or 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 environmental aspects

Example:

Aspect - Radioactive material

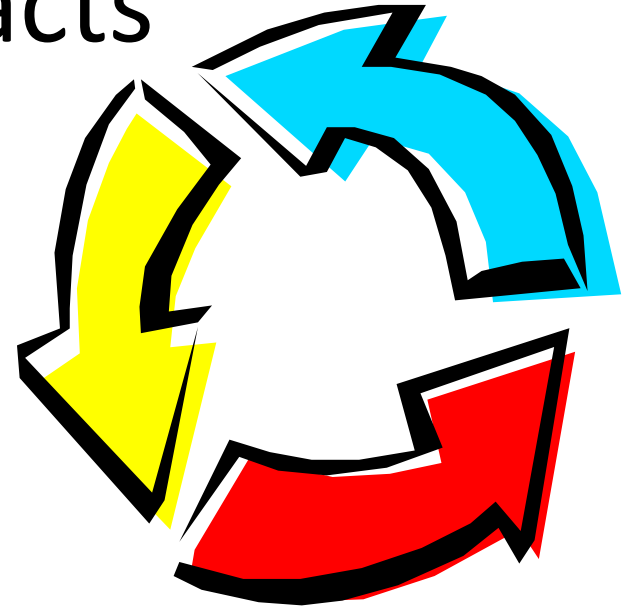
Impact –Environmental contamination

4.3.1 Environmental Aspects

- Establish, implement and maintain a procedure to:
 - identify environmental aspects that it can control and those it can influence
 - Determine which aspects have or can have significant environmental impacts
- Document and keep information up-to-date
- Ensure that significant environmental aspects are taken into account in the EMS

Aspects and Impacts

- **Consider:**
 - Air emissions
 - Solid/hazardous waste
 - Water effluents
 - Contamination of land
 - Noise, vibration and odor
 - Land use, energy use, water use
 - Raw material and resource use
 - Positive environmental issues



Not just
regulated issues!

4.3.2 Legal and Other Requirements

- Establish, implement and maintain a procedure to:
 - identify and have access to applicable legal and other requirements related to environmental aspects
 - determine how these requirements apply to the environmental aspects
- Ensure legal and other requirements are taken into account when establishing, implementing and maintaining the EMS

4.3.3 Objectives, Targets and Programs

- **Establish, implement and maintain**
 - Environmental Objectives and Targets and
 - Programs to achieve them.
- Objectives and Targets should be set at all applicable levels, and should be measurable, where practicable.
- Programs designate the who, how and when.
- Items that are part of establishing objectives and targets
 - environmental policy
 - legal & other requirements,
 - significant environmental aspects,
 - technological options,
 - financial, operational and business requirements,
 - views of interested parties

OBJECTIVES & TARGETS

- Reduce generation of hazardous waste
- Improve indoor air quality by reducing solvent odors
- Prevent spills
- Reduce electrical use
- Reduce spent solvent by 80% by 01/2002
- Reduce emissions by 90% by 05/2002
- Max. of 2 /yr. by 2003
- Reduce electricity use by 10% by 08/2002

Do

Implementation and Operation(4.4)

- ❑ Structure/responsibility (4.4.1)
- ❑ Training, awareness, & competence (4.4.2)
- ❑ Communication (internal/external) (4.4.3)
- ❑ EMS Documentation (4.4.4)
- ❑ Document control (4.4.5)
- ❑ Operational control (4.4.6)
- ❑ Emergency preparedness and response (4.4.7)

4.4.1 Resources, Roles, Responsibility and Authority

- Management must provide resources for EMS - human resources, specialized skills, organizational infrastructure, technology and financial resources
- Roles, responsibilities and authorities need to be defined, documented and communicated
- Management must appoint EMS Management Representative who
 - Ensures the EMS Requirements are established, implemented and maintained in accordance with ISO 14001
 - Reports performance to top management for review including recommendations for improvement

4.4.2 Competence, Training and Awareness

- Requires that all persons performing tasks associated with significant environmental impacts to be competent
- Identify training needs associated with environmental aspects and EMS, provide training and keep records

4.4.3 Communication

- Establish, implement and maintain a procedure for
 - Internal Communication about Environmental Aspects and EMS
 - Receiving, documenting and responding to “Relevant” Communications from external parties
- Decide whether to communicate externally about significant aspects and document decision. If decide to communicate, must establish and implement a method for this external communication.

