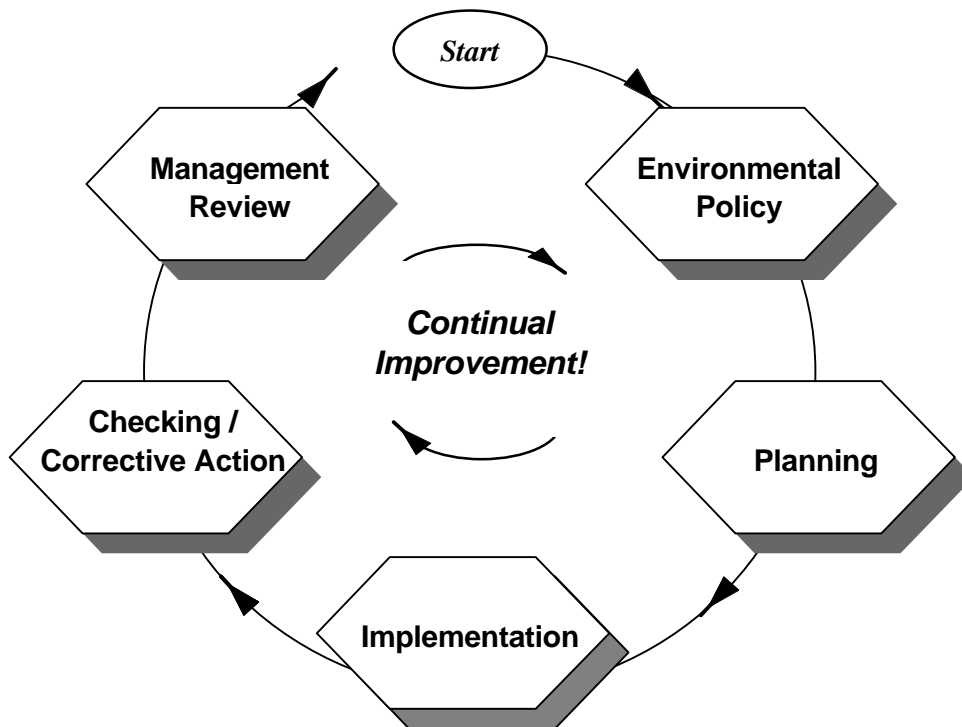


**Environmental Management Systems:
*An Implementation Guide for
Small and Medium-Sized Organizations***



**NSF International
Ann Arbor, Michigan
November 1996**

Environmental Management Systems:

An Implementation Guide for Small and Medium-Sized Organizations

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Acknowledgments

This document was prepared with funding through a cooperative agreement with the U.S. Environmental Protection Agency's Office of Wastewater Management and Office of Compliance.

NSF International gratefully acknowledges the following Steering Committee Members for their invaluable contributions to the design and content of this Guide:

Jeffrey R. Adrian, The John Roberts Company
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Ken Burzelius, Midwest Assistance Programs, LeSueur County
Marci Carter, Iowa Waste Reduction Center, University of Northern Iowa
John Dombrowski, U. S. Environmental Protection Agency - Office of Compliance
David Fiedler, Michigan Department of Environmental Quality - Environmental Assistance Div.
Jim Horne, U. S. Environmental Protection Agency - Office of Wastewater Management
Wendy Miller, U. S. Environmental Protection Agency - Office of Compliance
Charles Tellas, Milan Screw Products
Bryant Winterholer, K. J. Quinn & Co., Inc.

The authors of this Guide would like to thank Douglas Baggett of Hach Company, and Charles Tellas of Milan Screw Products, Inc., for sharing their experience and insight via case studies of their respective companies.

The authors of this Guide would also like to thank Craig Diamond and Tom Ambrose of NSF International for their significant contributions to the development of this Guide. Your suggestions and assistance were greatly appreciated.

Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations

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Introduction

This Guide is intended to support and facilitate the development of environmental management systems (EMS) among small and medium-sized organizations. The Guide explains how you can develop and implement an effective EMS and how it can support your organization's mission and goals. Development of an EMS is a **voluntary** approach to improving your organization's environmental performance.

The Guide is designed primarily for use by EMS **implementers** — the people within a small or medium-sized organization that will lead the EMS development effort. The heart of the Guide is found in **Section 4**, "Key Elements of an EMS." For each of the recommended EMS elements, this section discusses the importance of the element, how you can get started, and some key suggestions for implementation. In addition, examples of how other organizations have addressed various EMS elements are provided in Section 4.

The Guide uses the ISO 14001 Standard as a model for an EMS. The ISO 14001 Standard is the widely accepted official international standard for environmental management systems. This Guide is **not** intended for use by registrars (or others) for registration purposes, nor is it intended to provide specific interpretation of the ISO 14001 Standard.

How this Guide is Organized

- Section 1** Describes the many benefits of an EMS and how it can help your organization to compete and prosper in today's global marketplace.
- Section 2** Summarizes the overall management systems concepts. This section explains what a management system is and how it can support your organization's mission.
- Section 3** Describes the overall process for building an EMS and provides recommendations for planning the overall EMS development effort.
- Section 4** Provides detailed guidance on how your EMS should be designed and implemented. This section discusses each of the key elements of an EMS and how you can put them in place.
- Section 5** Describes the process for registering an EMS and selecting a registrar.
- Section 6** Discusses other sources of assistance your organization can use to build and sustain its EMS.
- Appendices** Provide case studies, sample environmental policies, other sources of information, and information on EMS standards. In addition, the **Tool Kit** provides sample EMS procedures and other tools that your organization can tailor to fit its EMS needs. The sample procedures are adapted from

actual EMS procedures used by other companies that have implemented an EMS.

Introduction (cont'd.)

Use of Icons

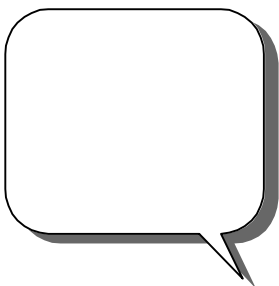
A variety of icons are used in this Guide to highlight key concepts and suggestions for the reader. A few of these icons include:



The light bulb is used to highlight EMS examples and experiences from small and medium-sized organizations. It is also used to indicate that additional help is provided in the **Tool Kit** or available from other sources.



The hand is used to point out **key hints** for implementing EMS elements.



The speech balloon is used to indicate quotes from representatives of organizations that have implemented an EMS (as well as definitions from the ISO 14001 Standard).

Section 1: Why Your Organization Should Have an EMS

This section explains why an EMS can help your organization to compete and prosper in today's global market.

A systematic approach to meeting your environmental and business goals

Key EMS Benefits

- improved environmental performance
- reduced liability
- competitive advantage
- improved compliance
- reduced costs
- fewer accidents
- employee involvement
- improved public image
- enhanced customer trust
- better access to capital

"We view the establishment of an EMS as a process that forces us to better organize our priorities and projects and to identify problems and exposures before they occur."

- K.J. Quinn & Co.
(A small specialty chemical company)

- Is your organization required to comply with **environmental laws and regulations**?
- Are you looking at ways to improve your overall **environmental performance**?
- Is the state of your organization's environmental affairs a significant **liability**?
- Does a **lack of time or resources** prevent your organization from taking charge of its environmental obligations?
- Does your organization know how its **environmental objectives** relate to its business objectives?


If you answered YES to one or more of the above questions, an **environmental management system (EMS) can help your organization — and so will this Guide!**

As one of your organization's leaders, you know that interest in environmental protection and sustainable development is growing. Like many others, your organization may be increasingly challenged to demonstrate its commitment to the environment. **Implementing an EMS can help in a number of important ways.**

First, an effective EMS makes good **business** sense. By helping you identify the **causes** of environmental problems (and then **eliminate** them), an EMS can help you **save money**. Think of it this way:

- Is it better to **make a product right the first time** or to perform a lot of re-work later?
- Is it cheaper to **prevent a spill in the first place** or clean it up afterwards?
- Is it more cost-effective to **prevent pollution** or to manage it after it has been generated?

Second, an EMS can be an **investment in long-**



"We found that an EMS could improve employee retention, new hire selection, working conditions, and the perceptions of our customers, suppliers, lenders, neighbors, and regulators."

- Milan Screw Products
(A 32-person manufacturer of precision fittings)

term viability of your organization. An EMS will help you to be more effective in achieving environmental goals. And, by helping businesses to keep existing customers and attract new ones, an EMS **adds value**.

Much of what you need for an EMS may **already be in place!** The management system framework described in this Guide contains many elements that are common to **managing other business processes**, such as quality, health & safety, finance, or human resources. As you review this Guide, you may find that you already have many EMS processes in place, but for other purposes (such as quality). Integrating environmental management with other key business processes can improve the organization's financial **and** environmental performance.

The key to effective environmental management is the use of a **systematic approach** to planning, controlling, measuring and improving an organization's environmental efforts. Potentially significant environmental improvements (and cost savings) can be achieved by reviewing and improving your organization's **management processes**. Not all environmental problems need to be solved by installing expensive pollution control equipment.

Of course, there is some work involved in planning and implementing an EMS. But many organizations have found that the development of an EMS can be a **vehicle for positive change**. These organizations believe that the benefits of an EMS far outweigh the potential costs (*see next page*). As they say in the Total Quality Management (TQM) world, "quality is free" — as long as you are willing to make the investments that will let you reap the rewards. The same holds true for environmental management.

Want to know more about EMS costs and benefits?
Read on ...

Costs and Benefits of Developing and Implementing an EMS

<u>COSTS</u>	<u>BENEFITS</u>
<ul style="list-style-type: none"> • Staff / employee time • Possible consulting assistance • Training of personnel 	<ul style="list-style-type: none"> • Improved environmental performance • Improved compliance • New customers / markets • Increased efficiency / reduced costs • Enhanced employee morale • Enhanced image with public • Reduced training effort for new employees • Enhanced image with regulators

If your organization already has or is considering a quality management system (such as ISO 9000), you will find some significant synergy between what you need for **quality** management and for **environmental** management.

Some Common Aspects of Quality and Environmental Management Systems

<ul style="list-style-type: none"> • Quality Policy • Adequate Resources • Responsibilities and Authorities • Training • System Documentation • Process Controls • Document Control • System Audits • Management Review 	<ul style="list-style-type: none"> • Environmental Policy • Adequate Resources • Responsibilities and Authorities • Training • System Documentation • Operational Controls • Document Control • System Audits • Management Review
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One final note: Small and medium-sized organizations often have some advantages over larger organizations in ensuring effective environmental management. In smaller organizations, lines of communication are generally shorter, organizational structures are less complex, people often perform multiple functions, and access to management is simpler. All of these can be real advantages for effective environmental management.

Are you interested in learning more about how an EMS can help your organization? If so, let's look at some key management systems concepts and how they are applied in the environmental area.

Section 2: Key EMS Concepts

This section explains what a management system is — and how it can help your company.

The focus on quality principles

Definition of an EMS:

A continual cycle of **planning, implementing, reviewing and improving** the actions that an organization takes to meet its environmental obligations.

