



Environmental Management System (EMS)

Introduction to Developing an EMS

An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. This course provides an overview of EMS and how the program can support environmental improvements at businesses, associations, the public, and state and federal agencies that are subject to environmental regulations.

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OSHAcademy Course 790 Study Guide

Environmental Management Systems (EMS)

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This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Course 790.

Read each module, answer the quiz questions, and submit the quiz questions online through the course webpage. You can print the post-quiz response screen which will contain the correct answers to the questions.

The final exam will consist of questions developed from the course content and module quizzes.

We hope you enjoy the course and if you have any questions, feel free to email or call:

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Course Introduction

To some degree, all organizations consider environmental issues in their overall management processes. For some, it means dealing with a problem when an internal audit of compliance raises concern with environmental regulations. Alternatively, environmental considerations may take a commanding role in decision-making due to the organization's policies. Each of these approaches can be considered the existing environmental management system for those organizations.

The content of this course draws from the EPA's "Introduction to EMS 101" and other sources. It provides an overview of environmental management systems (EMS) and how EMS can support environmental improvements at facilities that are subject to environmental regulations. It also presents information regarding the [United States Environmental Protection Agency's](#) (EPA) involvement in supporting EMS efforts at facilities regulated under several environmental statutes.

Module 1: Environmental Management System (EMS) Basics

Today it's more important than ever to the success of organization that they help maintain a balance between socio-economic needs and the environment. The challenge in meeting this goal can best be met by establishing an effective Environmental Management System or "EMS".

An effective EMS helps a company achieve its environmental goals through consistent control of its operations through the entire life cycle of its products or services. The assumption is this increased control will improve the environmental performance of the company. The EMS itself does not dictate a level of environmental performance that must be achieved; each company's EMS is tailored to the nature of the company's business and goals.

Purpose and Scope

An Environmental Management System (EMS) is a set of systematic processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. The scope of the EMS will depend largely upon the context of operations: its size, activities, and the nature of its products and services.

Compliance Obligations

An EMS helps a company address its environmental compliance obligations in a systematic and cost-effective manner. This proactive approach can help reduce the risk of non-compliance and improve health and safety practices for employees and the public.

The EMS concept represents a fundamental change from the traditional reactive, compliance-based environmental management programs to a proactive, impact-predicting management system focused on the corporate mission and embedded in everyday business processes and activities.

Benefits

When a systematic approach is taken, top management will have the information to build long term success in meeting environmental goals, including:

-) identifying significant aspects within the context of the organizations operations, and the risks and opportunities they present
-) mitigating the adverse impacts and taking advantage of positive impacts
-) helping the company improve sustained performance and fulfill compliance obligations

-) continually improving all phases of the product throughout the entire life cycle
-) realizing significant cost savings that can result from incorporating effective alternatives
-) incorporating people, procedures, and work practices into a formal structure to ensure that the important environmental impacts of the organization are identified and addressed;
-) promoting continual improvement in the EMS, including periodically evaluating environmental performance; and
-) involving all members of the organization.

While an effective EMS will certainly improve organization's environmental performance, it has been proven to enhance performance in other mission areas as well. Further, the detailed process of reviewing environmental issues associated with a facility's activities, products, and services often identifies redundancies, wasted effort, and coordination problems that lead to inefficiencies.

Leadership and Commitment

Both leadership and commitment are extremely important components of an effective EMS. Without it, the EMS will not succeed, so let's take a look at these important concepts.

Leadership: Top management controls the organization at the top level and has important overall accountability for the success of the EMS. Managers should set the example and demand high standards of performance for everyone, not just to control other, but because they really care about everyone and the success of the EMS.

Management should take the lead in integrating the requirements of the EMS into the company's core business strategies, priorities and processes. The EMS is not something separate from the company's business vision and mission: it's a vital component of it.

Commitment: A recent study showed that the most effective organizations in making the greatest environmental improvements have very strong upper management commitment. Top level management has an obligation to protect the environment through all the aspects of its business operation. To do this it must clearly state a commitment to:

-) protect the environment

-) meet compliance obligations

Leadership and commitment to the purpose and goals of the EMS can be demonstrated when:

-) Top management owns the EMS. They take accept accountability for the success and failures of the EMS.
-) Managers are involved in establishing environmental policy and objectives that are compatible with the context of the organization.
-) Management is committed to the continual improvement process through the entire lifecycle of the products or services from creation to disposal.
-) Management designs the EMS such that it is seamlessly integrated in all phases of the organization's general operational processes.
-) Systems are set up to make sure all resources in terms of materials, equipment, machinery, and personnel are provided.
-) Employees hear and see managers at all levels of the organization express the importance of the EMS.
-) Management closely analyzes results to make sure the EMS achieves intended outcomes.
-) Managers make sure all employees receive adequate physical and psychosocial support required for an effective EMS.

Developing the EMS

Building an Environmental Management System (EMS) might sound like an overwhelming task for a smaller organization, but it need not be. When it is taken in steps, it is a job any organization can tackle. But, before you dig into the content of the course, be sure to review some important definitions (click on definitions tab) that you must be familiar with if you want an effective EMS.

The Plan-Do-Check-Act Model

There are several models that can be used to develop, implement and maintain an EMS. This course discusses the model described by the International Organization for Standardization's, ISO 14001 Standard, and builds on an approach developed many years ago by quality experts. It focuses on continual improvement through an ongoing cycle of actions called the Plan-Do-Check-Act or continual improvement cycle.

The "Plan, Do, Check, Act" diagram used to illustrate the process is typically like that in the image above: a circular image with arrows directing the viewer clockwise through the never-ending continuous improvement process.

Briefly, each of the four steps in the cycle involve:

1. **Plan – Planning.** Identifying environmental aspects and establishing goals that meet the needs and expectations of all interested parties.
2. **Do – Support and operation.** Implementing, including training and operational controls.
3. **Check – Performance evaluation.** Checking intended outcomes against actual outcomes. Includes monitoring and taking corrective action.
4. **Act – Improvement.** Reviewing, including progress reviews and acting to make needed changes to the EMS based on identified internal and external issues.

You can also learn more about continual improvement and the PDCA cycle in [OSHAcademy Course 700, Module 8](#).

The Continual Improvement Process

It's important that the company take a long-term "life-cycle" perspective when identifying environmental aspects and reducing negative impacts. Development and continual improvement of environmental performance is a five-phase cycle:

1. **Environmental Policy** – The employer signs a policy statement and makes it available to all employees and the public.
2. **Planning phase** – The organization conducts and documents a self-assessment consistent with its EMS policy and informs the employer. The employer compiles a

prioritized list of environmental aspects, resulting impacts, and the objectives and targets to reduce negative impacts.

3. **Implementation phase** – The employer signs a written plan with scheduled dates, identified resources, timelines and organizational responsibilities for implementing the EMS. The company implements the plan’s programs, processes, procedures, and practices.
4. **Checking and Corrective Action phase**
5. **Management Review phase**

The Management Review feeds back into the Planning phase to achieve changes required to attain and maintain the desired level of system effectiveness.

Elements of an Effective EMS

To develop an effective EMS, be sure to include important elements that all work together as a system. In this course, we’ll focus on basic elements integrated within each of the five continuous improvement phases of an effective EMS.

-) **Environmental Policy** - develop a statement of the organization’s commitment to the environment.
-) **Environmental Aspects and Impacts.** Aspects - identify attributes of products, activities and services that interact with the environment. Impacts - identify the changes or effects environmental aspects have on the environment.
-) **Compliance Obligations.** Identify and ensure access to relevant laws and regulations.
-) **Objectives and Targets and Environmental Management Program.** Set environmental goals for the organization and plan actions to achieve objectives and targets.
-) **Structure and Responsibility.** Establish roles and responsibilities within the organization.
-) **Training, Awareness and Competence.** Ensure employees are aware and capable of their environmental responsibilities.

- J **Communication.** Develop processes for internal and external communication on environmental management issues.
- J **EMS Documentation.** Maintain information about the EMS and related documents.
- J **Document Control.** Ensure effective management of procedures and other documents.
- J **Operational Control.** Identify, plan and manage the organization's operations and activities in line with the policy, objectives and targets, and significant aspects.
- J **Emergency Preparedness and Response.** Develop procedures for preventing and responding to potential emergencies.
- J **Monitoring and Measuring.** Monitor key activities and track performance including periodic compliance evaluation.
- J **Evaluation of Compliance.** Develop procedure to periodically evaluate compliance obligations.
- J **Nonconformance and Corrective and Preventive Action.** Identify and correct problems and prevent recurrences.
- J **Records.** Keep adequate records of EMS performance.
- J **EMS Audit.** Periodically verify that the EMS is effective and achieving objectives and targets.
- J **Management Review.** Review the EMS to mitigate the risks and take advantage of the opportunities.