4.4.4 Documentation

- The level of detail of the documentation should be sufficient to describe the EMS and how its parts work together, and to provide direction on where to obtain more detailed information on the operation of specific parts of the EMS.
- Documentation may be integrated with documentation of other systems implemented by the organization.
- Examples of documents include:
 - statements of policy, objectives and targets,
 - information on significant environmental aspects,
 - procedures,
 - process information,
 - organizational charts,
 - internal and external standards,
 - site emergency plans, and
 - records,

4.4.5 Control of Documents

- Must **establish, implement and maintain a procedure** to
 - Approve documents for adequacy prior to issue
 - Review and update as necessary and re-approve documents
 - Changes and current revision status of documents are identified
 - Relevant versions are available at points of issue
 - Documents remain legible and readily identifiable
 - Documents of external origin are identified and controlled
 - Prevent unintended use of obsolete documents, and suitably identified

4.4.6 Operational Control

- An organization should evaluate those of its operations that are associated with its identified significant environmental aspects and ensure that they are conducted in a way that will control or reduce the adverse impacts associated with them, in order to fulfill the requirements of its environmental policy and meet its objectives and targets.
- This should include all parts of its operations, including maintenance activities.

4.4.7 Emergency Preparedness and Response

- The organization should develop emergency preparedness and response procedure(s) that suits its own particular needs,

The organization should include consideration of

- Nature of on-site hazards, e.g. flammable liquids, storage tanks and compressed gases, and measures to be taken in the event of spillages or accidental releases,
- the most likely type and scale of an emergency situation or accident,
- the most appropriate method(s) for responding to an accident or emergency situation,
- internal and external communication plans,
- the action(s) required to minimize environmental damage,
- mitigation and response action(s) to be taken for different types of accident or emergency situation,

4.4.7 Emergency Preparedness and Response

- The need for a process for post-accident evaluation to establish and implement corrective and preventive actions,
- periodic testing of emergency response procedure(s),
- training of emergency response personnel,
- a list of key personnel and aid agencies, including contact details (e.g. fire department, spillage clean-up services),
- evacuation routes and assembly points,
- the potential for an emergency situation(s) or accident(s) at a nearby facility (e.g. plant, road, railway line),and
- the possibility of mutual assistance from neighboring organizations.

CHECK

4.5 Checking/Corrective Action

4.5.1 Monitoring and Measurement

- Must establish, implement and maintain procedure to monitor and measure key characteristics of operations and activities that could have significant impact on the environment
- Procedure must include documenting information to monitor performance, operational controls and conformance with the Objectives and Targets
- Monitoring equipment must be calibrated, maintained and records kept

4.5.2 Evaluation of Compliance

- Establish, implement and maintain a procedure for periodically evaluating compliance with applicable legal requirements and keep records of the evaluation
- Evaluate compliance with “other requirements” and keep records of the evaluation
- Can combine the two evaluations or establish a separate procedure for “other requirements”

4.5.3 Nonconformity, Corrective Action and Preventive Action

- **Must establish, implement and maintain a procedure** for dealing with actual and potential nonconformities, and taking corrective and preventive action
- Procedure must define requirements for:
 - Identifying and correcting nonconformities and take action to mitigate impacts
 - Investigating nonconformities, determining cause(s) and taking action to avoid recurrence
 - Evaluating need for action to prevent nonconformities, and implement appropriate actions
 - Recording results of corrective and preventive actions taken
 - Reviewing the effectiveness of corrective and preventive actions
- Must ensure changes are made to EMS documentation as needed

4.5.4 Control of Records

- Establish, implement and maintain a procedure for identification, storage, protection, retrieval, retention and disposal of records
- Records must be legible, identifiable and traceable

Records

- a) complaint records,
- b) training records,
- c) process monitoring records,
- d) inspection, maintenance and calibration records,
- e) pertinent contractor and supplier records,
- f) incident reports,
- g) records of tests for emergency preparedness,
- h) audit results,
- i) management review results,
- j) external communications decision,
- k) records of applicable legal requirements,
- 1) records of significant environmental aspects,
- m) records of environmental meetings,
- n) environmental performance information,
- o) legal compliance records, and
- p) communications with interested parties.

4.5.5 Internal Audit

- **Ensure internal audits of your EMS are conducted at planned intervals to**
 - **Determine whether your EMS**
 - **Conforms to ISO 14001 Standard**
 - **Has been properly implemented and maintained**
 - **Provide audit results to management**
- **Audit procedures shall be established, implemented and maintained that address**
 - **Responsibilities and requirements for planning and conducting audits, reporting results and retaining records**
 - **Determination of audit criteria, scope, frequency, and methods**
- **Auditors must be objective and impartial**

ACT

4.6 Management Review

- Top Management shall review the EMS
- Purpose of meetings is to ensure the continuing **suitability, adequacy and effectiveness** of EMS
- Need to assess opportunities for improvement and need for changes to EMS, environmental policy and objectives and targets
- Review must be documented and records retained