Continual Improvement:

Enhancing your EMS to better your overall environmental performance



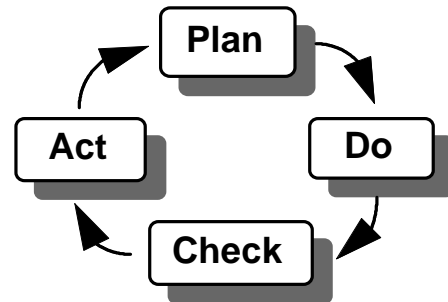
An effective EMS doesn't just happen. An effective EMS needs ongoing management support.

You have probably heard of **Total Quality Management (TQM)**. Your organization may apply TQM principles to some or all of its operations and activities.

An effective EMS is built on TQM concepts. To improve environmental management, your organization needs to focus not only on **what** things happen but also on **why** they happen. Over time, this systematic identification and correction of system deficiencies leads to better environmental (and overall business) performance.

Most EMS models (including the recently issued ISO 14001 Standard, which will be described later) are built on the “Plan, Do, Check, Act” model introduced by Shewart and Deming. This model endorses the concept of **continual improvement**.

Figure 1



In the ISO 14001 EMS Standard, these “plan, do, check, act” steps have been expanded into seventeen EMS elements. Each element is discussed in **Section 4** of this Guide.

Putting TQM principles into practice in the environmental area is the job of **top management**. To build and sustain an effective EMS, management must communicate to all employees the importance of :

- **making the environment an organizational priority** (thinking of effective environmental management as fundamental to the organization’s survival)
- **building environmental management in everywhere** (thinking about the environment as part of product and process development, among other activities)
- **looking at problems as opportunities**

(identifying problems, determining root causes and preventing their recurrence)

The concept of continual improvement recognizes that problems will occur. But a committed organization **learns from its mistakes** and **prevents** similar problems from occurring in the future.

An effective EMS must be **dynamic** to allow your organization to adapt to a quickly changing business environment. For this reason, you should keep your EMS flexible and simple. This also helps make your EMS **understandable for the people who must implement** it — you and your organization's employees.

As you build and implement an EMS, some roadblocks may be encountered. Some people in the organization may view an EMS as bureaucracy or extra expense — an “add-on” to what you do now. There may be resistance to change or fear of new responsibilities. To overcome these potential roadblocks, make sure that everyone understands **why** the organization needs an effective EMS and **how** an EMS will help you control environmental impacts in a cost-effective manner. Getting people involved in designing and implementing the EMS will demonstrate the organization's commitment to the environment **and** help to ensure that the EMS is realistic, practical and adds value.

Building or improving your EMS (with the help of this Guide) is a great opportunity to assess how your organization manages environmental obligations and to find better (and more cost-effective) solutions. While you will probably identify some areas where your current EMS can be improved, this does **not** mean that you should change things that are working well ! By reviewing what your organization does and how well it works, you can ensure that your EMS will be viable and effective, both now and in the future.

Don't get discouraged if your system has some bugs at first — this is to be expected. Remember, the focus is on *continual improvement* !



*Flexible + simple =
adaptable + understandable*



*Employee involvement
is crucial*

Regulators have begun to incorporate management system concepts into regulatory programs (for example, OSHA's *Process Safety Management Standard* and EPA's *Risk Management Program for Chemical Accidental Release Prevention*).

Section 3: Step-by-Step Action Plan

This section explains the process of building an EMS.

Putting the theory of EMS into practice

Steps to Consider

- Gain management commitment
- Choose a champion
- Prepare budget and schedule
- Build cross-functional team
- Involve employees
- Conduct preliminary review
- Modify plan
- Prepare procedures / other documents
- Plan for change
- Train employees
- Assess performance

Building an EMS might sound like an overwhelming task for a small organization, but it need not be. Time and other resources are limited in any small organization, so it is important that your resources are used wisely. One way to do this is by following a simple, effective **plan**. Fortunately, you can build on the experiences of other organizations who have already implemented an EMS. Examples are provided throughout this Guide.

Figure 2 illustrates some key steps in the EMS building process. The importance of careful planning cannot be overemphasized. Taking the time to figure out **what** you need to do, **how** you will do it, and which **people** must be involved will pay big dividends down the road.

Using a **team approach** for building your EMS is a good way to improve commitment and ensure that the objectives, procedures and other system elements are realistic, achievable, and cost-effective. Ideas for using your team and involving employees are discussed on the following pages.

A few **hints** to keep in mind as you build your EMS:

- Help is available — don't hesitate to use it. (See Section 6 of this Guide for more on **resources**.)
- Consultants can provide help in evaluating your EMS and suggesting approaches used successfully elsewhere. Look for ways to hold consulting costs down. For example, you may be able to join forces with other small businesses in your area to hire a consultant.



Milan Screw Products found that the use of a cross-functional group (the environmental task group) was the key to progress in evaluating and implementing their EMS. Participation of shop floor employees is essential in successfully implementing an EMS.



K.J. Quinn & Company found that it could perform a initial self-assessment of its environmental programs in 20-25 hours.

Some Thoughts on the Use of Consultants

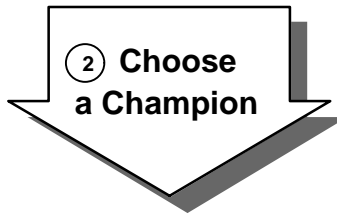
- Assess your own in-house resources first.
 - Make sure both parties understand the scope of work.
 - Get references and check them. Look for consultants with experience in small business and your specific industry.
 - Use consultants to gain insights on approaches used by other companies.
 - An EMS developed by consultants "in isolation" will not work. Your own people need to be involved in the process.
- Look at your existing environmental compliance plans and programs to assess how effective they have been and how they might be improved.

Figure 2

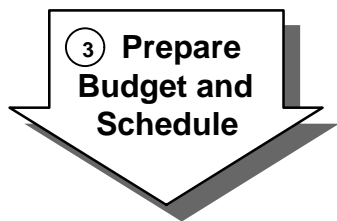
Creating Your Own EMS: Key Steps



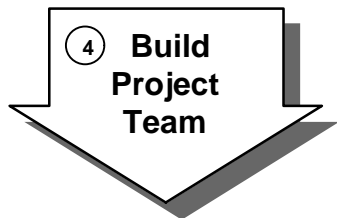
The first step in the EMS-building process is gaining top management's commitment to supporting the EMS. Management must understand the benefits of an EMS and what it will take to put an EMS in place. **Management commitment** and vision should be clear and communicated across the organization.



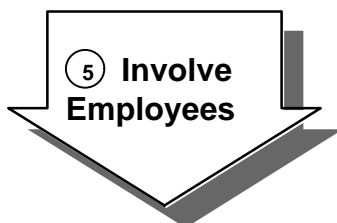
Not all small or medium-size organizations have the luxury of choosing among multiple candidates, but your choice of **project champion** is critical. The champion should have the necessary authority, an understanding of the organization, and project management skills. The champion should be a "systems thinker" (some ISO 9000 experience would be a plus, but is not necessary) and must have the time to commit to the EMS-building process.



The project champion should prepare a preliminary **budget and schedule** for developing the EMS. Costs will likely include staff and employee time, training, some consulting assistance, materials, and possibly some equipment (such as a computer or word processor). The schedule should consider the various tasks described below, among others.



A **team** with representation from key management functions and production or service areas can identify and assess issues, opportunities, and existing processes. You may want to consider including contractors, suppliers, and other external parties to be part of the project team where appropriate. This team will need to meet frequently, especially in the early stages of the project. The cross-functional team can help to ensure that procedures are reasonable and will build commitment to the EMS.

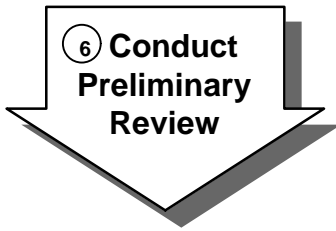


Employees are a great source of knowledge on environmental and health & safety issues related to their areas as well as on the effectiveness of current processes and procedures. They can help the project team in drafting procedures. **Employee ownership** of the EMS will be greatly enhanced by meaningful employee involvement in the EMS development process.

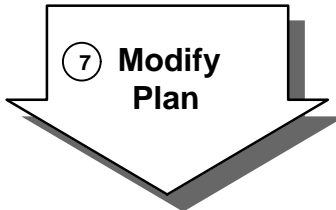
more

Figure 2 (cont'd.)

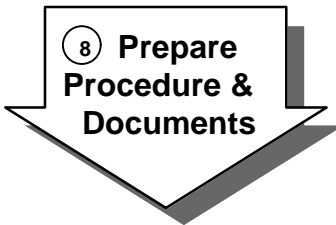
Creating Your Own EMS (cont'd.)



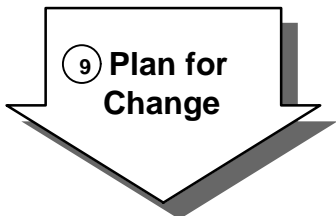
The next step is to conduct a **preliminary review** of your current environmental programs and system and compare these against the criteria for your EMS (such as ISO 14001). Evaluate your organization's structure and its procedures, policies, environmental impacts, training programs, and other factors. Determine which elements of your current system are in good shape and which need additional work.



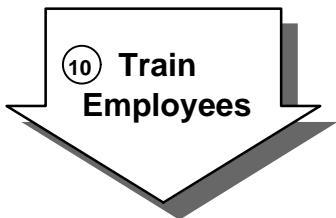
The **project plan** might need to be **modified** based on the results of the preliminary review. The modified plan should describe in detail the key actions needed, who will be responsible, what resources are needed, and when the work will be completed.



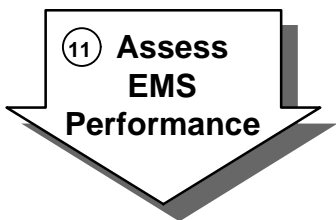
At this point, you are ready to **develop procedures and other system documents**. In some cases, this might involve modifying existing environmental procedures or adapting other business procedures (such as quality or health & safety management procedures) for EMS purposes. In some cases, you might need to develop new procedures. Get help from employees and the cross-functional team, as discussed above.



In building your EMS, make sure that the system is sufficiently **flexible**. While you will likely need to modify your EMS over time, try to avoid making your EMS so rigid that you must change it frequently to reflect the realities of your operation.



Once the procedures and other documents have been prepared, you are ready to implement the EMS. As a first step, **train** your employees on the EMS, especially with regard to the environmental impacts of their activities, any new / modified procedures, and any new responsibilities.



After the EMS is up and running, be sure to **assess system performance**. This will be accomplished through periodic EMS audits and ongoing monitoring and measurement. Assessment of EMS performance provides the opportunity to **improve the system and your environmental performance** over time.