Support for the EMS

Internal Organization Commitment: Top level management must champion the EMS and ensure that key organization or facility stakeholders such as those responsible for budget or facility operations are aware of the management commitment to the EMS. Change comes slowly to any organization. Ensure personnel knows you support the EMS and that they are accountable for the success of this effort.

Environmental Policy: The organization's senior manager must sign the EMS policy statement. A robust, clear environmental policy statement is a documented reminder of what is expected by senior leadership. The policy is a critical document in the EMS process and is the ultimate guiding environmental principle for each individual within the organization or facility.

Local Community Outreach: Senior managers represent their facility or organization through interaction with local community leaders and should communicate the EMS initiative as a positive message to send to the organization's neighbors. Communicating this issue to the local community is not only good public relations; it is essential to the success of the EMS because neighbors share our most sensitive environmental concerns.

Maintaining Momentum: Fully implementing a formal EMS may take several years, and maintaining momentum can be a challenge. Sustained vision, leadership and top-level management commitment are critical to meeting this challenge. When senior managers maintain interest and commitment, employees also stay focused.

There will be some frustrations as implementation progresses and previously unforeseen issues arise. Accept these as opportunities and focus on continual improvement to address existing issues and prevent future problems. Don't allow the focus on the EMS to be diverted by competing initiatives that will result in lesser long-term gains. Remember, organizational attitude reflects leadership!

EMS Team Formation: The core EMS team is selected and provided support and resources to begin development of the organization or facility EMS. This team must receive adequate training to ensure proper development of the EMS.

Tip

Every choice you and your employees make can affect the environment. Involving everyone helps produce cost-effective long-term results.

Best results will be achieved by involving everyone in the company in some way. There are two benefits to involving all employees: first, they will be more likely to take ownership of managing environmental concerns; second, they often have valuable insight into how improvements can be made.

Take a look at this comprehensive [webinar](#) introducing the various aspects of an effective EMS.

Module 1 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. A/An _____ is a set of systematic processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.**
 - a. Continuous Improvement System (CIS)
 - b. Safety Management System (CMS)
 - c. Environmental Management System (EMS)
 - d. PDCA Program

- 2. This is the process of enhancing the environmental management system to achieve improvements in overall environmental performance.**
 - a. Statistical Analysis
 - b. Traditional Management
 - c. Continual Improvement
 - d. Total Quality Environment

- 3. Which of the following describes the organization's activities, products or services that can interact with the environment?**
 - a. Environmental Aspects
 - b. Environmental Impacts
 - c. Environmental Objectives
 - d. Environmental Processes

- 4. Which of the following describes any changes to the environment resulting from an organization's activities, products or services?**
 - a. Environmental Aspects
 - b. Environmental Impacts
 - c. Environmental Objectives
 - d. Environmental Processes

- 5. The EMS model described by the ISO 14001 Standard focuses on continual improvement through an ongoing cycle of actions called the_____.**
- a. The Deming-Shewhart Management Method
 - b. Five-Step EMS Management Process
 - c. Tough Caring leadership approach to EMS
 - d. Plan-Do-Check-Act cycle

Module 2: EMS Assessment, Scope, and Policy

Baseline Assessment

The Baseline Assessment involves an Initial Environmental Review (IER) and Gap Analysis (GA). The baseline assessment helps to establish the company's current level of environmental performance by conducting the IER and also helps to identify the "gaps" needed to close to comply with ISO 14001 requirements. The baseline assessment also helps to estimate the cost and manpower that will be involved.

Once the initial baseline assessment is completed, management will decide what the scope of the EMS will be and develop the organization's environmental policy statement. The environmental policy will naturally be based on what is important to the organization in terms of vision and mission.

An early step in the process of developing an EMS is conducting a baseline analysis to establish the organization's current methods for managing environmental concerns.

Next, management will decide on the scope of the EMS and develop the organization's environmental policy statement. The environmental policy will naturally be based on what is important to the organization in terms of vision and mission.

Scope of the EMS

When an organization implements an EMS, it has to make the decision about where the EMS will apply. The scope of the EMS is commonly referred to as the "fenceline." For instance, your fenceline might include the following:

-) Commuting and Travel
-) Corporate Office
-) Field Operations

Generally, the scope will be the facility's entire operation. However, for large companies or facilities, a specific production operation, production line, or support activity may have its own EMS. It's also critically important management provides the resources needed for implementation.

Policy Statements

An EMS begins with a strong environmental policy statement. The policy statement lays the groundwork for the EMS planning phase. It describes the company's approach to managing its environmental affairs and reflects its commitment to protecting human health and the environment. It acts as a contract between the personnel of the organization and company stakeholders. To help ensure an effective EMS, top management should pledge complete support and make a commitment to provide whatever resources are needed.

Developing an environmental policy helps to lay the groundwork for the EMS planning phase. In addition to the environmental policy, successful EMS implementation also requires:

1. Ensuring that management is prepared to provide active support,
2. Forming a multi-disciplinary EMS implementation team, and
3. Holding a facility kick-off meeting to prepare everyone to implement the EMS.

Sample Environmental Policy Statements

EMS policy statements vary greatly, depending on the size and nature of the business. Here are a few samples for smaller companies:

-) "Our Company is committed to continual improvement using the EMS"
-) "We will continually improve our environmental performance in the management of environmental aspects through the use of our EMS by..."

For larger public- and private-sector organizations, the following policy statement might be use:

-) In support of our company's commitment to the EMS, we will:
 - o Ensure compliance by meeting or exceeding all applicable environmental requirements.
 - o Improve our performance in managing environmental aspects.
 - o Strive to continuously improve environmental performance in terms of both regulated and unregulated environmental impacts.

- Employ source reduction and other pollution prevention approaches whenever practicable.
- Require consideration of environmental factors when making purchasing and operating decisions.
- Establish, track and review specific environmental performance goals.
- Share information on environmental performance with the public and allow appropriate opportunities for input into EMS development and implementation.

ISO 14001 Policy Statement Requirements

The [International Organization for Standardization \(ISO\)](#) develops and publishes international standards. ISO 14001 specifies requirements for an environmental management system. The standard gives guidelines to help an organization to develop and implement environmental policy. Take a look at this [video](#) for a short overview by ISO.

The Environmental Policy statement is the central focus of the environmental management system and should clearly communicate the following:

-) the vision, mission, purpose and core values with respect to the environment;
-) a commitment to provide leadership in the protection of the environment, prevention of pollution, compliance obligations, and the continual improvement of the EMS;
-) the nature of the environmental aspects and the impacts of its activities, products and services;
-) a commitment to control and improve environmental performance with respect to significant environmental aspects of the organization's products, services and/or activities;
-) the long-term strategic environmental goals and operational objectives; and
-) a commitment to manage and continually improve environmental performance with respect to significant environmental aspects of the organization's products, services and/or activities.

Employers must have a clear vision of who they are and what they want for the future. Once they know “who they are” as an organization, they can better plan what they need to do to achieve that vision with a concise mission statement. It’s important to understand core values about the environment are not merely priorities. Core values are non-negotiable: they don’t change.

The commitment to control and improve environmental performance with respect to the environment leads to the development of Environmental Objectives and Targets. Once those items have been delineated the rest of the environmental management system is devoted to accomplishing the objectives and targets which fulfil the Environmental Policy.

Context of the Organization

Every organization has unique interactions with and impacts on the environment. These unique interactions are relevant to the nature of the activities, products and services the organization provides. The unique nature of the help to define the “context of the organization.”

For instance, in this [video](#), you can see how the unique activities at the worksite may have a direct negative impact on the local environment.

An organization attempting to comply with the requirements of ISO 14001 must be able to demonstrate it is fully aware of all relevant environmental issues and their potential impact and importance. The organization should review at a minimum the following issues:

-) its operation,
-) pollutant emissions and releases,
-) past environmental performance,
-) location,
-) land use activities,
-) sensitive environmental areas,
-) environmental impacts from other organizations nearby,
-) environmental legislation and regulation,

-) community stakeholder views, and
-) client and/or customer views.

