

ISO 14000 ENVIRONMENTAL MANAGEMENT SYSTEM

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1 BASIC CONCEPTS OF ENVIRONMENTAL MANAGEMENT

Basic Concepts of Environmental Management

Man-made changes in the environment have continued through most historical epochs. However, the last two centuries following the industrial revolution have witnessed accelerated environmental changes due to the exploitation of natural resources on an unprecedented scale. Extensive burning of fossil fuels, release of various chemical pollutants into the air, the water and soil, clearing of forests for agriculture and extensive exploitation of all natural resources are now threatening to destroy the very environment on which human existence depends.

Fortunately, awareness of environmental problems is growing in most countries of the world. It is felt by many people that to continue development patterns that cannot be sustained in the long term is a recipe for disaster. Governments are now listening more to the advice of environmentalists and increasingly enacting legislation aiming at protecting

the environment from the negative impacts of economic activities. However, the enforcement of environmental legislation is proving to be difficult in most cases.

A new approach to environmental protection is now available thanks to the development of new international standards on environmental management, in particular, ISO 14001. This approach relies less on command-and-control dictates from the Government and more on proactive efforts by all workers in the company.

The implementation of the environmental management system prescribed by ISO 14001 can lead to good compliance with environmental legislation and tangible, continual improvement in the environmental performance of enterprises thanks to the commitment and involvement of top management and all workers. Widespread implementation of these standards can go a long way toward improving the environmental performance of industry and promoting sustainable development in the countries of the world.

2 ISO 14000 Family of Standards

ISO 14000 is a group of standards covering the following areas:

- Environmental Management Systems (14001, 14002, 14004)
- Environmental Auditing (14010, 14011, 14012)
- Evaluation of Environmental Performance (14031)
- Environmental Labeling (14020, 14021, 14022, 14023, 14024, 14025)
- Life-Cycle Assessment (14040, 14041, 14042, 14043)

ISO 14001 is the only standard intended for registration by third parties. All the others are for guidance. ISO 14001 is a management standard, it is not a performance or product standard. The underlying purpose of ISO 14001 is that companies will improve their environmental performance by implementing ISO 14001, but there are no standards for performance or the level of improvement. It is a process for managing company activities that impact the environment.

Some unique and important characteristics of ISO 14001 are:

- It is **comprehensive**: all members of the Organization participate in environmental protection, the environmental management system considers all stakeholders, and there are processes to identify all environmental impacts.
- It is **proactive**: it focuses on forward thinking and action instead of reacting to command and control policies.
- It is a **systems** approach: it stresses improving environmental protection by using a single environmental management system across all functions of the Organization.

The Environmental Management System contains the following elements:

- An environmental policy supported by top management.
- Identification of environmental aspects and significant impacts.
- Identification of legal and other requirements.
- Environmental goals, objectives, and targets that support the policy.
- An environmental management program.
- Definition of roles, responsibilities, and authorities.
- Training and awareness procedures.
- Process for communication of the EMS to all interested parties.
- Document and operational control procedures.
- Procedures for emergency response.
- Procedures for monitoring and measuring operations that can have a significant impact on the environment.
- Procedures to correct nonconformance.
- Record management procedures.
- A program for auditing and corrective action.
- Procedures for management review.

3 Benefits of Implementing ISO 14000 EMS

Environmental Management Systems (EMS) are the foundation of the ISO 14000 group of international environmental management standards. An EMS can be registered as meeting the ISO 14001 EMS standard.

Since the ISO 14001 EMS includes everyone in the Organization and all aspects of the Organization that affect the environment, it can improve an organization's environmental performance in many ways. This improved performance comes at a cost to the Organization, a cost that can be recovered by aggressively seeking benefits.

The benefits of an EMS and registration of the EMS to ISO 14000 are organized into the following categories:

- Increased Profits
- Operations
- Marketing
- Regulatory Compliance
- Social

The benefits gained in each category are briefly described below.

Increased Profits

- Implementing ISO 14001 today can provide a basis for implementing the other standards in the ISO 14000 series. This incremental approach can reduce overall costs to implement ISO 14000 because of lessons learned in each phase.
- The quantity of materials and energy required for manufacturing a product may be reduced, thereby reducing the cost of the product, material handling costs, and waste disposal costs.
- Some companies have found that it costs more to run a compliance-driven system than an EMS
- An EMS can help reduce incidents of pollution and the associated expense of recovery.
- Recycling manufacturing waste and unused inputs could increase revenues. Recycling need not be within the same facility, but with another one that can use the waste as input to their production.
- Employee health and safety can be improved, thereby improving productivity, decreasing sick days, and reducing insurable risk.
- Insurance claims may be reduced, thus reducing the costs of coverage and settlements.
- Meeting the standards of different countries can be expensive. ISO 14000 can reduce this effort by providing one standard