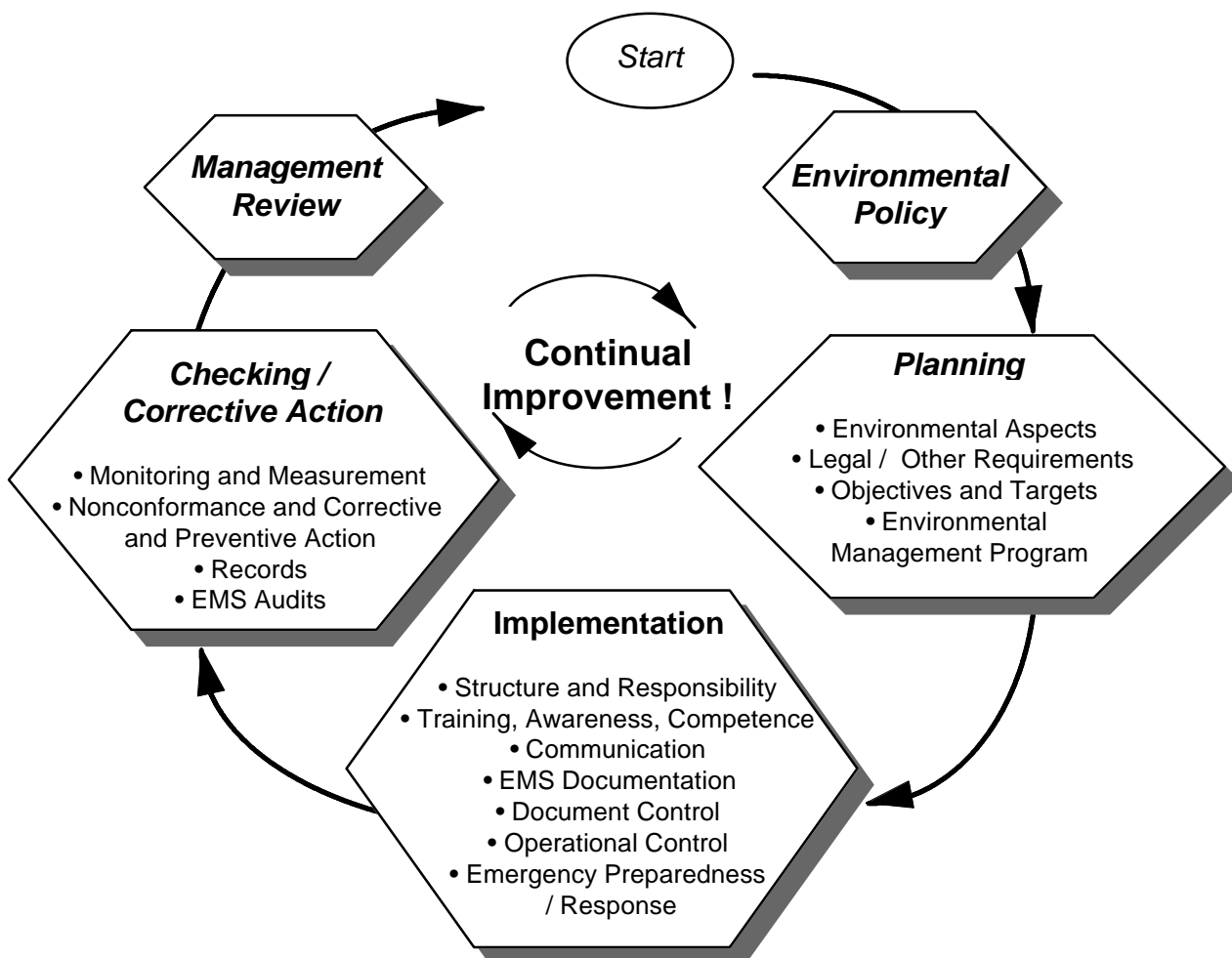
Section 4: Key Elements of an EMS

This section provides guidance on how to build and implement an EMS.

As mentioned earlier, your EMS should be built on the “Plan, Do, Check, Act” model to ensure that environmental issues are systematically **identified, controlled, and monitored**. Using this approach will help to ensure that performance of your EMS **improves** over time.

This section describes seventeen EMS elements included in the ISO 14001 Standard. While there are several good EMS models available, this Guide uses the ISO 14001 Standard as a starting point for describing EMS elements for several reasons:

- ISO 14001 is a widely accepted international Standard for EMS;
- Companies may be asked to demonstrate conformance with ISO 14001 as a condition of doing business in some markets; and
- The Standard is consistent with the key elements found in most EMS models.



Elements of an ISO 14001 EMS: A Snapshot

- **Environmental policy** — Develop a statement of your organization's commitment to the environment. Use this policy as a framework for planning and action.
- **Environmental aspects** — Identify environmental attributes of your products, activities and services. Determine those that could have significant impacts on the environment.
- **Legal and other requirements** — Identify and ensure access to relevant laws and regulations (and other requirements to which your organization adheres).
- **Objectives and targets** — Establish environmental goals for your organization, in line with your policy, environmental impacts, views of interested parties and other factors.
- **Environmental management program** — Plan actions to achieve objectives and targets.
- **Structure and responsibility** — Establish roles and responsibilities and provide resources.
- **Training, awareness and competence** — Ensure that your employees are trained and capable of carrying out their environmental responsibilities.
- **Communication** — Establish processes for internal and external communications on environmental management issues.
- **EMS documentation** — Maintain information on your EMS and related documents.
- **Document control** — Ensure effective management of procedures and other system documents.
- **Operational control** — Identify, plan and manage your operations and activities in line with your policy, objectives and targets.
- **Emergency preparedness and response** — Identify potential emergencies and develop procedures for preventing and responding to them.
- **Monitoring and measurement** — Monitor key activities and track performance.
- **Nonconformance and corrective and preventive action** — Identify and correct problems and prevent recurrences.
- **Records** — Keep adequate records of EMS performance.
- **EMS audit** — Periodically verify that your EMS is operating as intended.
- **Management review** — Periodically review your EMS with an eye to continual improvement.

How Does the ISO 14001 Standard Support Environmental Compliance?

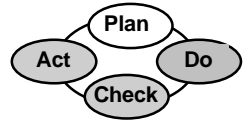
ISO 14001 requires an organization to:

- develop an environmental policy with a commitment to compliance;
- have a procedure for identifying and having access to environmental laws and regulations;
- set objectives and targets that are in line with its environmental policy (which includes a commitment to compliance);
- establish operational control procedures;
- establish procedures for emergency preparedness and response;
- establish a procedure for periodically evaluating compliance ...

While these requirements relate directly to an organization's compliance management, each of the seventeen elements of the ISO 14001 Standard can contribute to enhanced compliance (e.g., communication, training, documentation, records, nonconformance and corrective / preventive action, EMS audits, management review, etc.). An EMS based on the ISO 14001 Standard can complement and improve your organization's compliance management and help your organization to meet objectives and targets that go "beyond compliance." An EMS based on the ISO 14001 Standard can also help your organization to meet objectives and targets that address issues that are not subject to regulation.

If you would like to order a copy of the actual ISO 14001 Standard, please contact one of the authorized sources (see Annex C - page 88 for additional information).

The following is a overview of each of the 17 elements of the ISO 14001 Standard in greater detail ...



Environmental Policy

Why do we need an environmental policy?

What is my organization's commitment to the environment?

Continual Improvement:

"Process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy"

- ISO 14001



Key Policy Commitments

- Continual improvement
- Pollution prevention
- Compliance with relevant laws and regulations

An environmental policy is your management's declaration of commitment to the environment. The policy should serve as the **foundation** for your EMS and provide a **unifying vision** of environmental concern by the entire organization.

Your policy should be more than just flowery prose. Since it serves as the framework for setting environmental objectives and targets, the policy should be **brought to life** in your plans and deeds.

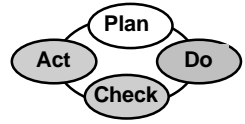
Everyone in the organization should **understand** the environmental policy and what is expected of them in order to achieve the organization's objectives and targets.

Your policy should contain three key commitments (see *box, below*), including a commitment to **continual improvement**. This doesn't mean that you must improve in all areas at once, but that the policy should drive your overall efforts to continually improve your organization's environmental management.

Sample environmental policies (which contain the three key policy commitments) are provided in the **Tool Kit** (see page 92).

Hints:

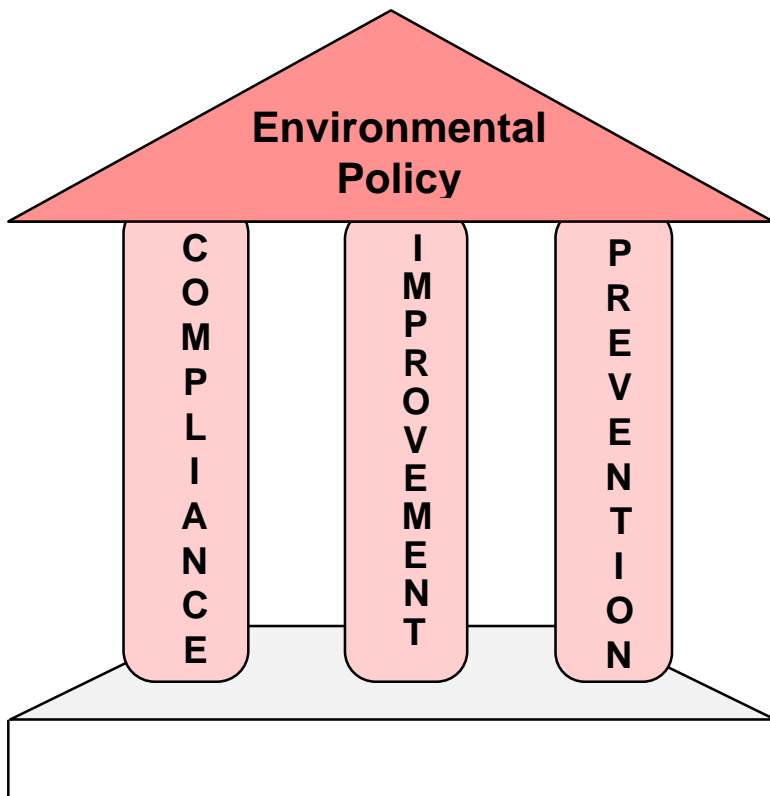
- Your organization probably has an environmental policy now, even if it's not written. For example, your organization is probably committed to complying with the law and avoiding major environmental problems, at a minimum. Document your existing commitments as a starting point.
- Your policy should be related to your products and services, as well as supporting activities. Consider the results of your **preliminary review** before finalizing the policy. Also, make sure the policy reflects the environmental aspects of your products, services and activities (as described in the next section).
- Keep your policy simple and understandable. Ask yourself: What are we trying to achieve? How can I best communicate this to the rest of the organization? Will we do what we said we would? Keep in mind that your policy should be explicit enough to be auditable.



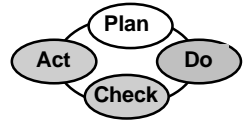
Review: Have we ...

- developed a written policy?
- considered our key products, activities, and services?
- addressed the three key commitments?
- effectively communicated the policy?

- The policy can be a stand-alone document or it can be **integrated** with your health & safety, quality, or other organizational policies.
- Consider who should be involved in **developing the policy** and the best process for writing it. Input from a range of people in your organization should increase commitment and ownership.
- Make sure that your employees **understand** the policy. Options for communicating your policy internally include posting it around the site (e.g., in the lunch room), paycheck stuffers, incorporating the policy into training classes and materials, and references to the policy at staff or all-hands meetings. **Test awareness** from time to time by asking employees what the policy means to them.
- The policy should also be communicated **externally**. Options for external communication include business cards, newspaper advertisements and annual reports, among other options. You can choose to communicate the policy proactively or in response to external requests.