No distinct list will be appropriate to all organizations. The organization must develop its own methodology to investigate relevant environmental issues and their potential impact and importance.

Setting Environmental Objectives and Targets

Environmental Objectives are specific and defined goals that need to be achieved in order to meet the requirements of the Environmental Policy. Environmental Targets are detailed EMS quantifiable results that arise from and are usually stated within objectives. We'll be discussing these two important concepts in more detail in the next module.

Each Environmental Objective must be traceable back to the Environmental Policy statement. In order to be acceptable under the ISO 14001 standard every action, requirement, procedure, etc., contained within the environmental management system must have its roots in the Environmental Policy statement.

It's important to remember that if you can't trace specific environmental objectives back to the Environmental Policy statement it must be assumed that the Environmental Policy statement is not accurate. The Environmental Policy Statement must include objectives that address the organization's environmental aspects and impact.

Commitment to Comply with Regulations and Requirements

The Compliance Obligations Requirements Procedure describes how the organization gathers information, analyzed it, and identifies the requirements that apply to operations. Like other EMS procedures, it describes the who, what, where, when, why, and how for an activity. Your company may be regulated primarily under the [Resource Conservation and Recovery Act](#) (RCRA), the [Clean Air Act](#) (CAA), and the [Clean Water Act](#) (CWA).

You may also identify other requirements that your company voluntarily implements. For example, you may be required to adhere to the company's policy to implement pollution prevention, improve environmental performance through objectives and targets, and communicate with the public on your environmental management progress.

ISO 14001 does not contain a specific clause that requires unconditional compliance with all applicable laws and regulations. What is required is as follows:

-) identify applicable laws and regulations,
-) decide whether it is in compliance or noncompliance,
-) for those areas where noncompliance exists, develop an action plan to correct noncompliance, and
-) establish a system to maintain compliance.

A continued pattern of noncompliance may lead to nonconformance with ISO 14001 due to a lack of an adequate "system to maintain compliance". If the organization subscribes to any codes of practice or voluntary guidelines the Environmental Policy statement will also need to include these agreements.

Document and Implement the Environmental Policy

Top management, preferably the President or CEO, should sign the Environmental Policy statement. In addition, the Environmental Policy statement should be maintained in a manner consistent with Document Control procedures within ISO 14001.

Commitment to Communicate EMS Policy to all Employees and the Public

This requirement is really a subset of the ISO 14001 section Training, Awareness and Competence. All employees within the organization must:

-) understand and recognize EMS commitments
-) be able to relate how their job function interacts with the Environmental Policy statement

ISO 14001 encourages communication with external stakeholders. When a complete Environmental Policy statement is crafted by the organization, an opportunity is created to discuss openly the organization's Environmental Objectives. These objectives, along with mission and core values of the organization, have the potential to foster an open dialogue with outside parties.

View sample EMS Policy Statements developed by:

-) [Virginia Department of Environmental Quality](#)

) [Julie's Bicycle](#)

) [Michigan Department of Environmental Quality](#)

OK. Time for a little break. Check out this great short [video](#), “Environ*MENTAL*.” You’ll laugh!

Module 2 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. Development of an Environmental Management System (EMS) begins with ____.**
 - a. support and commitment by ISO managers
 - b. a strong environmental policy
 - c. internal reliance on stakeholders
 - d. close coordination effort with the community

- 2. Developing the environmental policy helps to lay the groundwork for the EMS ____ phase.**
 - a. planning
 - b. action
 - c. correcting
 - d. checking

- 3. The Environmental Policy must contain and clearly communicate which of the following?**
 - a. key priorities for mitigating environmental aspects
 - b. safety and health vision for operations
 - c. vision, mission and core values with respect to the environment
 - d. at least three goals and objectives

- 4. What is the assumption if an Environmental Objective cannot be traced back to the Environmental Policy statement?**
 - a. The Environmental Goal is too vague
 - b. The Environmental Objective is inadequate
 - c. The Environmental Aspect is not stated properly
 - d. The Environmental Policy statement is not accurate.

- 5. According to ISO 14001 all employees within the organization should be able to ____.**
- a. discuss the four steps in the PDCA cycle
 - b. relate how their job interacts with EMS policy
 - c. know the procedure for mitigating environmental aspects
 - d. understand the seven-step EMS development process

Module 3: Planning – Aspects, Impacts, Objectives and Targets

Risks and Opportunities

Every organization engages in activities which produce various products or services that interact with the physical environment. These activities or "aspects" of doing business may affect or "impact" the environment in a positive, neutral or negative way. Also, it's important to know that the aspects of doing business may change the environment locally, regionally, or even globally.

Within the EMS, environmental aspects and impacts should be analyzed for the risks and opportunities they present. In this course, we will focus on designing an EMS that helps employers reduce risks and take advantage of opportunities that benefit the company and the environment.

It's also important to determine which aspects of the business that affect the environment are significant, and to prioritize them to identify those aspects to address first. So, let's take a closer look at two very important concepts: Aspects and Impacts.

Environmental Aspects

Some people have a difficult time understanding what environmental aspects are. Simply put, they are the "cause" of the changes in the environment. As a part of the PDCA planning phase, identifying your organization's aspects is very important. You'll need to decide if you can control the aspect.

For an EMS, only focus on those aspects you can control. For example:

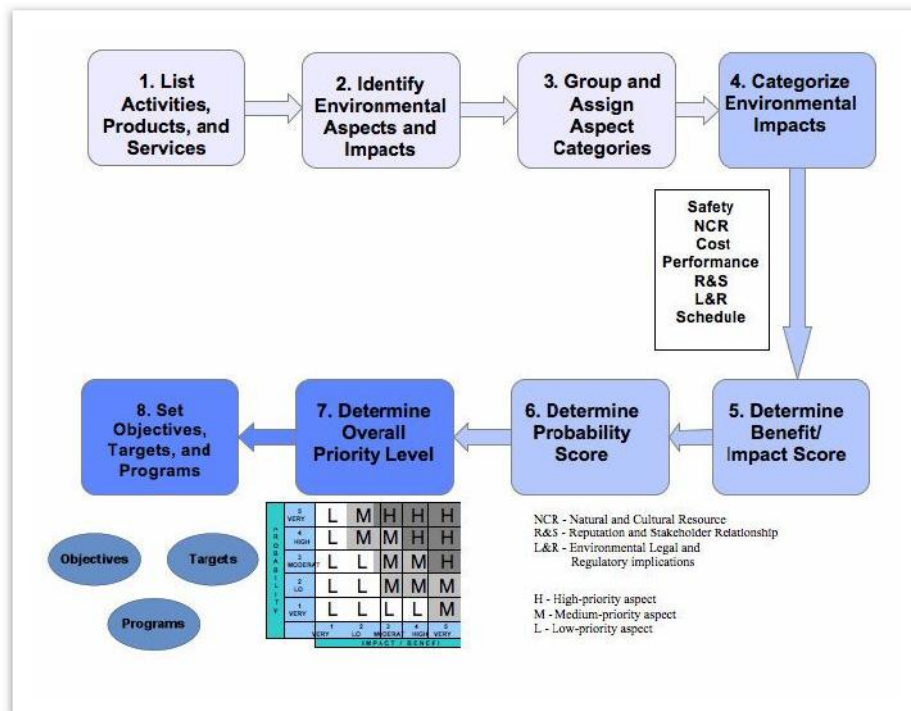
- J You can't control everything about how raw materials are made, but you do have control over who you purchase from, which materials you use, and how you manage those materials during our production process.
- J Although you may not always have control over how electricity is generated at the power plant from which you purchase electricity, you can exercise some control over how much electricity you use.

After you identify environmental aspects you can control, rank them using a predetermined set of criteria. Each company or facility should develop criteria that are important to achieving its specific environmental and business goals and meeting its environmental policy commitments.

Let's look at examples of possible ranking criteria that is used at various types of facilities:

-) actual or potential environmental impact
-) costs associated with addressing the aspect or potential impact
-) potential savings from addressing the aspect
-) pollution prevention potential from addressing an aspect or impact
-) risk of noncompliance associated with an aspect
-) community concerns associated with an aspect

The National Air and Space Administration (NASA) has an excellent process for identifying and prioritizing environmental aspects to determine significant aspects. Take a look at this process below. You can also download the NASA Procedural Requirement (NPR) as a model EMS program.