Operations

- The EMS standards can define "best practices" and create a foundation for the next level of improvement.
- An EMS integrated with all other business systems improves management's ability to understand what is going on in their Organization, determine the effect on the company, and provide leadership.
- The standards build consensus throughout the world that a common terminology for environmental management systems is needed.
- A common terminology for all locations of a multinational Organization will increase efficiency of communication and improve results. An EMS can identify instances of redundancy in day-to-day efforts for regulatory compliance. These can be eliminated, thus making the Organization more efficient. An EMS includes procedures and metrics for measuring and evaluating wastes and the costs of environmental emissions. This information can help organizations implement the best practices and determine their results.
- The environmental staff can help employees and management understand and use environmental systems to improve organizational performance and benefits.
- A management system can lead to more reliable and predictable environmental performance, which can reduce or limit the severity of incidents. ISO 14000 requires a common terminology, which improves the communication of goals, procedures, impacts, and solutions.

- Improved communications can mean greater efficiency in decision making. For example, the severity of an environmental impact can increase with time, so an efficient notification system can reduce the time it takes to respond, and thus the impact, risk and liability to the Organization.
- ISO 14000 provides feedback on the operations of the Organization that can be used for daily action and to determine the appropriateness of pollution prevention strategies. Problems that could be expensive to resolve and damaging to the environment can be identified earlier.
- Early management awareness of problems would offer the best opportunity for efficient resolution.
- Management awareness of environmental impacts provides the opportunity for planning to reduce negative impacts. As ISO 14000 is accepted internationally, organizations will need to meet only one standard, thus simplifying environmental management.
- A unified approach to environmental management provides the opportunity for sharing ideas among facilities. This can increase the efficiency and benefits of an EMS.
- Spreading environmental responsibility throughout the Organization places it with those directly associated with environmental impacts and pollution prevention. This improves the effectiveness and efficiency of pollution prevention programs

Marketing

- When environmental risks are reduced, the company becomes a more attractive investment to potential and current stockholders. Three factors contribute; corporate environmental management, environmental performance, and environmental communications. Establishing a strong environmental image can help attract environmentally conscious customers and create pressure on competitors. This image must be carefully marketed to receive these benefits.
- Employees see ISO 14000 as good for their Organization and for them personally.
- Companies can receive credit for existing systems and accomplishments.
- Customers might favor companies with an EMS. These customers could be the ultimate consumer or industrial customers.
- As large, multinational manufacturers register to ISO 14000, they may favor suppliers with ISO 14000 registration.
- Community support for a facility could be increased by demonstrating concern for the local environment through an EMS.
- Workers may be attracted to a company with a plan to protect the immediate work environment and the surrounding community.
- A company's products may appeal to customers seeking green products.
- ISO 14000 registration demonstrates that the EMS meets international standards. Since registration requires third party auditing, it validates the EMS and the claims made by the Organization.

Regulatory Compliance

ISO 14000 requires evidence of working processes to maintain compliance with laws and regulations. These processes can help companies identify where they are out of

compliance and take action. Regulators may favor organizations with a ISO 14000 registered EMS. Improved compliance with legislative and regulatory requirements could reduce penalties and redemption costs. An ISO 14000 EMS demonstrates to regulatory agencies that the organization is proactive about reducing pollution and committed to continual improvement.

Social

ISO 14000 helps create:

- A common language and way of thinking about environmental aspects which can help companies, communities, governments, and organizations communicate and work together.
- Cleaner air, waters, and soils.
- Longer resource life through reduced usage.
- Progress toward a sustainable culture.
- Less waste in land fills.

In conclusion: Protecting the environment by coming into compliance or, ideally, going beyond compliance reduces waste and reduces costs and inefficiencies. It preserves natural resources and reduces the cost of finding new and more resources. It makes greater use of materials already purchased and reduces purchasing costs. It makes for cleaner emissions and reduces the severity of spills, leaks, and other accidents. Reducing these events reduces permitting costs, remediation costs, worker comp costs, insurance costs, lawsuit costs and fines, and many other costs and fees. Protecting the environment involves purchasing smaller amounts of materials or purchasing less toxic materials. These choices improve worker safety and morale, leading to more productive workers. Purchasing less hazardous materials reduces the need for and the costs associated with the need for special equipment, special training, and specially designed storage areas. These purchasing practices also reduce the cost of disposal. Protecting the environment by going beyond compliance helps keep regulators and inspectors out of the plant.

4 Keys to Success in Implementing ISO 14000 EMS

How do you define success?

Is actual achievement of progress toward sustainability or an appearance that meets public and "standards" requirements? Are you producing practical, measurable, demonstrable results? Measurements include reducing the amount or severity of needed permits, producing less waste, and reducing emissions. In the long run, pursuing measurable, actual success provides real information for real decisions, which can result in real savings.