***Three Pillars
of an
Environmental
Policy***



Identifying Environmental Aspects

How does my organization interface with the environment?

Environmental **Aspect**:
“Element of an organization’s activities, products, or services that can interact with the environment.”

ISO 14001

Environmental **Impact**:
“Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s activities, products, or services.”

To plan for and control its significant environmental impacts, an organization must first know what these impacts are. But knowing **what** the impacts are is only part of the challenge — you also should know **where these impacts come from**.

If your organization has undertaken pollution prevention projects, you are probably familiar with this concept — you must know **how** a waste is generated in order to minimize or eliminate it. As with pollution prevention, the identification and management of environmental aspects can (1) have positive impacts on the bottom line and (2) provide significant environmental improvements.

Your EMS should include a procedure to identify the environmental **aspects** that your organization:

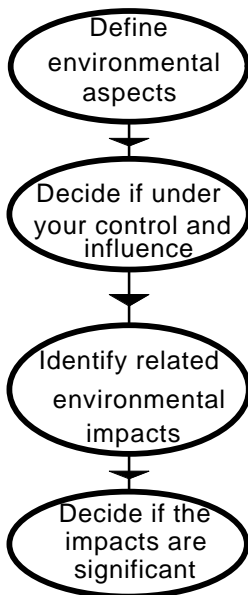
- can **control**, and
- over which it can **have an influence**.

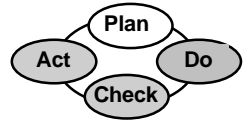
The **relationship between aspects and impacts** is one of cause and effect. The term “aspects” is neutral, so keep in mind that your environmental aspects could be either **positive** (such as making a product out of recycled materials) or **negative** (such as discharge of toxic materials to a stream).

Your organization **is not expected** to manage issues outside its sphere of influence. For example, while your organization probably has control over how much electricity it uses, it likely does **not** control the way in which the electricity is generated.

Once you have identified the environmental aspects of your products, activities, and services, you should determine which aspects could have significant **impacts** on the environment. These environmental aspects should be considered when you set your environmental **objectives** and define your **operational controls** (as discussed later).

A multi-step process (see figure at left) can be used to make this evaluation. Keep the resulting information **up-to-date**, so that potential aspects of new products, services, and activities are factored into your objectives and controls.





Service Organizations Can Benefit from an EMS

The **US Postal Service** examined environmental aspects related to the vehicles it operates, the chemicals it uses to maintain equipment, the solid wastes it generates, and the products (stamps) that it sells.

Key Hints:

- Look beyond regulations and at non-regulated activities
- Prioritize in setting objectives
- Consider services & contractors

Warner-Lambert Company developed process flow sheets to identify & “visualize” all waste streams from operations, and to determine how much they were costing the company. It also examined the packaging of products and

Factors to Consider:

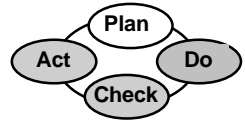
- ecological effects
- human health impacts
- catastrophic effects
- resource depletion
- scale, severity & duration of impacts
- probability of occurrence
- cost of changing
- other business effects

Hints:

- In identifying aspects and impacts, you should also **look at activities not controlled by applicable laws and regulations.** But because many of your aspects/impacts may be addressed by legal requirements, your compliance program might yield some valuable information. Permits, audit reports, and other such documents can serve as useful inputs. Beyond regulations, look at issues such as land, energy, and other natural resource use.
- Once you have identified environmental aspects and related significant impacts, use this information in setting your objectives and targets. **This does not mean that you need to address all of your impacts at once.** There may be good reasons (such as cost, availability of technology, and scientific uncertainty) for addressing some impacts now and deferring action on others. Keep in mind that managing environmental aspects could have **positive business impacts.**
- Remember to look at **services** as well as products. While the need to examine your on-site operations might be obvious, you should also consider the potential impacts of what you do **off-site** (such as servicing equipment at customer sites). Similarly, the environmental aspects of the products, vendors, and contractors **you use** may be less obvious, but should still be considered.
- Identifying significant environmental aspects is one of the most critical elements of the EMS — and can be one of the most challenging. Decisions you make in this task can affect many other system elements (such as, setting objectives and targets, establishing operational controls, and defining monitoring needs). Careful planning and conduct of this activity will pay dividends in later steps.

Getting Started

- To understand your environmental aspects, it helps to understand the processes by which you generate products and services. A **flow chart** of your major processes might help you understand the inputs and outputs of your processes and how materials are used. A sample flow chart is provided in the **Tool Kit** (see page 96). You may also want to consider the views of **interested parties** — some organizations have found external parties to be a good resource to help you identify your organization’s environmental aspects.
- There are many readily-available sources of information to help you perform your assessment. For starters, look at your permits, various regulations that apply to your operations, audit reports, EPCRA



reports,

Review: Have we ...

- evaluated our products, activities, and services?
- determined which aspects have significant impacts?
- documented a procedure?

and monitoring records. Trade associations, regulatory agencies, your customers and suppliers also might provide useful information to support your assessment.

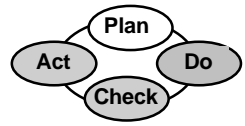
- Various techniques exist for evaluating environmental impacts. Find one that can be readily adapted for your use in identifying environmental aspects and significant impacts. Consider techniques used for compliance with the OSHA Process Safety Management Standard, environmental impact assessments, and life cycle analysis. More information on these techniques can be found in the **Tool Kit** (see page 98).
- Once you've found a process that works for your organization, describe the process in a written **procedure**. A sample procedure for performing the assessment is provided in the **Tool Kit** (see page 100).
- You can start out with a simple process for identifying aspects and then refine the process over time as needed. You also can address the more obvious impacts or "low hanging fruit" first, then tackle the more complex issues later.

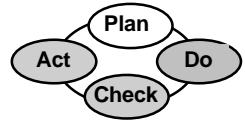
The Link Between Aspects and Impacts - Some Examples from a Real Company

Aspects	Potential Impacts
Emissions of volatile organic compounds	Increase in ground level ozone
Discharges to stream	Degradation of aquatic habitat and drinking water supply
Spills and leaks	Soil and groundwater contamination
Electricity use	Air pollution, global warming
Use of recycled paper	Conservation of natural resources

Things to Consider in Evaluating Environmental Aspects:

- | | |
|--|--|
| <input type="checkbox"/> Air Emissions | <input type="checkbox"/> Water Effluents |
| <input type="checkbox"/> Solid and Hazardous Wastes | <input type="checkbox"/> Land Use |
| <input type="checkbox"/> Contamination of Land | <input type="checkbox"/> Raw Material and Resource Use |
| <input type="checkbox"/> Local Issues
(e.g. concerns raised by the community such as: noise, odor, dust, traffic, appearance, etc.) | <input type="checkbox"/> Normal and Abnormal Conditions
(e.g., start-up, shutdown, emergencies) |





Legal and Other Requirements

What standards affect the organization?

Setting the legal framework for your EMS

Legal requirements include:

- Federal requirements
- State or local requirements
- Permit conditions

Other requirements might include (for example):

- Company-specific codes
- Standards in locations where you sell products
- International Chamber of Commerce (ICC) Charter for Sustainable Development
- Chemical Manufacturers Association's (CMA) Responsible Care®
- American Petroleum Institute's Strategies for Today's Environmental Partnership (API STEP)
- Other industry codes or programs to which your organization voluntarily subscribes.

Key Steps

- Identify Requirements
- Analyze Impacts
- Communicate
- Act

To be in compliance with the laws and regulations that apply to your organization, you must first know **what the rules are** and **how they affect** what you do. As discussed earlier, compliance with legal requirements is one of the “three pillars” upon which your environmental policy should be based. Costs of non-compliance (in terms of dollars, public image and possible damage to the environment) can be very high.

An effective EMS will include a process for:

- **identifying** applicable legal and other requirements, and;
- **ensuring** that these requirements are factored into the organization's efforts.

Changing legal requirements might require that you modify your environmental objectives or other elements of your EMS. By anticipating new requirements and making changes to your operations, you can avoid some future compliance obligations and their associated costs.

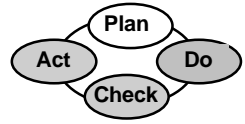
Getting Started

Your EMS should include a procedure for **identifying** and **having access to** the legal and other requirements that apply to your organization. These “other requirements” might include industry codes, the CERES Principles, or similar requirements to which your organization may subscribe.

The process of identifying applicable regulations, interpreting them, and determining their impacts on your operations can be a time-consuming task. Fortunately, there are many ways in which your organization can obtain information about applicable laws or regulations. These include:

- commercial services (offered on-line, on computer disk, and on paper);
- regulatory agencies (federal, state and local);
- trade groups / associations;
- public libraries;
- seminars and courses;
- newsletters / magazines;
- consultants and lawyers;
- the Internet; and
- customers, vendors and other companies.

Small business assistance programs exist in every state. Under the Clean Air Amendments of 1990, each state environmental regulatory agency must establish a



Get information
on federal
environmental rules
on the Internet at
<http://www.epa.gov>

Review: Have we ...

- identified applicable rules and other requirements and determined their impacts?
- established and documented a process for keeping up-to-date?
- communicated to the right people?

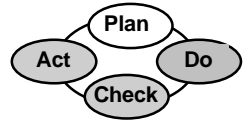
technical and compliance assistance program to help companies comply with air quality rules. These programs are being expanded into other environmental “media” (e.g., water, waste management) as well. In addition, National Compliance Assistance Centers can provide compliance assistance for certain industry sectors (see Section 6 & Annex C for more information).

Once the applicable legal and other requirements have been identified and analyzed for their impacts, you should **communicate** these requirements (and plans for complying with them) to the appropriate people within the organization. Communicating the “other requirements” that apply to your organization (as well as their impacts) is an important — and often overlooked — step.

A list of some resources you can use to identify and track environmental laws and regulations is provided in the **Tool Kit** (see page 104). **Annex C** also contains additional sources of information about environmental laws and regulations. The **Tool Kit** contains a sample procedure for tracking environmental laws and regulations (see page 106).