Environmental Impacts

Impacts are the “effects” on the environment caused by the environmental aspects. Another way to say it is that environmental impacts are the way(s) the aspects affect the environment. Any impact or change to the environment whether adverse or beneficial, wholly or partially resulting from an organization’s activities, products, or services need to be analyzed to determine what can be done to improve those impacts. At a minimum, your EMS should include a list of the facility’s most significant environmental impacts.

Here’s a short [video](#) about the impact of using plastic water bottles, and the strategy one company used to mitigate that impact.

Bottom Line: It’s simple cause and effect: Aspects are the causes and impacts are the effects.

Environmental Objectives and Targets

Environmental Objectives are overall environmental goals, arising from EMS policy, that the organization sets to achieve. The objectives should be quantifiable whenever practicable and aligned with environmental policy. It’s important to monitor the progress toward meeting objectives, and the results should be communicated throughout the organization and public.

Objectives and targets are linked directly to specific aspects and impacts. Each objective will include two components:

1. A **goal component** that states the general goal, such as to “reduce the amount of fuel use.”
2. A **target component** that states a quantifiable change, such as “by 5% in two years.”

The point is that objectives and targets are designed to decrease negative aspects and impacts or increase positive impacts. In other words, objectives and associated targets are established to measure progress.

Here’s another example. Let’s say your facility currently generates hazardous waste from various processes. You plan to reduce hazardous waste generation at the plant; this is an objective. The quantifiable target for that is to “reduce hazardous waste generation by 10 percent by the year 2017” using hazardous waste generation in 2015 as a baseline.

Here’s still another example (I want to make sure you get this): if the objective is to “Reduce the amount of paper used by 10% by 2018.”

-) The goal component would be to reduce the amount of paper used.
-) The target component would be a 10% reduction by 2018.

Therefore, if the current (baseline) amount of paper used by the company in 2 years is 10 tons, the target reduction would be 1 ton.

When you set objectives and targets, it is important to make sure you're able to track and measure (quantify) your performance or progress. Then, during other stages of the EMS process, you can report on progress toward achieving the objectives and targets you set.

Ideally, the most significant aspects will be assigned an Objective or goal. Task strategies can then be identified to meet the Objective.

Environmental Task Strategies and Tactics

To reduce the negative impacts of the various aspects of an organization's activities, products or services, and to achieve the environmental objectives set for the organization, you should develop EMS strategies and task tactics. Usually, task strategies and tactics describe changes in work requirements and tasks performed during normal operations.

Here are some examples of task strategies and tactics:

Task strategies – things you require everyone to do as a general rule. Weighing the amount of recycle waste is required; only biodegradable cleaning products are approved for cleaning personal work areas.

Task tactics – things you do with your hands to comply with task strategy requirements. Each worker throws all paper, plastic and metal into recycle containers; workers use reusable cups and mugs for drinks; employees use biodegradable products for cleaning their work area.

Examples: Impacts, Objectives and Targets, Strategies and Tactics

It's so important for you to understand these basic EMS concepts that we're going to take a look at some examples of environmental aspects, the impact they may have on the environment, the objectives to improve the impact, and finally, the task strategies to achieve each objective:

1. **Aspect:** Transportation and vehicle use (including agency employee commuting methods and patterns, agency employee travel).

-) **Impacts:** Air emissions and resource depletion.
-) **Objective:** Reduce fuel consumption by 5% in 2 years.
-) **Task Strategies and Tactics:** Requirements and tasks that can reduce impacts include:
 - ✓ Determine current fuel consumption to establish baseline data.
 - ✓ Devise a system to track fuel consumption and progress.
 - ✓ Encourage the use of public transportation.
 - ✓ Allow telecommuting.
 - ✓ Encourage the use of alternative fuels.
 - ✓ Encourage walking or biking to work.
 - ✓ Purchase fuel-efficient vehicles for the fleet.

2. **Aspect:** Energy consumption (use of office lights, computers, printers, copiers, other electronic devices and other equipment).

-) **Impacts:** Resource depletion and air emissions.
-) **Objective:** Reduce energy consumption by 5% in 2 years.
-) **Tasks Strategies and Tactics:** Requirements and tasks that can reduce impacts include:
 - ✓ Establish baseline data on energy consumption.
 - ✓ Use Energy Star equipment.
 - ✓ Retrofit efficient lighting.
 - ✓ Develop policies for turning off lights, computers and other electronics that are not in use.
 - ✓ Purchase electricity from renewable sources.

3. **Aspect:** Water use (in restrooms, showers, water fountains and other facilities).

-) **Impacts:** Resource depletion and water quality.
-) **Objective:** Reduce water consumption by 5% in 2 years
-) **Tasks:** Tasks that can reduce impacts include:
 - ✓ Establish baseline for water consumption
 - ✓ Use non-potable water where applicable
 - ✓ Capture rain water for landscaping needs
 - ✓ Install low flow fixtures and faucets
 - ✓ Raise awareness of water conservation efforts

4. **Aspect:** Procurement (types and quantities of materials purchased by the agency).

-) **Impacts:** Solid waste, hazardous waste and landfill space.
-) **Objective:** Establish a 'Green Purchasing' policy.
-) **Task Strategies and Tactics:** Requirements and tasks that can reduce impacts include:

- ✓ Establish and implement a process for purchasing environmentally preferable products. Purchasing considerations may include:
 - toxicity
 - longevity
 - reduced packaging
 - ability to be recycled
 - ability to be maintained
 - energy efficiency
 - recycled content
 - materials from renewable resources

Before you take the quiz, check out the [EPA's "Widget Manufacturing Co."](#) website to learn more about ways to reduce waste.



Module 3 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. Simply put, which of these are the “cause” of the changes in the environment?**
 - a. environmental impacts
 - b. environmental aspects
 - c. environmental occurrences
 - d. environmental variables

- 2. Environmental _____ are the “effects” on the environment caused by the environmental _____.**
 - a. changes, evolution
 - b. aspects, impacts
 - c. targets, objectives
 - d. impacts, aspects

- 3. Which of the following describe overall environmental goals, arising from EMS policy, that the organization sets to achieve?**
 - a. environmental aspects
 - b. environmental objectives
 - c. environmental impacts
 - d. environmental targets

- 4. If the objective is to “Reduce the amount of paper used by 10% in 2 years,” the _____ component would be “by 10% in 2 years.”**
 - a. goal
 - b. second
 - c. target
 - d. result

- 5. The statement, “We require weighing the amount of recycle waste each week,” is an example of an environmental _____.**
- a. task strategy
 - b. task tactic
 - c. impact
 - d. objective

Module 4: Developing Environmental Management Programs (EMP)

The goal and end-product of the planning phase is a one or more written Environmental Management Programs (EMP) within the EMS. Each EMP contains formal detailed environmental policies, processes, procedures and practices explaining how the objectives and targets will be accomplished in a particular environmental area.

Here's a list of sample Environmental Management Programs within the EMS you might include at your facility:

-) Air Emissions
-) Energy Use
-) Material Use - Paper Use
-) Waste – Purchasing Green Products
-) Waste - Zero Waste
-) Waste - Green Meetings
-) Water Use

Think of the EMP as a formal structured written document that describes an action plan to implement and achieve environmental objectives and targets. The EMP usually includes information on:

-) Responsible personnel,
-) means and methods
-) milestones and dates, and
-) measurements of success.

In other words, the EMP specifies who will do what, how they will do it, and by when they will do it.

Structure and Responsibility

ISO 14001 requires that the relevant management and accountability structure be defined in this element. Top management is expected to ensure that resources are available so that the EMS can be implemented, maintained, and improved. These resources include human resources, organizational structure, financial and technological resources, and others as needed.

Roles, responsibilities, and authorities must be defined, documented and communicated as appropriate.

The organization must identify the Management Representative who is responsible to oversee the EMS and report to management on its operation. This person(s) ensures the EMS is established, implemented and maintained consistent with ISO 14001, and also reports to top management on the performance of the system including recommendations for improvement.

Involvement

To ensure the company's aspects and impacts are clearly defined and its objectives and targets can be met, it's useful to involve plant personnel which may be impacted by any changes. In addition, management must support the environmental policy and be willing to invest money and resources to achieve objectives and targets.