Thoughts on Going for ISO 14001

- Attend an overview class
- Start with gap analysis or “road map”
- 6-18 months to design and fully implement
- Work in teams or task groups
- Staff resources
- Incorporate Health and Safety
- Level of Involvement of Suppliers/Contractors
- Training (internal/lead auditor, overview)
- Using an accredited trainer/registrar

Becoming ISO 14001 certified

- ISO 14001 is the only certification standard
- Registration body examines EMS for conformity to the ISO 14001 standard
- Not a compliance audit, an EMS audit
- Does NOT mean that products are more environmentally friendly
- Does mean have a documented EMS that is fully implemented and consistently followed

Cost of Obtaining ISO 14001 Certification

- Depends upon the nature, size, and initial status of environmental protection activities
- The cost depends upon three activities: execution cost of EMS, consultancy charges, auditing and certification charges
- Consultancy charges and certifying charges: 2.5-9.0 Lakhs (2001)

List of Certification Bodies

Environmental Management Systems			
Accreditation No.	Name of the Certification Bodies	Valid from	Valid Upto
EM001	Det Norske Veritas	21 Jun 2001	20 Jun 2016
EM002	Tuv India Pvt Ltd.	12 Sep 2002	11 Sep 2013
EM003	International Certifications Services Pvt. Ltd.	16 Aug 2004	15 Aug 2014
EM004	Bureau Veritas Certification (India) Pvt. Ltd.	03 Oct 2005	13 Apr 2017
EM005	Indian Register Quality Systems (IRQS)	15 Dec 2005	11 Apr 2017
EM007	Lloyd's Register Quality Assurance Ltd. (India Branch)	12 Jun 2006	11 Jun 2017
EM008	Vexil Business Process Services Pvt. Ltd.	18 Jun 2006	20 Jun 2016
EM009	TUV SUD South Asia Pvt. Ltd.	28 Aug 2006	15 Dec 2013
EM014	GCAS Quality Certifications Pvt. Ltd.	27 Oct 2008	30 Dec 2015
EM015	KBS Certification Services Pvt. Ltd.	12 Jul 2012	11 Jul 2015
EM016	Integrated Quality Certification Pvt. Ltd.	02 Jul 2013	01 Jul 2016

Source: http://qcin.org/nabcb/accreditation/reg_bod_ems.php
 National Accreditation Board for Certification Bodies (NABCB)

Environmental Policy

- Establishes basic guidance for making decisions on environmental issues
- Provides a public commitment to environmental matters
- Foundation or basis for an organization's EMS

Environmental Aspects

- Central feature of an organization's EMS
- Careful evaluation of the effects an organization has on the environment
- Prioritization of most important
- Allows organization to design a system to focus on priority issues

Legal and Other Requirements

- Awareness of legal and other requirements is essential in proper management
- Understanding of how legal and other requirements apply to the organization

Objectives, Targets and Programs

Definitions

- **Environmental Objective** – overall environmental goal, consistent with the environmental policy, that an organization sets itself to achieve
- **Environmental Target** - detailed performance requirement, 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

Objectives, Targets and Programs

- Systematic process to achieve continual improvement

Resources, Roles, Responsibility and Authority

- Clear understanding of environmental roles and responsibilities
- Establish individual to oversee EMS
- Management ensures proper resources allocated to EMS

Competence, Training and Awareness

- Provide adequate training to personnel who deal with environmental issues
- Ensure personnel are capable to perform their responsibilities

Communication

- System of internal and external communication in place for the EMS and environmental issues

Documentation, and Control of Documents

- Specifies documentation to be in place for EMS and how that documentation will be handled

Operational Control

- Plan and carry out processes to prevent and minimize impacts to the environment

Emergency Preparedness and Response

- Procedures for identifying and managing emergencies that can have environmental impacts

Monitoring and Measurement

- Formal process for tracking environmental performance

Evaluation of Compliance

- Systematic process for evaluating compliance with applicable regulations and other requirements

Nonconformity, Corrective Action and Preventive Action

- Systematic approach to identify problems and fixing them in a manner so they will not occur again

Nonconformity, Corrective Action and Preventive Action Definitions

- **Nonconformity** - non-fulfilment of a requirement
- **Corrective action** - action to eliminate the cause of a detected nonconformity
- **Preventive action** - action to eliminate the cause of a potential nonconformity

Control of Records

- Specifies records to be in place for EMS and how the records will be handled

Internal Audit

- Conduct checks (EMS audits) to determine if EMS is working properly

Management Review

- Top management receives and reviews information about the EMS, and recommends changes for improvement

Becoming ISO 14001 certified

- ISO 14001 is the only certification standard
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- Not a compliance audit, an EMS audit
- Facility awarded registration
- Does NOT mean that products are more environmentally friendly
- Does mean have a documented EMS that is fully implemented and consistently followed