Commonly Applicable Federal Environmental Laws in the US

Clean Air Act (CAA) [40 CFR Parts 50-99]	Establishes ambient and source emission standards and permit requirements for conventional and hazardous air pollutants.
Clean Water Act (CWA) [40 CFR Parts 100-145, 220-232, 410-471]	Establishes ambient and point source effluent standards and permit requirements for water pollutants, including those discharged directly to a waterbody and to a public sewer.
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) [40 CFR Parts 150-189]	Establishes a program for the review of, registration, and control of pesticides.
Resource Conservation and Recovery Act (RCRA) [40 CFR Parts 240-299]	Establishes regulations and permit requirements for hazardous waste management. Also, creates standards for underground storage tanks holding oil or hazardous substances.
Toxic Substances Control Act (TSCA) [40 CFR Parts 700-799]	Regulates the use, development, manufacture, distribution and disposal of chemicals. Certain chemicals (such as PCB's) targeted for specific management standards.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as “Superfund”) [40 CFR Parts 300-311]	Establishes program for cleaning up contaminated sites and establishes liability for clean-up costs. Also, provides reporting requirements for releases of hazardous substances.
Emergency Planning and Community Right-To-Know Act (EPCRA) [40 CFR Parts 350-374]	Establishes a program to inform the public about the hazardous and toxic chemicals used by industries. Reporting requirements apply to companies using, processing, or storing specific chemicals over specified quantities.
Hazardous Materials Transportation Act (HMTA) [49 CFR Parts 100-180]	Establishes standards for the safe transportation of hazardous materials.



Objectives and Targets

How will objectives and targets help my organization?

What does my organization do to achieve its policy?

Environmental Objective:

“Overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable.”

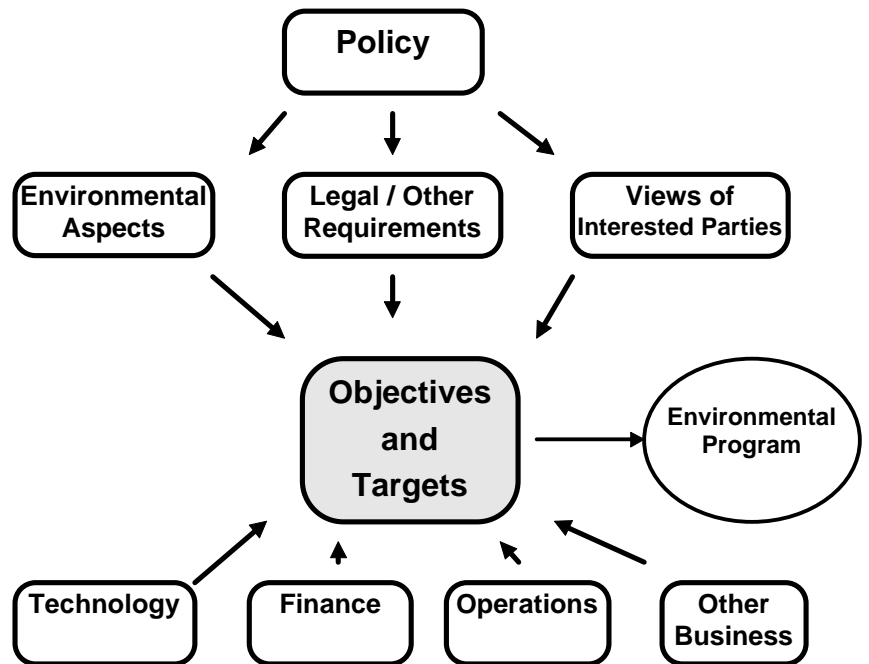
- ISO 14001

Environmental Target:

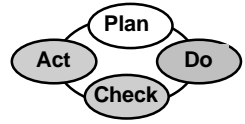
“Detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.”

Objectives and targets help you **translate purpose into action** — they should be factored into your strategic plan and can facilitate the integration of environmental management with other business management processes.

You determine what objectives and targets are appropriate for your organization. These goals can be organization-wide or applied to individual units or activities. In setting objectives, keep in mind your environmental **policy**, including its three “pillars.” You should also consider your significant environmental **aspects**, applicable **legal and other requirements**, the **views of interested parties**, your **technological options**, and **financial, operational, and other business requirements**.



There are no “standard” environmental objectives that fit all organizations. Your objectives and targets should reflect what your organization does and what it wants to achieve.



**Factors to consider
in setting objectives
and targets:**

- ability to control
- ability to track / measure
- cost to track / measure
- progress reporting
- links to policy commitments

Hints:

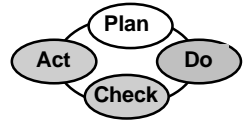
- Objectives and targets should be **set by the people in the functional area involved** — they will be best positioned to establish, plan for, and achieve these goals.
- **Involving people** in the area will help to **build commitment**.
- Objectives should be **consistent** with your overall business mission and plan and the key commitments established in your policy (pollution prevention, continual improvement, and compliance).
- Be **flexible** in your objectives. Define a desired result and let the people responsible determine **how** to achieve the result.
- **Keep your objectives simple** initially, gain some early successes, and then build on them.
- **Communicate** objectives and targets (as well as your progress in achieving them) across the organization. Consider a regular report on progress at staff meetings.
- To obtain the **views of interested parties**, consider holding an open house or establishing a focus group with people in the community. These activities can have other payoffs as well.
- Make sure your objectives and targets are **realistic**. Determine how you will **measure progress** towards achieving them.
- Keep in mind that your **suppliers (service or materials)** can help you in meeting your objectives and targets (e.g., by providing more environmentally friendly products).

A sample worksheet and procedure for setting objectives and targets are included in the **Tool Kit** (see pages 109 & 113).



☆☆ **POLLUTION**
PREVENTION ☆☆

The most significant savings from **Pacific Gas & Electric's** EMS have come from reductions in hazardous waste generation and disposal. Ten years ago the hazardous waste generated by operations exceeded 90,000 tons per year — now that number is below 10,000 tons per year and is still falling.



Comparing Objectives and Targets - Some Examples

Objectives	Targets
Reduce energy use	<ul style="list-style-type: none"> • Reduce electricity use by 10% in 1996 • Reduce natural gas use by 15% in 1996
Reduce usage of hazardous chemicals	<ul style="list-style-type: none"> • Eliminate use of CFC's by 1997 • Reduce use of high-VOC paints by 25%
Reduce hazardous waste generation	<ul style="list-style-type: none"> • Reduce chrome wastes in plating area by 50% in 1997
Improve employee awareness of environmental issues	<ul style="list-style-type: none"> • Hold monthly awareness training courses • Train 100% of employees by end of year
Improve compliance with wastewater discharge permit limits	<ul style="list-style-type: none"> • Zero permit limit violations by the end of 1997

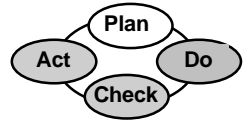
☆☆ POLLUTION PREVENTION ☆☆

Warner-Lambert Company used a “holistic” approach to identify its waste streams. The company looked beyond emissions from its property and considered all of the ramifications of its activities ...

- By replacing chillers and redesigning the chilling system to be more efficient, the company has realized \$250,000 in energy savings. Because the company is more energy efficient, it has reduced emissions at the local power plant!
- By redesigning and revising dust collection, the company now uses 40 hp instead of 100 hp (without compromising the effectiveness of the dust collection system), has lowered its operating costs (and, reduced emissions at the local power plant).

Review: Have we ...

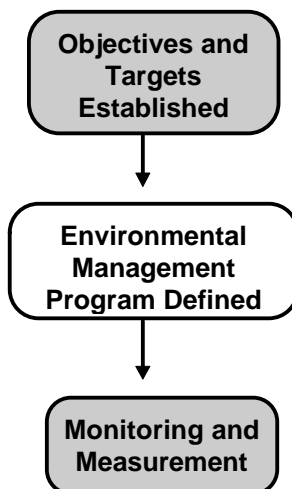
- documented objectives and targets at relevant functions and levels within the organization?
- ensured that our objectives and targets are consistent with the environmental policy (including commitments to pollution prevention, continual improvement, and compliance)?
- ensured consistency with our business plan / mission?
- established a process for tracking and reporting progress?



Environmental Management Program(s)

Why do we need an environmental management program?

A road map for achieving your environmental goals



So far, this Guide has focused on the **foundations** of your EMS (the planning elements) and on defining what your organization intends to achieve in the environmental area. To ensure that objectives and targets are achieved, you need an **action plan**.

The environmental management program should be **linked directly to your objectives and targets** — that is, the program should describe **how** the organization will **translate its goals into concrete actions** so that environmental objectives and targets will be achieved.

To ensure its effectiveness, your environmental management program should:

- designate **responsibilities** for achieving goals, and
- define the **means** and **time frame** for achieving those goals.

Keep in mind that your program should be a **dynamic** one. Consider modifying the program when:

- objectives and targets are revised or added;
- progress in achieving your objectives and targets is made — or not made; or
- products, processes, or facilities change or other factors arise.

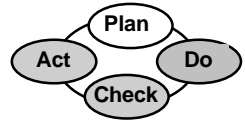
Your action plan need **not** be compiled into a single document. A “**road map**” to several plans is an acceptable alternative, as long as the key responsibilities, tactical steps and schedules are adequately defined in these other documents.

Keep in mind that this program should **not** be developed in a vacuum — it should be **coordinated or integrated with other business plans, strategies, and budgets**. For example, if you are planning changes to a manufacturing process (say, for quality or production purposes), then it makes sense to look at the possible environmental issues associated with this process change at the same time.

Hints:

- **Involve your employees** early in establishing and carrying out the program.
- Clearly **communicate** the expectations and responsibilities laid out in the program to those who need to know.
- **Build** on the plans and programs you have now for environmental compliance, health & safety, and/or quality management purposes.





Key Hints

- Involve employees
- Communicate expectations
- Build on existing programs
- Keep program simple
- Look for opportunities

- Re-evaluate your action plan when you are considering significant changes to your products, processes, facilities or materials. Make this re-evaluation part of your **change management process**.
- **Keep it simple** (see sample tool, below) and **focus on continual improvement** of the program over time.

Thought to Keep in Mind: There may be real **opportunities** here!! Coordinating your environmental program with your overall business plans and strategies may position your organization to exploit some significant cost-saving opportunities.

☆☆ **POLLUTION PREVENTION** ☆☆

In an effort to reduce VOC emissions, **Aeroquip Corporation** has successfully replaced a high-solids paint with a water-based paint. Solvent use has decreased significantly because the dilution solvent for the paint is now deionized water.

Review: Have we ...

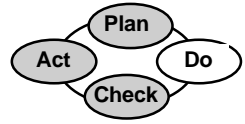
- prepared an action plan on how the organization will meet its objectives and targets?
- included responsibilities, means and time frames?
- incorporated environmental concerns in our change management process?
- communicated the plan and tracked progress internally?

Environmental Management Program -- Sample Tool

Action Items	Priority	Responsibilities	Schedule	Resources Needed	Comments
• • • • •					

(Note: A full-size copy of this tool is provided in the **Tool Kit** — see page 116.)

A Sample Schedule for an EMS Action Plan is provided in the **Tool Kit** (see page 118).



Structure and Responsibility

How does our organizational structure affect environmental management?

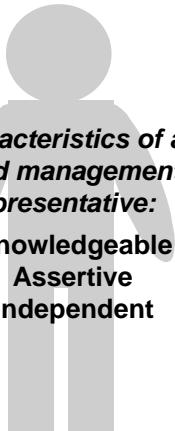
Aligning your resources to succeed

“Resources include human resources and specialized skills, technology, and financial resources.”

- ISO 14001

Characteristics of a good management representative:

- Knowledgeable
 - Assertive
 - Independent



More organizational advantages of small business:

- shorter lines of communication
- less complex organization
- limited delegation
- simpler access to management

For your EMS to be effective, roles and responsibilities must be clearly defined and communicated. In a small organization, the commitment of all employees is needed.