Resources may be required to support training for facility personnel, the purchase of new equipment, time for meetings, and hiring outside consultants. Ultimately, management is responsible for providing adequate resources and being involved in the development, review, and approval of objectives and targets.

Management should appoint an EMS coordinator. The EMS coordinator is the specific management representative responsible for ensuring that the EMS is established, implemented, and maintained in accordance with facility-specific requirements.

Compliance Obligations

Another important part of the planning phase is identifying the company's compliance obligations under 14001. For this part of planning, a facility should develop a specific procedure that describes how the facility will identify legal and other regulatory requirements that apply to its operations.

You should develop a Legal and Other Requirements Procedure that describes how you gather information, analyze it, and identify the requirements that apply to your operations. Like other EMS procedures, it describes the who, what, where, when, why, and how for this activity.

At most large operations the facility is regulated primarily under the Resource Conservation and Recovery Act (RCRA), the Clean Air Act (CAA), and the Clean Water Act (CWA). You should also identify any other requirements that organizations may voluntarily implement.

For example, you may be adhering to the company's policy to implement pollution prevention, improve environmental performance through objectives and targets, and communicate with the public on our environmental management progress. The video to the right is an interesting introduction to the RCRA.

Sample Programs

Here are some good examples of written EMPs that you may want to use for ideas in your own EMP.

-) [Oregon Department of Transportation.](#) Your program may not be as detailed as this program, but it gives you examples of the various elements within the EMP. You can also visit the [ODOT EMS website.](#)
-) [U.S. Bureau of Reclamation module on EMPs.](#) Contains guidance and worksheets on developing your EMP.

EMS Software Packages

Because EMS documents are updated on an ongoing basis, they should be kept electronically on an internal company database. You might ask if a software system necessary to develop and implement a functioning EMS. Some of software packages can be helpful in implementing an EMS, but they may not be necessary or appropriate for all facilities.

I would recommend that you do thorough research before committing to any large purchase of an EMS software package. Depending on the size of the business and scope of the EMS, a fancy software package may not be necessary. You should get through the planning phase of your EMS before making decisions about what your particular needs are. Check out this [website](#) that lists top environmental software packages which might be appropriate for your EMS.

Module 4 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. What is the goal and end-product of the EMS planning phase?**
 - a. identification of Environmental Aspects and Impacts
 - b. development of Environmental Management Programs (EMP)
 - c. award of Environmental recognition by ISO
 - d. establishment of Environmental Objectives and Targets

- 2. Which of the following is an area in which you would expect to develop an Environmental Management Program (EMP)?**
 - a. Violence in the workplace
 - b. Personal protective equipment
 - c. Lockout Tagout
 - d. Material use – paper use

- 3. The organization must identify _____ who is responsible to oversee the EMS and report to management on its operation.**
 - a. a third-party representative
 - b. a safety committee member
 - c. an elected employee representative
 - d. a management representative

- 4. Why is it important to involve plant personnel who may be impacted by any EMS changes?**
 - a. because ISO 14001 requires it
 - b. to ensure that the company's aspects and impacts are clearly defined
 - c. to make sure the blame is spread equally between management and labor
 - d. because the environment impacts everyone, not just management

5. At most large operations the facility is regulated primarily by which of the following environmental laws?

- a. OSHA, NIOSH and ASSE
- b. RCRA, the CAA and the CWA
- c. RCRA, SMS and PCDA
- d. CWA, OSHA and the CAA

Module 5: Implementing the EMP

Now that we've reviewed the planning phase, let's talk about the implementation phase. During this step, you do the things that you've planned. In this module, we'll take a look at the various elements in the implementation phase:

-) Structure and Responsibility
-) Training, Awareness, Competence
-) Communication
-) EMS Documentation
-) Document Control
-) Operational Control
-) Emergency Preparedness and Response

Structure and Responsibility

The first activity includes defining a management structure and associated roles and responsibilities for the EMS. The groundwork for this activity was laid during the planning phase, when environmental management programs are designed to achieve objectives and targets.

That's right, the steps build on, and support, each other. For the EMS, roles and responsibilities should be defined, documented, and communicated at all levels to facilitate effective implementation.

To ensure EMS roles are established and associated activities take place, job-specific EMS responsibilities should become a part of each individual's job description. Incentives also can be used - for example, some facilities provide incentives for employees to meet EMS requirements, through reward and recognition programs.

EMS Education and Training

EMS education and training are key activities for implementation.

EMS education is usually online or classroom instruction. The goal of EMS education is to help employees become aware of key EMS concepts and why it is important to the success of the organization.

EMS training may be online, in the classroom, or hands-on instruction. The primary goals of EMS training is to teach each employee how to do something. Be sure employees demonstrate the necessary skills to safely perform tasks by using on-the-job (OJT) training. The OJT method is very important for any procedure that might cause an injury, illness or property damage. You can learn more about this training method in [OSHAcademy Course 723](#).

Because EMS concepts are new to many employees and impact their daily activities, you can't expect success unless you teach them about our EMS and what they can and must do to support it.

Job-specific training is tailored to job types to ensure that workers understand the significant environmental aspects of their job functions and the potential impacts of not following EMS instructions. The training also reviews the benefits of improved environmental performance. For example, such training may include instruction on how to manage hazardous waste properly. Where EMS objectives and targets require changes to equipment or operations, workers also need to be trained regarding the changes required in how they perform their jobs.

For more information on training, be sure to check out OSHAcademy Courses [703](#), [721](#), or [723](#).

Communication

Another important element of the implementation phase is communication. This includes both internal and external communication to support continual improvement with respect to environmental protection.

Internal communication: It's important to focus on communication within the organization. Communication channels must be created to ensure the personnel who need information at any level and function will receive the necessary information in a reasonable time frame. Personnel must also be able to forward suggestions and concerns about the EMS to those management personnel that can appropriately address such issues.

It is quite helpful to allow all personnel the authority to identify system nonconformance or regulatory noncompliance and report issues to the person responsible for managing the corrective and preventive action process. This helps to foster continual improvement. Of course, this only works well if employee suggestions and comments are appreciated and rewarded.

Examples of Internal Communication include:

-) notes in pay checks that inform employees about EMS efforts
-) training courses
-) posted signs with reminders of key EMS goals and actions
-) weekly EMS meetings at the facility to review progress with key management personnel
-) posting the results of progress toward objectives and targets on facility bulletin boards (for example, waste generation and chemical use rates)
-) meetings with senior management to report on the EMS
-) employee suggestion box and communications about awards for successful projects

External Communication: You should also identify external stakeholders and have implement regular communication with them regarding your EMS. This group includes customers, vendors, suppliers, neighbors, and regulators. More importantly, you should have a procedure to receive and document external concerns and ensure an appropriate response in a timely manner. Here are some of the ways you can communicate with our external stakeholders:

-) Meet with vendors and suppliers to explore options for green chemicals.
-) Tell customers about our EMS efforts.
-) Participate in community meetings to discuss our plant and its EMS efforts.
-) Host an open house or tour of the facility.
-) Host meetings like this to share information and obtain input about EMS efforts.
-) Communicate your EMS efforts to Federal, state, and local regulators.

Take a look at the [video](#) on EMS Communications and Engagement by the Washington State Department of Ecology.

EMS Documentation

Another activity in the implementation phase is two types of documentation:

-) documentation that describes the EMS, and
-) other documentation related to the EMS.

The first item includes your EMS manual, which describes the core elements of your EMS and provides direction to related documentation like management procedures, work instructions, and forms.

Part of document management includes identifying each EMS document and its document retention period.

EMS Document Control Procedure

Because documentation is so important, you should have a specific EMS Document Control procedure to manage EMS documents, including:

-) environmental policy
-) lists of objectives and targets
-) description of roles, responsibilities, authorities, and lines of communication
-) EMS Manual (system description)
-) system-level procedures
-) work instructions to support the EMS
-) related plans (for example, emergency preparedness and response and training plans)

Means and Controls

Also, develop and describe the means and controls you will use to make sure EMS documentation is up to date and readily available to all employees. The EMS Document Control Procedure describes how to manage EMS documentation. It describes how documents are

periodically reviewed and revised and how obsolete documents are promptly removed from all points of issue and use.