The following are keys to success with ISO 14000 EMS:

- Setting objectives, defining success, and determining how to measure success are very important. As the saying goes, if you don't know where you are going, you can end up anywhere. |
- Targets and objectives: tying environmental effects to targets gives a company (and the people who work there) something to work towards and be proud of when they achieve their targets. It helps create "champions" who will do a great deal of work on their own, without cattle prodding from the management. IS
- In the policy statement, use words that can be audited and connect to significant aspects and impacts. Words such as "not", "never", always, and "empowered" are inappropriate
- Middle management and operations employees can have important input to the value of EMS and ISO 14000, but they may see it as an additional burden. So, look for ways that it benefits them to gain their support and creative input.
- Focus in the early stages on identifying win-win initiatives in order to reinforce and deliver the bottom line opportunities for your Organization. Self-certification may be the best first step for many companies.
- When performing a preregistration audit or gap analysis, if there are many issues of nonconformance, look at the next level up for the cause. |
- The ISO 14000 EMS is a system where each part is related to and integrated with the others. Environmental aspects, those elements of a company's activities, products, or services that can interact with the environment, are the keys to the whole system. Impacts, policy, objectives, training, emergency preparedness, procedures, and documentation must all relate to the aspects.
- Many companies are moving easily into ISO 14000 because they were already doing many of the things it requires. So, even if a company is uncertain about its timing and commitment for ISO 14000, it can identify those aspects of the standard that can benefit it now and begin phasing them in over time. This "cherry picking" can bring immediate benefits and the phased approach will minimize disruption. If the market or regulators encourage registration, progress will be faster because of this foundation.
- Setting high standards can help a company achieve more than it thought possible. Many companies are setting a standard of "zero waste." This may not be realistic for some. It is important that goals be a stretch and achievable. The bar can always be raised later. Achievement of goals builds confidence and momentum.
- An employee suggestion program is a good first step to getting people involved and harnessing the power of local knowledge. Two things that can add to the power of this

program are giving employees the ability to implement their own suggestions and rewarding them for their efforts. Follow-up is also important; give timely feedback. ISO

- Companies can turn their wastes into profits when their wastes can be input to the processes of other companies, and companies can reduce their materials costs when they use the wastes of another company as their input. This requires coordination among purchasing, product design, and waste management. ISO Communication by top management is critical. The intent of the project, its benefits to company and individual, the overall vision, and the plan for accomplishment must be clearly communicated.

Potential problem areas that need consideration in implementing EMS includes:

According to SGS, an international certification Organization, the following have been the major areas of nonconformance to the standard found in audits:

- Establishing procedures for identifying environmental aspect (4.3.1),
- Integrating the EMS into existing management system elements (4.4.1, 4.4.3, and 4.4.4),
- Identifying appropriate operational controls (4.4.6), and procedures for identifying problems and taking action to eliminate them (4.5.2).

Extra attention to these areas during EMS development and gap analysis can speed the registration process.

The biggest challenge and opportunity for success is to change the way a company thinks about the environment. It must be seen as a business issue: what benefits does the environment bring to the company and its customers? This is a change from reactive, command and control thinking. This change in thinking leads to protection of the sources of business prosperity.

There will be conflicts between environmental management and business operations. Management must truly consider all sides with an eye to win-win solutions. Since most people can sense when a "spin" is being given to a situation, rigorous honesty is required in the communication of problems and solutions.

Top management's commitment to ISO 14000 must include visible concern over environmental issues and high standards for which people are held accountable. Most important is the commitment of adequate financial, organizational, and technological resources. If the "walk" doesn't match the "talk", credibility will be lost along with individual effort and results.

5 Gap Analysis

It is critical to compare the organization's existing environmental management systems, if there is one - with the requirements of the standard (ISO 14001) to see where you start the implementation process by filling the gap. To do so it is necessary to devise a questioner such as the statements given below that address the requirement of the standard. By answering to each of the statements in number (0=none 1=some 2=about half 3=most 4=all) to represent the degree your company has accomplished each statement.

Statement 1: Environmental Policy

An environmental policy has been defined by top management that includes the following:

- It is **appropriate** for the nature, scale and environmental impacts of the company's activities, products, and services.
- It includes a commitment to continual **improvement** in the prevention of pollution.
- It includes a commitment to **comply** with relevant environmental legislation, regulations, and requirements.
- It provides a **framework** for setting and reviewing environmental objectives and targets.
- It is **documented, implemented, and maintained**.
- It has been **communicated** to all employees.
- It is **available** to the public.

Statement 2: Environmental Aspects

- A **procedure** exists to identify environmental aspects and determine which have significant impacts on the environment.
- Significant aspects are **considered** when setting environmental objectives.
- This information is kept **up-to-date**.