Top management plays a key role by **providing the resources** needed to ensure that the EMS is implemented effectively. Ensuring this capability is one of the most important jobs of top management (see “Finding Resources” on next page).

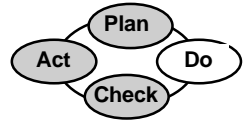
Any effective management system needs an advocate. Top management should **appoint a management representative**. This representative (1) ensures that the EMS is established and implemented; (2) reports on its performance over time; and (3) works with others to modify the EMS when necessary. The management representative could be the same person who serves as the project champion (as discussed in Section 3), but this is not mandatory. Management can use information on EMS performance to improve the system over time. (A business owner, plant or shop manager, or any number of other people might serve as an effective management representative.)

Small and medium-sized businesses may have an **advantage** over larger businesses in structuring their organizations for environmental management. Because personnel and other resources are generally more limited in small businesses, people often “wear more than one hat” and are experienced in performing multiple functions. In some cases, the individual responsible for environmental management in a small firm is also responsible for quality, health & safety, facilities, or other related functions. For this reason, integrating environmental responsibilities with other functions can be greatly simplified.

Getting Started:

The following questions can help you determine the right organizational structure for environmental management:

- **Look at the scope of your environmental management program:** What capabilities do we need? Who needs to be involved to make the system effective? What training or other resources will they need?
- **Look at your significant environmental impacts:** What operations / activities need to be controlled? Who needs to be involved to ensure that controls are implemented?



- **Look at the results of previous audits or other assessments:** What does this information tell us about the effectiveness of our organizational structure? How could it be improved?
- **Look at the current responsibilities for environmental management:** How can we enhance ownership of environmental management across the organization? How can other business functions support the EMS? (See next page.)
- **Look at your quality management and / or other existing management systems:** What roles and responsibilities exist in these management systems? Where are the opportunities for integration?

Consider **flow charting** your organization's activities relating to environmental management. This can help you understand how processes work and the final product can be a great communication and training tool. Flow charts might be useful to look at processes such as chemical purchasing and distribution, employee training, and preventive maintenance, among others.

Hints:

- Build **flexibility** into your organization's EMS. Recognize that environmental (and other) management needs will change over time.
- Be sure to **communicate** to people what their roles are (as well as the roles of others). One tool for communicating these responsibilities is a **responsibility matrix** (an example of which is provided in the **Tool Kit** — see page 120).



Getting Started

Look At:

- Program scope
- Environmental aspects
- Previous audits
- Other systems

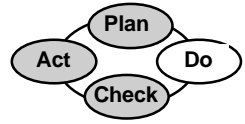
Consider integrating EMS with your existing:

- information systems
- purchasing controls
- quality procedures
- work instructions
- training programs
- communication efforts
- reporting systems
- recruitment, appraisal and disciplinary processes

Finding Resources

In most cases, developing and maintaining an EMS will not require large capital outlays. What an EMS will require is **time**. Many small organizations have found that they can make effective use of interns or temporary employees to perform potentially time-consuming EMS development tasks (such as collecting data, drafting and typing procedures, etc.). This approach allows in-house personnel to focus on more complex EMS development tasks.

Also, exploit the links between environmental management and other aspects of your organization. Look for areas where environmental management can support other business functions (and vice-versa — see next page).



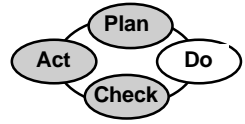
More information on resources is found in Section 6 of this Guide

How Various Functions Can Support Your EMS

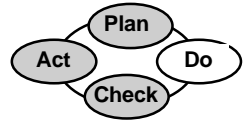
Functions	How They Can Help (Possible Roles)
Purchasing	<ul style="list-style-type: none"> • Develop and implement controls for chemical / other material purchases
Human Resources	<ul style="list-style-type: none"> • Define competency requirements and job descriptions for various EMS roles • Integrate environmental management into reward, discipline and appraisal systems
Maintenance	<ul style="list-style-type: none"> • Implement preventive maintenance program for key equipment
Finance	<ul style="list-style-type: none"> • Track data on environmental management costs • Prepare budgets for environmental management program • Evaluate economic feasibility of environmental projects
Engineering	<ul style="list-style-type: none"> • Consider environmental impacts of new or modified products and processes • Identify pollution prevention opportunities
Top Management	<ul style="list-style-type: none"> • Communicate importance of EMS throughout organization • Provide necessary resources • Track and review EMS performance
Line Workers	<ul style="list-style-type: none"> • Provide first-hand knowledge of environmental aspects of their operations • Support training for new employees

Review: Have we

- defined roles for environmental management?
- communicated those roles internally?
- assessed resource needs?
- designated a management representative?



- integrated environmental management with other business functions wherever possible and practical?



Training, Awareness and Competency

Why is training important to the success of our EMS?

Building internal capabilities

Implementing an EMS involves everyone

Reasons for Training

- motivation
- awareness
- commitment
- skills/ capability
- compliance
- performance



*An example of a training log is provided in the **Tool Kit** (see page 123).*

There are two excellent reasons for training employees about environmental management and your EMS:

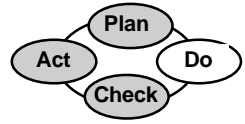
- Every employee can have an **impact** on the environment.
- Any employee can have **good ideas** about how to improve environmental management efforts.

Each person and function within your organization can play a role in environmental management. For this reason, your training program should cast a wide net. Everyone in the organization should be trained on the environmental policy, significant environmental impacts of their work activities, key EMS roles and responsibilities, procedures that apply to their activities, and the importance of conformance with EMS requirements.

All personnel should receive appropriate training. However, training is just one element of establishing **competence**, which is typically based on a combination of education, training, and experience. For certain key roles (including tasks which can cause significant environmental impacts), you should establish criteria for measuring the competence of individuals performing those tasks.

Getting Started:

- A critical first step in developing your training program is **assessing your training and skill needs**. In assessing these needs, you should consider both **general** and **specific** aspects (e.g., “What EMS procedures affect Joe’s daily work and what happens if they aren’t followed?” “What environmental impacts might Joe’s work cause?” “What broader understanding of environmental issues and our EMS does Joe need?”)
- Look at the **training you conduct already**, for compliance with environmental and health and safety regulations and other purposes. You may find that your existing training efforts go a long way towards satisfying the requirements for the EMS.



Milan Screw Products found that it could provide a great deal of its EMS training during “brown bag” lunches, during which employees bring their lunches, participate in a training session, and remain “on the clock” for the lunch period.

Key Steps in Developing a Training Program

- Step 1:* Assess training needs & requirements
- Step 2:* Define training objectives
- Step 3:* Select suitable programs and methods
- Step 4:* Prepare training plan (who, what, when, where, how)
- Step 5:* Implement training program
- Step 6:* Track training (and maintain records)
- Step 7:* Evaluate training effectiveness
- Step 8:* Improve training program (as needed)

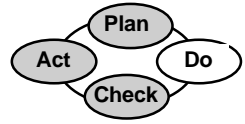


Training Resources:

- internal trainers / experts
- consultants
- community colleges
- vendors / suppliers
- customers
- technical / trade / business associations
- self-study or study groups
- training consortia (teaming with other local companies)
- computer-based training

Hints:

- Because of the level of effort involved in a training program, this is one EMS area where you don't want to start from scratch. Many employees may already be qualified on the basis of their experience and previous training. (Keep in mind that all training should be documented.) Since some employees may require training on how to run a process safely, **on-the-job training** certainly plays a role.
- **Plan and schedule** training opportunities carefully. While finding enough time for training can be a challenge, there may be creative ways to make “more time” (see box above left). Use venues like safety meetings, staff meetings, and tool box meetings to provide “training” and reinforce key messages.
- New employees can pose a significant training challenge. Consider developing an EMS training package for **new employee orientation**. Even better, videotape one of your current EMS training courses to show new employees.
- In reviewing training needs, don't forget to consider the qualifications and training needs of your **environmental manager** and your **trainers**. Professional certification programs may be appropriate for certain functions.
- Factor your EMS skills requirements into your **recruiting, selection**, and new employee **orientation** efforts (as noted above).
- Establishing **competency** for various tasks can be a challenge. Competency criteria for jobs that can



cause significant environmental impacts should be as objective as possible.

When Training Might Be Needed

- New employee is hired
- Employee is transferred to new job
- Individual doesn't follow procedure / instruction
- Procedures are changed
- New process, material, or or equipment is introduced
- Company changes objectives and / or targets
- New regulation affects company activities
- Job performance is not acceptable

One informal method for assessing competency is to question employees in critical functions as to how they perform various aspects of their jobs (e.g., "Show me how you....."). Use responses to determine whether they have the requisite skills and understanding to do the job safely. This will help you gauge whether additional training may be needed.

- Consider "**job aids**" to supplement training or help establish competence. Examples of job aids include written or pictorial job procedures, decision tables or flow charts.

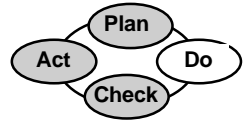
A Few Thoughts about Adult Learning

- Adults need the opportunity to integrate new ideas with what they already know.
- Information that conflicts sharply with existing beliefs or has little conceptual overlap with what is already known is acquired more slowly.
- Adults prefer self-directed learning and want to have a hand in shaping the training program.
- Adults have expectations. It is important to clarify these up-front.
- Adults prefer active participation to straight lecture.

- Adapted from "30 Things We Know for Sure About Adults Learning"
(Training Magazine, July 1988)

Review: Have we ...

- identified training needs?
- developed a training plan?
- provided the required training at all levels?
- communicated training responsibilities?
- tracked and documented training?



Communications

How are communications critical to the success of our EMS?

Opening the information lines

Consider communication strategies for:

- neighbors
- community groups
- other interest groups
- local officials
- regulatory agencies
- emergency responders

The importance of employee involvement in developing and implementing your EMS has been discussed earlier. Effective environmental management requires effective communications.

Communications will help you:

- motivate the workforce;
- explain the environmental policy (both internally and externally) and how it relates to the overall business vision / strategy;
- ensure understanding of roles and expectations;
- demonstrate management commitment;
- monitor performance; and,
- identify potential system improvements.

Effective **internal** communications require mechanisms for information to flow top-down **and** bottom-up. Since employees are on the “front lines,” they are often an excellent source of information, issues and ideas.

Communicating with **external parties** is also important for effective environmental management. Obtaining the views of neighbors, community groups, and customers, (among others), will help you understand how your organization is perceived by others. Information from external sources can be critical in setting environmental and other business goals.

An effective EMS should include procedures for:

- communicating **internally** (between levels and functions), and
- soliciting, receiving, documenting and responding to **external** communications.

Getting Started:

The first step in designing a communications program is determining **your audiences**. Make a list of internal and external audiences.

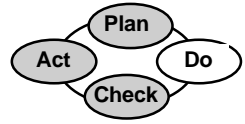
Once you identify the audiences, you should then determine **what** you need to communicate with them. (What do they need to know about your products or operations? What are their concerns?)