The EMS Document Control Procedure should address how EMS documents will be:

-) prepared
-) issued and distributed
-) revised
-) reviewed
-) disposed of (for outdated documents)

Operational Controls

Operational controls ensure that operations and activities do not exceed specified conditions or performance standards, or violate applicable regulations such as discharge limitations. The need for operational controls is based on the significant aspects and legal requirements identified earlier.

Operational controls are used to support the EMS and can be:

-) Physical controls, (for example, berms, walls, and roofs),
-) Engineering controls (for example, alarms, level indicators, and gauges), or
-) Administrative controls (for example, procedures and inspections).

For aspects that need to be controlled, review whether existing physical controls, engineering controls, and administrative controls are sufficient. If they are not, develop an operational control. Here are a couple of examples:

1. You may have operational controls for production lines regarding chemical use, production methods, and temperature control to support both high quality production and EMS objectives and targets.

2. You may have an Operational Control Procedure that describes how a wastewater treatment plant will be operated to ensure compliance with Clean Water Act permit requirements regarding discharges to surface water from our facility.

These operational controls help ensure that specified conditions and performance standards are met.

One of the goals should be to keep operational control procedures simple, focusing on the "who, what, where, when, how, and why" of getting the job done to meet both facility production and EMS requirements.

Examples of activities that may require operational controls include:

-) chemical purchasing
-) material handling
-) maintenance
-) plating line operations
-) wastewater treatment system operation
-) waste accumulation and disposal
-) storage of parts before off-site shipment

Emergency Preparation and Response

This activity is critical whether you have an EMS or not. Your company should have a strong program in this area to:

-) comply with applicable environmental laws and corporate policy
-) to protect personnel and those who live around the facility

It's important to build on existing procedures and plans to develop the Emergency Preparedness and Response Plan for the EMS. A critically important area to develop is the process for identifying the potential for emergencies and accidents. Typically, it's best to develop a proactive process for identifying potential hazards that may not be strictly regulated.

Items that should be addressed in the Emergency Preparedness and Response (EPR) program include:

-) type and location of hazardous substances used and stored on site
-) key organizational responsibilities
-) arrangements with local emergency responders, including points-of contact for response agencies
-) emergency response procedures
-) emergency communication (lines of communication and internal and external contact information)
-) locations and functions of emergency equipment and provisions for maintenance of such items
-) prevention requirements (for example, testing alarms, training)
-) evacuation routes

Finally, make sure your EPR plans address relevant environmental regulations and the requirements of the EMS. This will help consolidate EPR efforts so you have fewer documents and clear direction regarding what you need to do in the event of an emergency. This is sometimes referred to as integrated contingency planning.

Important EPR items include:

-) identifying the potential for problems,
-) testing the EPR plan annually, and
-) updating the EPR plan, as necessary.

Module 5 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. To ensure that EMS roles are established and associated activities take place, _____ should become a part of each individual's job description.**
 - a. individual task strategies
 - b. job-specific EMS responsibilities
 - c. EMS goals and objectives
 - d. each employee's impact on EMS

- 2. Which of the following training methods should be used for any procedure that might cause an injury, illness or property damage?**
 - a. Online training
 - b. Classroom training
 - c. On-the-job (OJT) training
 - d. Lecture

- 3. Posting the results of progress toward objectives and targets on facility bulletin boards are examples of _____.**
 - a. relationship communication
 - b. internal communication
 - c. content communication
 - d. external communication

- 4. Which of the following ensures that operations and activities do not exceed specified conditions or performance standards, or violate applicable regulations?**
 - a. Level I documents
 - b. Operational controls
 - c. Structural limitations
 - d. Compliance guidelines

5. Which of the following items should be addressed in the Emergency Preparedness and Response (EPR) program?

- a. Prevention requirements (for example, testing alarms, training)
- b. Reactive procedures to ensure emergencies are handled
- c. Aggressive fire-fighting techniques
- d. Semi-annual EPR review requirements

Module 6: Checking and Corrective Action

Now let's discuss the third step of the EMS process, checking and corrective action. Checking evaluates how you are doing and corrective action responds to any issues you identify.

Questions to ask include:

-) Are we doing what we said we would do? If not, why?
-) Are we making progress toward our objectives and targets?
-) Do we need to make any adjustments?

If you properly set up the tracking mechanisms during the planning and implementation steps, checking only represents making sure everything is being done and evaluating results. This is where it all starts to tie together.

Checking and Corrective Action has four elements:

1. Monitoring and Measurement
2. Nonconformance, Corrective and Preventive Action
3. Records
4. EMS Audit

Monitoring and Measurement

The first element in this phase is monitoring and measurement. This means that you track specific parameters that help:

-) Document that you are implementing the EMS,
-) Determine if you are meeting our objectives and targets,
-) Achieve operational control,
-) Calibrate monitoring equipment, and
-) Ensure compliance.

At this point, be sure to focus on what you found was significant during the initial planning phase. Examples of items that you might measure include:

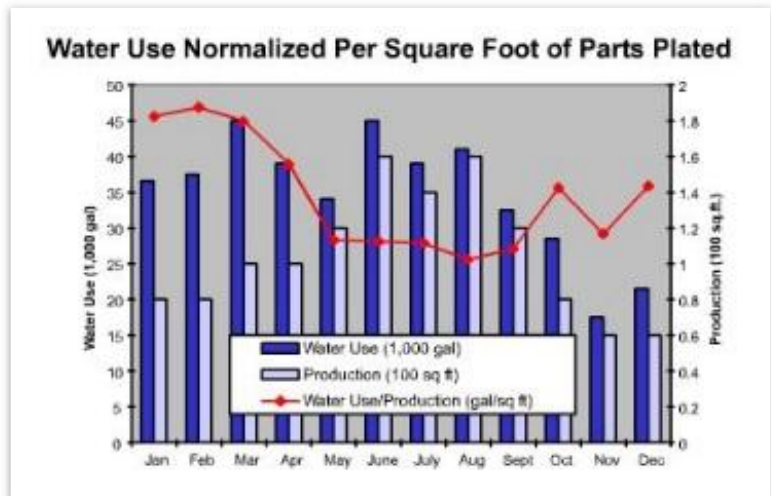
-) chemical additions and concentrations in processes
-) temperature changes and extremes
-) percent of widgets meeting quality specifications
-) amount of hazardous waste generated
-) amount of solvent used for parts cleaning
-) use of checklists to determine compliance with applicable regulations

You may want to use databases to track production data. Employees can use a computer or complete daily or weekly logs that are then provided to administrative personnel for data entry. It's a good amount of work, but it supports the production quality program as well as the EMS.

How to Use the Data

You might ask who looks at all this data and how is it used. Supervisors and managers use it for a variety of purposes, including determining if the company is in conformance with the EMS. The data is also useful to plan for purchasing raw materials, staffing, and similar items.

You could also post key data on a bulletin board to show how well the company is doing; sharing information with staff helps keep the EMS moving in a positive direction.



The image to the right shows an example of an EMS tracking chart for production lines. The chart shows water use normalized per square foot of parts plated.

Check out this [video](#) on Monitoring and Measuring by the Washing State Dept. of Ecology.

Non-conformance, Correcting, and Preventive Actions

No EMS is perfect. You will probably identify problems with your system (especially in the early phases) through audits, measurement, or other activities. In addition, your EMS will need to change as your facility adapts and grows.

Examples of non-conformance include:

-) Work instructions are not followed or records that document compliance with work instructions are not available (for example, required inspection logs are not completed)
-) Employees do not receive required training
-) Contrary to established procedures, contractors are allowed on-site to conduct work without meeting pre-approval criteria
-) The EMS documentation is not kept up-to-date

To deal with system deficiencies, your facility needs a process to ensure:

-) Problems (including nonconformities) are identified and investigated;
-) Root causes are identified;
-) Corrective and preventive actions are identified and implemented; and
-) Actions are tracked and their effectiveness is verified.

Identifying Trends

EMS nonconformities and other system deficiencies, including legal noncompliance, should be analyzed to detect patterns or trends. Identifying trends allows you to anticipate and prevent future problems.

Key steps to identifying trends include:

-) Identify the problem;
-) Investigate to identify the root cause;
-) Come up with the solution;

-) Implement the solution;
-) Document the solution;
-) Communicate the solution; and
-) Evaluate the effectiveness of the solution.

Focus on correcting and preventing problems. Preventing problems is generally cheaper than fixing them after they occur. Start thinking about problems as opportunities to improve!