Statement 3: Legal and Other Requirements

- A **procedure** exists to identify and have access to legal and other requirements pertaining to the environmental aspects.

Statement 4: Objectives and Targets

- These have been **established** at each relevant function and level.
- Legal and other **requirements** were **considered** in establishing them.
- Significant environmental **impacts** were **considered** in establishing them.
- **Technological** options were **considered** in establishing them.
- **Financial, operational and business requirements** were **considered** in establishing them.
- The views of interested **parties** were **considered** in establishing them.

- They are **consistent** with the environmental policy.

Statement 5: Environmental Management Programs

An environmental management **program** for achieving objectives and targets has been established and includes:

- Designation of **responsibility** for achieving objectives and targets at each relevant function and level of the company.
- The **means** and **time-frame** for accomplishment.
- The program **applies to** new developments, new or modified activities, products, and services.

Statement 6: Structure and Responsibility

- Roles, responsibilities, and authorities are **defined, documented, and communicated**.
- **Resources** are provided that are essential to the implementation and operation of the environmental management system.
- A specific management **representative** (one or more) has been appointed by top management with defined roles, responsibility, and authority for:
 - **Establishing**, implementing, and maintaining the EMS.
 - **Reporting** on the performance of the EMS to top management.

Statement 7: Training, Awareness, and Competence

- **Training** needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training.
- Procedures are established and maintained to make appropriate employees **aware** of:
 - The importance of **conformance** with environmental policy and procedures and the requirements of the EMS.
 - The significant environmental **impacts** of their work activities and environmental benefits of improved personal performance.
 - Their **roles** and responsibilities in achieving: conformance with environmental policy, procedures, and EMS.
 - The potential **consequences** of departure from specified operating procedures.
- Personnel performing tasks which can cause significant environmental impacts are **competent**.

Statement 8: Communication

The company has established and maintains **procedures** for:

- **Internal** communications among levels and functions.

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

The company has **considered** processes for external communication on its significant environmental aspects and **recorded** its decision.

Statement 9: EMS Documentation

- Information describing the **core elements** of the EMS and their interaction has been established and maintained.
- Information providing **directions** to related documentation has been established and maintained.

Statement 10: Document Control

A **procedure** has been established and maintained for controlling documents to ensure that:

- They can be **located**.
- They are periodically **reviewed**, revised, and approved by authorized personnel.
- **Current** versions are available at all appropriate locations.
- **Obsolete** documents are promptly removed.
- **Obsolete** documents retained for preservation purposes are identified as such.
- Documents are **legible**, dated, readily identifiable, maintained, and retained.
- **Procedures** exist and are maintained for creation and modification of documents.

Statement 11: Emergency Preparedness and Response

- There are procedures for identifying the potential for and response to **accidents** and emergency situations.
- There are procedures for **preventing** and mitigating the environmental impacts that may be associated with emergencies.
- These are **reviewed** and revised as necessary.
- Procedures are periodically **tested** where practicable.

Statement 12: Monitoring and Measurement

- Procedures exist and are documented to regularly **monitor** and measure the key characteristics of operations having a significant impact on the environment.
- This includes recording information to **track performance**, relevant operations controls, and conformance with objectives and targets.
- Monitoring equipment is **calibrated** and maintained and records of the process retained.
- A procedure exists for periodically evaluating **compliance** with legislation and regulations.

Statement 13: Nonconformance and Corrective and Preventive Action

- **Procedures** exist and are maintained for defining responsibility and authority for handling and investigating nonconformance and taking appropriate action.
- Corrective or preventive action is **appropriate**.
- Changes in procedures resulting from corrective and preventive action are **documented**.

Statement 14: Records

- **Procedures** are established and maintained for the identification, maintenance, and disposition of environmental records. These include training and audit results.
- Records are **legible**, identifiable, and traceable to the activity, product, or service involved.
- Records are easily **retrievable** and protected from damage, deterioration, or loss.
- **Retention** times are established and recorded.
- Records demonstrate **conformance** to the standard.

Statement 14: EMS Audit

- A **program** and **procedures** for periodic EMS audits is established and maintained.
- The audits determine:
 - Whether the EMS **conforms** to the ISO 14001 standard.
 - Whether it has been properly **implemented** and maintained.
- The program provides **information** on the results of audits to management.
- **Procedures** cover the audit scope, frequency, and methods, and responsibilities and requirements for conducting audits and reporting results.

Statement 15: Management Review

- Top management regularly **reviews** the EMS to ensure its suitability, adequacy, and effectiveness. The review is documented.
- **Information** necessary for management to do this is collected.
- The review shall consider the need for **changes** to policy, objectives, and other elements of the EMS resulting from audit results, changing conditions, and the commitment to continual improvement.