Next, decide **how** you can best reach them. Appropriate communication methods might vary from audience to audience. Start by looking at your **existing methods** for communicating, both internally and externally. These might include:

External Outreach

Warner-Lambert Company has hosted local community leaders, state agencies, and federal agencies, to share its environmental activities and programs and to obtain feedback.

Milan Screw Products' staff interviewed neighbors, customers, suppliers, and employees' family members to obtain the views of external parties.



Sample procedures for internal and external communications are provided in the **Tool Kit** (see pages 125 & 128).

- Internal Methods**
- newsletters
 - staff meetings
 - employee meetings
 - bulletin boards
 - brown bag lunches

- External Methods**
- open houses
 - focus groups
 - press releases
 - annual reports
 - advertising



Hints:

- Determine how **proactive** your external communications strategy will be. Select an approach that fits your organization's culture and strategy. For example, will reporting on environmental performance and progress give you an edge over the competition?

While a proactive external communications program may require more resources, some organizations have found that a proactive strategy can be quite beneficial. Weigh the costs and benefits for yourself, but keep in mind that there might be many interested audiences.

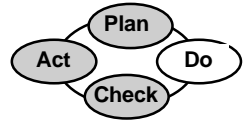
- In communicating with employees, it is helpful to explain not only **what** they need to do but **why** they need to do it. For example, when describing a requirement based on a regulation, simply saying "the regulations require it" is not sufficient explanation. Try to explain the purpose behind the rule and why it is important. Also make a clear connection between the requirement and how it applies to each person's job.
- **Keep the message simple** — all communications should be clear, concise, and accurate.
- Managing responses to external inquiries does not have to be a burdensome task. Use a simple method, such as stapling an inquiry to its written response and then filing them together. The key is to be able to demonstrate that the organization has a system for responding to external inquiries.

☆☆ **POLLUTION PREVENTION** ☆☆
and
Communication

Rochester Midland Corporation developed a program to improve indoor environmental quality in buildings where its cleaning products are used. This model program uses cleaning procedures that reduce emissions, products that are less hazardous, & engineering controls for consistent quality. Rochester Midland placed postcards on building tenants' desks that informed them of the program & solicited feedback for continual improvement of the program.

- Review:** Have we ...
- established procedures for internal and external communication?
 - determined who is responsible for responding to external inquiries?
 - identified target audiences?
 - determined the proper communications methods for each audience?

EMS Documentation



Why do we need documentation of our EMS?

Describing your EMS and how the pieces fit together

To ensure that your EMS is well understood and operating as designed, you need to get information to the people doing the work. In addition, there are external parties that might need to understand how your EMS operates, such as customers, registrars, regulators, lending institutions, and the public. A “road map” of your EMS explaining how the pieces fit together can be a very useful tool.

EMS documentation can be viewed as a series of explanations or statements of how EMS criteria (such as ISO 14001) apply to your organization. While you don’t need to maintain a single “manual”, you should maintain EMS information in a form that:

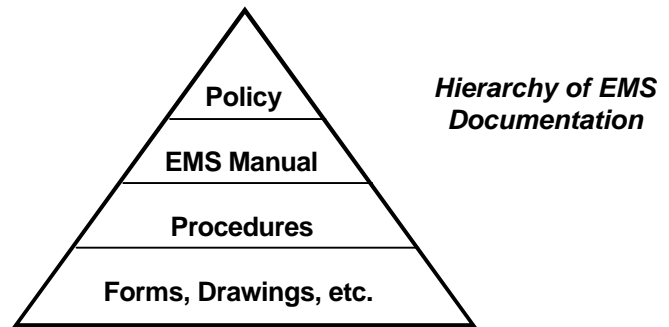
- describes the **core elements** of your EMS (and how these elements relate to each other), and
- provides **direction** to related documentation.

You can maintain this documentation either on paper or electronically. There may be some advantages to maintaining documents electronically, such as easier updating, access control, and ensuring that the most up-to-date version of a document is used by all readers.

EMS documentation is related to (but not the same as) EMS **records**. EMS **documentation describes** what your system consists of (i.e., what you do), while EMS **records demonstrate** that you are doing what you said you would do. EMS records are described later in this Guide.

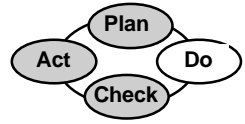
Rule of thumb:
Try to keep the description to no more than one page per EMS element

Easier to read and understand = easier to follow



One way to think about your EMS documentation is to use the figure shown above, which also applies to ISO 9000 documents.

Hints:



*Use flow charts
or other graphics
where they help
explain the
system and its
linkages*

- Keep your EMS documentation **simple** and choose a format that works best for your organization. The documentation does **not** need to describe every detail of your EMS or how your organization conforms to the ISO 14001 Standard (or other EMS criteria). Instead, consider **providing references** to other documents or procedures.
- Use the **results of your preliminary assessment** to prepare your EMS documentation. In the course of conducting the preliminary assessment, you should have collected or prepared useful material on how your organization satisfies the EMS criteria.
- The usefulness of your EMS documentation can be improved by including the organization's mission statement, vision, guiding principles, and annual objectives (if these exist). These will help readers understand the organizational context and **how the EMS supports** overall business goals.
- An EMS manual can be a useful tool for explaining your EMS to new employees, customers, or others. A sample outline for an EMS manual is provided in the **Tool Kit** (see page 133).
- EMS documentation should be **updated** as needed, based on any system improvements you put in place. However, if you put **too much detail** in an EMS manual, you may have to update the manual frequently (see first hint, above).

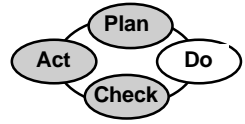
What Constitutes EMS Documentation?

Review: Have we ...

- documented the environmental policy, organization, key procedures, and other system elements?
- described where people can find the documents listed above and related documents?
- explained the linkages among system elements?

Consider including the following:

- your environmental policy
- your organizational structure and key responsibilities
- descriptions of **how** your company meets ISO 14001 requirements (e.g., "How do we identify environmental aspects?". "How do we control documents?" How do we conduct EMS audits?")
- references to key procedures / controls
- direction to other related documents (such as emergency response plans, training plans, etc.)



Document Control

How do we ensure everyone is working with the right information?

Getting everyone on the same page

Suggested elements of document control:

- issue / revision date
- effective date
- approval (i.e., signature)
- revision number
- document number (or other identifier)
- copy number
- cross-references

Key Question:

Is everyone working with the same set of documents?



Start with a few copies, then add more if the need is shown.

People in your organization probably use various documents (drawings, work instructions and the like) as they perform their duties. To ensure that your personnel are **consistently** doing the job right, the organization must provide them with the right tools. In this case, the tools needed are the correct and up-to-date procedures, drawings and other documents. Without a mechanism to control EMS documents, the organization has no way of knowing (or verifying) that people are working with the right tools.

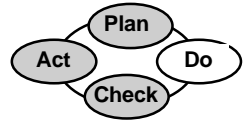
To ensure that everyone is working with the proper EMS documents, your organization should have a **procedure** that describes how documents are controlled. Implementation of this procedure should ensure that:

- EMS documents can be **located**,
- they are periodically **reviewed**,
- current versions are **available** where needed, and
- obsolete documents are **removed**.

Your document control procedure should designate **responsibility and authority** for preparing documents, making changes to them and keeping them up-to-date. In other words, you need to make it clear **who** can actually change documents and **what the change process is**.

Getting Started:

- EMS document control requirements are almost a mirror image of the ISO 9000 requirements. Organizations that have or are developing an ISO 9000 management system can enjoy some advantages here.
- Even if your organization doesn't have an ISO 9000 system, you might be better off than you think. Your organization probably has document controls in place for **other business purposes** (such as finance, human resources or purchasing). Assess how well these controls work and if they can be adapted for your EMS.



Documents that should be controlled:

- policy
- manual
- procedures
- work instructions
- forms & drawings

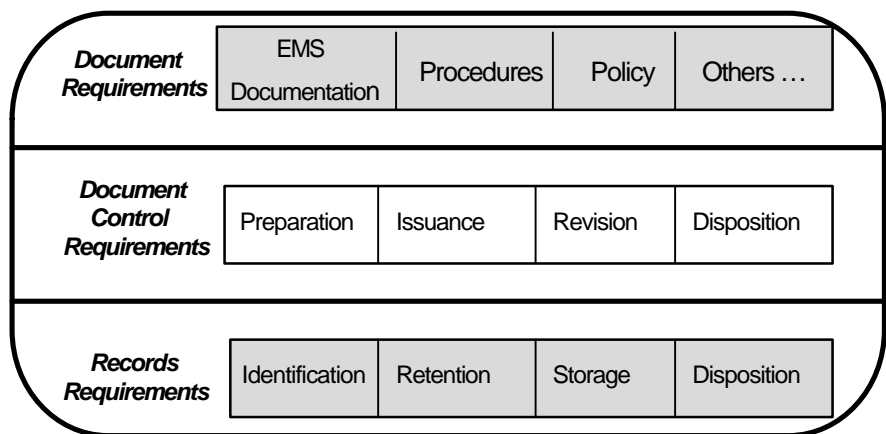
Hints:

- Don't make your procedure more complicated than it needs to be. While larger organizations often have complex processes for document systems control, smaller organizations can use simpler systems.
- **Limiting distribution** makes the job easier. Does everyone have access to one or a few copies? Determine **how many copies you really need** and where they should be located for **ease of access**.
- If the people that need access to documents are connected to a **local area network**, consider using a paperless system. This can facilitate control and revision of documents considerably.
- Prepare a **document control index** that shows all of your EMS documents and the history of their revision. Put this index in your manual. Also, if multiple copies of documents are available at the facility, prepare a **distribution list**, showing who has each copy and where the copies are located.
- As your procedures or other documents are revised, **highlight** the changes (by underlining, boldface, etc.). This will make it easier for the reader to find the changes.

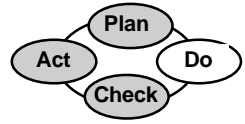
The **Tool Kit** contains a sample document control procedure (see page 135) and a sample index of EMS-controlled documents (see page 131).

Review: Have we ...

- developed a procedure to control EMS documents?
- determined the number of copies of documents we need?
- established responsibilities and authorities for document preparation, revision, management, and disposition?



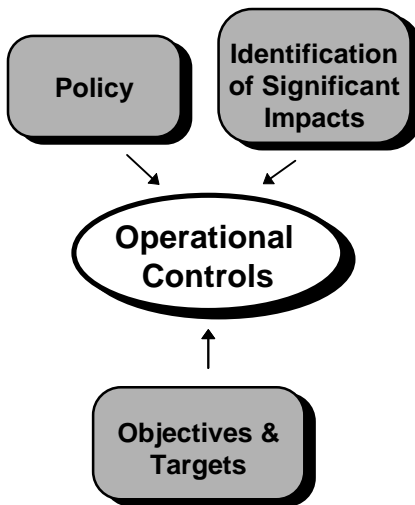
Linkages among EMS documentation, document control and records



Operational Control

What operations and activities must be controlled for environmental management?