Determining Causes of Problems

You will need to establish a method to determine the **root causes** of failing to conform. In some cases, the cause may be obvious, and in others, obscure.

EMS problems typically include:

-) poor communication
-) faulty or missing procedures
-) equipment malfunction or lack of maintenance
-) lack of training
-) lack of understanding of requirements
-) failure to enforce rule
-) corrective actions fail to address root causes of problems

“Root Cause Analysis”

Root cause analysis is a process by which you can identify causes and preventive actions. For instance, if a spill occurs several times in your raw material transfer area, you would attempt to identify the root cause of the spill occurring so that you could address the cause and prevent the spill in the future.

Root cause analysis can be used to describe a very formal analysis process, however, it also can mean something simpler, looking past the obvious or immediate reason for a nonconformance to determine why the nonconformance occurred.

The root cause diagram shown above will help you organize your thoughts when you analyze your facility's potential for environmental impact. This analysis can be done by one person or by a group, with one person writing down the ideas produced.

-) Each diagonal line represents a main component of the production process.
-) Each horizontal line stemming from the diagonal represents an important element contributing to each of the main components.

For example, elements of work practices might contribute to the labor component. This diagram is a device to help organize the analysis of the cause of potential environmental impacts. Use it if it helps, but don't get hung up on trying to make it work.

Taking Corrective and Preventive Actions

Once you document a problem with respect to meeting targets, you must resolve it. Take action as quickly as possible. Make sure assigned responsibilities for actions and schedules are clear so that correction occurs in a timely manner.

Employees in the facility may recognize the need for corrective action and provide good ideas for solving problems. Find ways to get them involved in the improvement process. It's important to determine whether a lapse is temporary or due to some flaw in the procedures or controls. For this reason, communicate any findings to employees and provide any follow-up training for changes in the procedures that may result.

The following is a checklist to help complete corrective action. Have you:

- ✓ Identified the problem(s)?
- ✓ Identified the cause(s)?
- ✓ Come up with a solution for each?
- ✓ Implemented the solution(s)?
- ✓ Documented the solution(s)?
- ✓ Communicated the solution(s)?
- ✓ Documented the action(s)?

Here are some things to think about to expedite the determination of your facility's corrective and preventive action process:

-) Use a portion of your management review meetings to review non-conformities, discuss causes and trends, identify corrective actions, and assign responsibilities.
-) Don't go overboard with bureaucracy—simple methods often work quite effectively.
-) Be sure that your corrective and preventive action process specifies responsibilities and schedules for completion.
-) Review your progress regularly and follow up to ensure that actions taken are effective.
-) Make sure your actions are based on good information and analysis of causes.
-) Find ways to get employees involved in the system improvement process (for example, via suggestion boxes, or contests).

Remember, corrective actions should:

1. resolve the immediate problem;
2. consider whether the same or similar problems exist elsewhere in the organization; and prevent the problem from recurring.

Records

The checking and corrective action phase also includes records. As we discussed earlier, records are one level of EMS documentation. Records are objective evidence that prove EMS activities have been performed or that desired results have been achieved.

Records are objective and provide evidence of the results of following a procedure. For example, let's say you have an Operational Control Procedure for a wastewater treatment plant. It states what you will do when you treat wastewater and how you will do it. The wastewater treatment system log sheets and database document that the procedure is followed and track your results; this comprises the record for that procedure.

Basically, records document that you are doing what you said you would do within your EMS, including:

-) training,
-) setting of objectives and targets,
-) identifying legal and other requirements,
-) implementing operational controls, and
-) following EMS system-level procedures.

When you audit the EMS, records are one type of documentation that will be reviewed.

Records provide a means of tracking the history of our EMS progress. Because they are part of the EMS and will be audited, EMS records must be kept in good order and should be readily retrievable. That is one reason that records are addressed in the EMS Document Control Procedure we discussed earlier. This brings us to the last item in the Checking and Corrective Action phase, EMS Audits.

Here's a list of sample records that might be appropriate for your facility:

-) conducting the EMS audit
-) EMS Team and Advisory Committee meeting minutes
-) management review - presentation material and meeting minutes
-) copies of postings, memorandums or management bulletins that cover EMS topics
-) records of requests from public regarding the EMS policy or any external communication regarding significant environmental aspects
-) EMS employee awareness training records

EMS Compliance and Conformance Audits

EMS audits check that the EMS system is implemented as planned. EMS audits are conducted internally or by outside parties to make sure the system is working or to support criteria related to certifications or participation in voluntary programs.

Compliance audits: An organization should periodically evaluate its compliance with the EPA, legal and other requirements applicable to its environmental aspects to ensure the commitment to compliance stated in its environmental policy statement. We encourage you to use this [EMS Compliance Assessments Procedure \(PDF\)](#) as a model for your own audit procedure.

Conformance audits: It should also conduct periodic conformance audits of its EMS to ensure that the system is structured and functioning in accordance with the ISO 14001 standard. You can open and use this [EMS Conformance Audit Procedure \(PDF\)](#) as a model for your own audit procedure.

Facilities which choose to implement an EMS that conforms to the [ISO 14001 Standard](#) can receive a formal registration. EMS auditors working for an organization that is accredited by ISO's Registrar Accreditation Board (RAB) will audit the facility's EMS to document that the EMS is implemented in conformance with the requirements of the standard. Once a facility passes the audit, they can claim that they are an ISO 14001 registered organization. The registration may help you compete with other companies in your industry. For example, most of the large automakers require that their suppliers are ISO 14001 registered.

If you have the time (1:20:51) take a look these two webinars on [EMS Auditing to Improve your EMS](#) and [Achieve Organizational Goals](#) by the Washington State Department of Ecology.

Module 6 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. In the Checking and Corrective Action process, you track specific EMS parameters that help ____.**
 - a. ensure conformance with related OSHA environmental regulations
 - b. answer basic questions about EMS implementation
 - a. determine if you are meeting our objectives and targets
 - b. establish EMS aspects and related impacts

- 2. Which of the following is important to deal with EMS system deficiencies?**
 - a. Persons at fault are identified and disciplined
 - b. Root causes are identified
 - c. Efficiency is verified
 - d. Impacts are identified and corrected

- 3. What would you do if a spill occurs several times in your raw material transfer area?**
 - a. Attempt to identify the surface cause of the spill
 - b. Attempt to identify the person causing the spill
 - c. Attempt to identify the frequency of the spill
 - d. Attempt to identify the root cause of the spill

- 4. Which of the following document that you are doing what you said you would do within your EMS and provide a history of progress?**
 - a. Data sheets
 - b. Records
 - c. Schedules
 - d. Lists

- 5. To make sure the EMS is working or to support criteria related to certifications or participation in voluntary programs _____ are conducted.**
- a. OSHA compliance inspections
 - b. EPA visits
 - c. RCRA investigations
 - d. EMS audits

Module 7: Management Review, Benefits, and EPA Perspectives

Management Review

At some point, generally within the first year of implementation, results of the checking phase are brought to management for review. Management reviews are one key to continual improvement and help ensure that the EMS will continue to meet the organization's needs over time.

Management Review requires at least two key elements be examined on a set frequency:

1. the EMS, with special emphasis on the policy and the objectives, to ensure that the system is still effective to the organization's activities; and,
2. conditions under which the previous environmental aspects were evaluated have changed, the policy and the objectives(s) and target(s) may need to be re-evaluated and modified.

Management Review Procedure

It is good to have a management review procedure to ensure that top management periodically meets to evaluate the EMS. Management begins to look forward and starts to plan EMS improvements.

Management needs to ensure the system is implemented as planned and that it is producing the expected results. Changes to the EMS may be necessary to address inadequacies or improve general performance. This is expected and senior management is responsible for reviewing and endorsing adjustments to the organization's or facility's EMS to reflect those changes.

Here are some examples of things to consider during management review:

-) EMS audit results
-) reports of spills or incidents
-) progress against objectives and targets
-) review of aspects and impacts
-) details regarding implementation of EMS procedures and work instructions

-) actual or potential changes to legal and other requirements
-) business and environmental challenges and their relevance to the EMS

The management review phase not only considers where things stand, but makes sure resources are available to make them better. This returns us full-cycle back to the planning phase of the EMS cycle.

Benefits of an Effective EMS

It's important to remember the specific design and implementation of an EMS is different in each and every organization. The effectiveness of the system is highly dependent upon an organization's commitment to establish and maintain an effective system. So, let's review some benefits and challenges associated with EMS.

An effective EMS may help you build a business case in each of the following ways:

-) Improves environmental performance;
-) Enhances compliance - the EMS process clearly outlines the responsibilities associated with achieving and maintaining compliance with environmental regulations.
-) Prevents pollution and conserve resources;
-) Reduces or mitigates risks;
-) Attracts new customers (and retain customers that require suppliers to have an EMS);
-) Increases efficiency and reduce costs - organizations are better able to identify regulatory compliance issues and address the root cause of the compliance problems to prevent recurrence, thus improving efficiency and effectiveness of operations.
-) Improves employee morale and the recruitment of new employees;
-) Enhances your image with citizens, regulators, lenders, and investors - Local communities recognize and appreciate your open commitment to improved environmental performance. Communications with the public are usually improved and refined as a result of EMS procedures.

-)] Improves employee awareness of environmental issues and responsibilities - the EMS ensures that all functional areas at a facility or within an organization recognize the relationship between their activities and potential environmental issues that could affect the mission of the organization; and
-)] Qualifies for recognition and incentive programs such as the EPA National Environmental Performance Track Program.
-)] Improved Environmental Accountability and Compliance - it empowers each individual to contribute to the goal of environmental stewardship.

Potential Challenges

The costs associated with environmental issues can be significant. In addition to the cost of maintaining permits and records, the cost associated with activities such as hazardous waste disposal, can be substantial. Implementation of an EMS identifies opportunities to reduce those costs through more efficient management and through pollution prevention efforts that reduce or eliminate the source of the problem. This approach also helps avoid costs through better management of risks.

Developing and implementing an effective EMS may also involve some additional costs and pose challenges, including:

-)] Internal resources, including management and employee time, are required;
-)] Facility personnel likely will require additional training;
-)] Consultants may need to be hired;
-)] Technical resources may be required to analyze environmental impacts and improvement options;
-)] New technologies may be needed to support environmental objectives and targets;
-)] Senior management must be committed and provide resources;
-)] A long-term commitment to EMS is required for success;

-) Facility personnel may be resistant to the changes that are necessary to implement an effective EMS; and
-) Facility personnel may view EMS obligations as "not part of my job."

For more information on developing a business case for EMS, check out the [EMS Business Advantage](#) (PDF) booklet.

Future Challenges

Environmental issues are closely associated with some of the major challenges organizations will face in the coming decades. Such issues include:

-) Increasing interests of communities located adjacent to industrial facilities. The public interest in activities will continue to impact decisions at these facilities. Organizations should be committed to being a good neighbor and responding to community environmental concerns is critical to gaining and maintaining community support.
-) Environmental regulatory requirements will continue to grow as new information on possible concerns becomes available. An EMS may allow an organization or facility to identify and address concerns before they reach regulatory status or the EMS will ensure that mechanisms are in place to achieve compliance when new regulations are enacted.
-) Increases in funding and manpower resources to address facility management issues are unlikely.

These and other challenges point to the need for a better way to reconcile mission, environmental, and community issues. In the past, environmental programs at facilities have focused on regulatory compliance as the goal and accepted standard for environmental management. That approach may not suffice in the future.

Environmental Protection Agency's Perspective On EMS

Generally speaking, the EPA believes that an effectively designed and operated EMS is advantageous to businesses and can play a role at facilities that are regulated by a number of statutes including:

-) the [Resource Conservation and Recovery Act](#), also known as RCRA,

-) the [Clean Air Act](#), and
-) the [Clean Water Act](#).

Because EMS is a proactive approach to environmental management, it can create an environment that supports regulators and the regulated community working together efficiently and effectively.

An EMS serves the organization and its mission. Implementing EMS is a process, not an end result. It's the people and their actions, not their words and aspirations. Improvement rests on changing attitudes and behaviors to want to, not have to.

While there are no guarantees of 100 percent compliance with environmental regulations, EPA believes that a well-run EMS can improve a facility's environmental performance. Strong initial implementation and a commitment to sustaining EMS efforts are important to EMS success, including sustained compliance and continual environmental improvement.

At a minimum, all facilities must have some method for addressing environmental requirements and achieving compliance. In the past, facilities often had a number of media-specific systems or programs in place, each focusing on complying with specific laws (for example, the Clean Air Act). Also, facilities often relied on reactive systems that responded to problems as they occurred.

In contrast, an EMS employs a proactive and holistic approach that deals with all environmental obligations in a systematic manner. EPA encourages the use of recognized environmental management frameworks, such as the ISO 14001, as a basis for designing and implementing an EMS.

Compliance Assistance Program

[The Compliance Assistance Program](#) provides assistance to States, tribes, municipalities, citizens, and the regulated community. This includes working with EPA program offices to develop plain language regulations and compliance assistance tools (such as the Compliance Assistance Clearinghouse and the Environmental Management Application Matrix); developing flexible compliance policies that encourage the use of compliance/technical assistance programs; promoting pollution prevention innovative technology and providing compliance monitoring assistance.

EPA has ten regional offices across the country, each of which is responsible for several states and in some cases, territories or special environmental programs. To find information about

visiting the regional offices, visit the [EPA's Regional Office website](#) and select your state or territory from the list they provide.

Generally speaking, EPA supports the idea of voluntary EMS. EPA supports and promotes the development and use of any EMS that helps an organization achieve its environmental obligations and improve its long-term environmental performance. However, EPA does not require EMS implementation.

On a more business-driven note, some major corporations are requiring that their suppliers implement EMS, or even obtain ISO 14001 registration.

The EPA's "E3" Program

E3 is a framework through which local communities connect local manufacturers with best technical assistance available. Each community is supported by coalition of federal agencies that have joined forces to form E3. E3 combines the strengths of federal, state, and local resources to promote sustainable manufacturing and economic growth throughout the United States. Communities use E3 to help boost local economies to achieve their unique sustainability goals and priorities. E3 directly helps manufacturers reduce costs, cut wastes, and be more competitive.

Module 7 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. Which of the following is an example of things to consider during a management EMS review?**
 - a. Individuals involved in any non-conformance issues
 - b. Progress against objectives and targets
 - c. Verification of OSHA compliance requirements
 - d. Notification of upcoming OSHA compliance inspections

- 2. Which of the following is considered a benefit of an effective EMS?**
 - a. EMS violations are easily detected by OSHA
 - b. employees do not have to rely on EMS procedures
 - c. mitigates the corporate bottom line
 - d. prevents pollution and conserves resources

- 3. Which of the following is considered a potential challenge to an effective EMS?**
 - a. Reduction in workforce issues
 - b. Mitigation of environmental aspects
 - c. Senior management commitment to provide resources
 - d. Increased commitment to community awareness

- 4. EPA encourages the use of recognized environmental management frameworks, such as the _____, as a basis for designing and implementing an EMS.**
 - a. OSHA 1910
 - b. ISO 14001
 - c. BSEE 9001
 - d. ANSI 490.1

- 5. The EPA's _____ provides assistance to States, tribes, municipalities, citizens, and the regulated community.**
- a. Compliance Assistance Program
 - b. Non-conformance Reliability Office
 - c. Consultative Compliance Services
 - d. Office of Homeland Assistance

Endnotes

Introduction to Environmental Management Systems Training, U.S. EPA. Retrieved from: <http://www.epa.gov/osw/inforesources/ems/ems-101/index.htm>

Guide to Developing an Environmental Management System, U.S. EPA. Retrieved from: <http://www.epa.gov/ems/implement.html>

Environmental Management Systems (EMS) – U.S. Army Environmental Command. Retrieved from: <http://www.aec.army.mil/Services/Support/EnvironmentalManagementSystems.aspx>

EMS Development Guide, New York Dept. of Environmental Conservation. Retrieved from: http://www.dec.ny.gov/docs/permits_ej_operations_pdf/p2emsstep3.pdf

Environmental Management Systems, Federal Facilities Environmental Stewardship & Compliance Assistance Center. Retrieved from: <https://www.fedcenter.gov/programs/EMS/>

NASA Environmental Management System, NASA Procedural Requirements NPR 8553.1B – 9/22/2009. Retrieved from: http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_8553_001B_&page_name=main

ODOT EMS Manual, Oregon Department of Transportation (ODOT), December 2012. Retrieved from: <http://www.oregon.gov/ODOT/HWY/OOM/pages/ems.aspx>