Building in performance



Examples of Activities and Operations that Might Require Operational Controls:

- management / disposal of wastes
- approval of new chemicals
- storage & handling of raw materials and chemicals
- wastewater treatment
- operation of paint line
- operation of plating system
- management of contractors

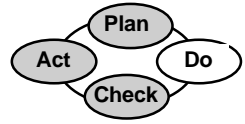
To ensure that your environmental policy is followed and that your objectives are achieved, certain operations and activities must be controlled. Where an operation or activity is complex and/or the potential environmental impacts are significant, these controls should take the form of **documented procedures**. Procedures can help your organization to ensure regulatory **compliance** and consistent environmental **performance**. Procedures can also play a key role in employee training.

Documented procedures should cover those situations where the absence of procedures could lead to **deviations from the environmental policy or your objectives and targets**. Determining **which operations** should be covered by documented procedures and **how** those operations should be controlled is a critical aspect of developing an effective EMS.

In deciding which activities need to be controlled, look beyond routine production on the shop floor. Activities such as **maintenance**, management of on-site **contractors**, and relationships with **suppliers or vendors** could affect your organization's environmental performance significantly.

Getting Started:

- Start by looking at the **environmental aspects** and potentially significant impacts which you identified earlier. Identify the **processes** from which these significant impacts arise, and consider what types of controls might be needed to prevent or manage these impacts. If you have **flow charts** of these processes, identify the points in each process where some type of control may be appropriate.
- Prepare draft procedures and review them with the people who will need to **implement** them. This will help to ensure that the procedures are accurate and realistic.



Hints:

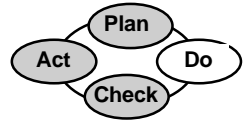
- Look at procedures you already have in place to **comply with** environmental and health & safety **regulations**. Some of these may be adequate to control significant impacts (or could be modified to do so). Develop a chart to keep track of what is needed:

Procedure needed (none exists)	Procedure exists, but is not documented	Procedure exists and is documented	No procedure needed
• • • •			

Factors That Could Affect the Need for Documented Procedures:

- risk of activity
- complexity of activity / methods
- degree of supervision
- skills / training of workforce

- **Rules of Thumb:** the more highly skilled and trained your employees are, the less critical procedures will be. The more complex the work or the greater the potential impact on the environment, the more important these procedures will be.
- Once you have identified operations that require control, consider what kinds of maintenance and calibration may be appropriate. However, the need for **maintenance** on equipment that could have significant environmental impacts should be obvious, and the need to plan and control such maintenance should not be overlooked. This does **not** mean that an elaborate preventive or predictive maintenance program is needed in all cases. Assess your existing maintenance program and its effectiveness before making significant changes.



☆☆ **POLLUTION PREVENTION** ☆☆

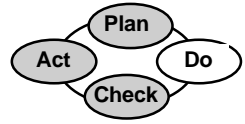
Rochester Midland Corporation, a manufacturer of cleaning and other chemical products, formed a partnership with a cleaning contractor that uses Rochester Midland's products, the owners of a building where the products are used, and building tenants, to lessen the risks associated with cleaning products. The partners began by developing common goals, identifying alternative cleaning products and processes, and identifying opportunities to reduce risks to building occupants and cleaning staff. Over a two-month period, they were able to: reduce chemical exposures; improve tenant satisfaction; improve communication, awareness, and training; achieve a 50% reduction in cleaning products; and achieve measurable cost savings.

Hints on Writing Procedures

- Understand the existing process (start with a flow chart, if one is available). Build on informal procedures where possible.
 - Focus on steps needed for consistent implementation.
 - Use a consistent format and approach.
 - Review draft procedures with employees that will have to implement them. (Better yet, enlist employees to help write them.)
 - Keep procedures simple and concise. Excessive detail doesn't provide more control and is not needed.
-
- Some of your identified environmental aspects may be related to the chemicals, raw materials, or other goods and services you obtain from **vendors/suppliers**. Likewise, the activities of your **contractors** can affect your environmental performance. **Communicate your expectations** (including any relevant procedures) to these business partners.
 - While the development of procedures can be time-consuming, some organizations have come up with creative ways to reduce the data collection burden. Consider having a college intern or temporary employee interview your employees "on the line" to collect information on what employees do and how they do it.
 - If your organization uses a "work team" concept, ask the work teams to draft procedures for their areas (or to modify existing procedures for EMS purposes).

Review: Have we ...

- developed procedures to control key operations / activities?
- trained employees on these procedures?
- covered normal operations, abnormal operations, emergencies?



Emergency Preparedness and Response

How should we be prepared for accidents and emergencies?

Minimizing the impacts of uncontrolled events

Don't think only about response — focus on how to prevent accidents in the first place!

Review prior accidents and incidents as one guide to where future incidents may occur.

Useful Information:

- Material safety data sheets
- Plant drawings
- Process flow diagrams
- Piping and instrumentation diagrams
- Design codes and standards
- Specifications on safety systems (alarms, sprinklers, etc.)

Despite an organization's best efforts, the possibility of accidents and other emergency situations still exists. Effective planning and preparation can reduce injuries, protect employees and neighbors, reduce asset losses and minimize production downtime.

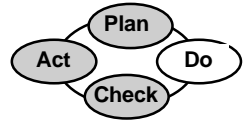
An effective emergency preparedness and response program should include provisions for:

- **assessing the potential** for accidents and emergencies;
- **preventing** incidents and their associated environmental impacts;
- plans / procedures for **responding** to incidents;
- periodic **testing** of emergency plans / procedures; and,
- **mitigating impacts** associated with these incidents.

Consistent with your organization's focus on continual improvement, it also is a good idea to **review** emergency response performance **after an incident** has occurred. This review can help determine if more training is needed or if emergency plans / procedures should be revised.

Getting Started:

- This is another area where you should not have to start from scratch. Several environmental and health and safety **regulatory programs** require emergency plans and/or procedures. Look at what you have in place now and assess how well it satisfies the items discussed above.
- One area where additional work is often needed is on **identifying the potential for accidents and emergencies**. A team of site personnel (from engineering, maintenance and Environmental Health & Safety, for example) can identify most potential emergencies by asking a series of "what if" questions related to hazardous materials, activities, and processes employed at the site. In addition to normal operations, the team should consider start-up and shutdown of process equipment, and other abnormal operating conditions.



- Ask yourself: Does **everyone** (including new employees) know what to do in an emergency? How would contractors or site visitors know what to do in an emergency situation?
- Communicate with **local officials** (fire department, hospital, etc.) about potential emergencies at your site and how they can support your response efforts.



Hints:

- **Mock drills** can be an excellent way to reinforce training and get feedback on the effectiveness of your plans / procedures.
- **Post copies** of the plan (or at least critical contact names and phone numbers) around the site and especially in areas where high hazards exist. Include phone numbers for your on-site emergency coordinator, local fire department, local police, hospital, rescue squad, and others as appropriate.

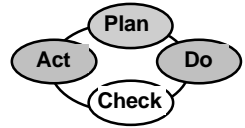
Checklist for Emergency Preparedness and Response Plan

Does your plan describe the following:

- potential emergency situations (such as fires, explosions, spills or releases of hazardous materials, and natural disasters)?
- hazardous materials used on-site (and their locations)?
- key organizational responsibilities (including emergency coordinator)?
- arrangements with local emergency support providers?
- emergency response procedures, including emergency communication procedures?
- locations and types of emergency response equipment?
- maintenance of emergency response equipment?
- training / testing of personnel, including the on-site emergency response team (if applicable)?
- testing of alarm / public address systems?
- evacuation routes and exits (map), and assembly points?

Review: Have we ...

- reviewed operations for potential emergency situations?
- developed plans / procedures for managing these situations?
- trained personnel and obtained any necessary emergency equipment?
- established a feedback loop so we can learn from our experiences?

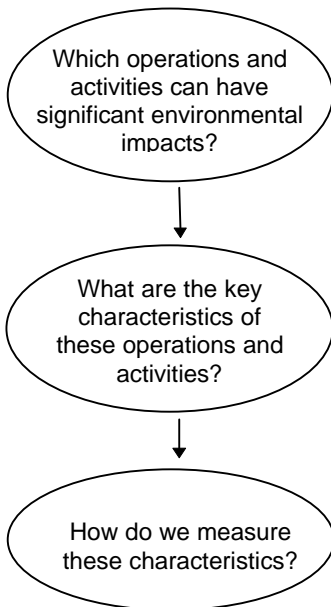


Monitoring and Measurement

How do we know how we are doing?

Assessing how well the system is working

**“If you can’t measure it, you can’t manage it.”
- Peter Drucker**



- Attributes of an Effective Measurement Program
- simple
 - flexible
 - consistent
 - ongoing
 - results communicated
 - reliable data produced

An EMS without an effective monitoring and measurement program is like driving at night without the headlights on — you know that you are moving but you can’t tell where you are going! Monitoring and measurement enables you to:

- **gauge** your environmental **performance**;
- **analyze root causes** of problems;
- **identify** areas where **corrective action** is needed; and,
- **improve performance** / increase efficiency.

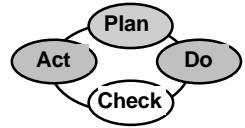
In short, **monitoring helps you manage your business better**. Pollution prevention and other strategic business opportunities are identified more readily when current and reliable data is available.

Your organization should **develop procedures** to:

- **monitor key characteristics** of operations and activities that can have significant environmental impacts;
- **track performance** (including how well you meet your objectives and targets);
- **calibrate and maintain** monitoring equipment; and,
- through internal audits, periodically **evaluate your compliance** with applicable laws and regulations.

Getting Started:

- Monitoring and measuring can be resource-intensive. One of the most important steps you can take is to clearly **define your needs**. While collecting information is clearly important, resist the urge to collect data “for data’s sake.”
- Review the kinds of monitoring you do now for **regulatory compliance** and other purposes (such as quality or health and safety management). How well does this serve your EMS purposes? What additional monitoring or measuring might be needed?
- You can start **with a relatively simple** monitoring and measurement system, then build on it as you gain experience.



Hints:

- **Monitoring key process characteristics:** Many management theorists endorse the concept of the “**vital few**” — that is, that a limited number of factors can be measured to determine the outcome of a process. The key is to figure out what those factors are and how to measure them. Root cause analysis is one way to identify what those factors might be.
- Most effective environmental measurement systems use a combination of **process** and **outcome** measures. Outcome measures look at results of a process or activity (such as the amount of waste generated or the number of spills that took place). Process measures, on the other hand, look at “upstream” factors, such as the amount of paint used per unit of product or the number of employees trained. A combination of process and outcome measures may be right for your organization.
- **Equipment calibration:** Identify process equipment and activities that truly affect your environmental performance. As a starting point, look at the **key process characteristics** you identified earlier. Some companies choose to put key monitoring equipment under a special calibration and preventive maintenance program. This can help to ensure accurate monitoring and lets employees know which instruments are most critical for environmental monitoring purposes. In some cases, it may be more cost-effective to subcontract calibration and maintenance of monitoring equipment than to perform these functions internally.
- **Assessing regulatory compliance:** Determining your compliance status on a regular basis is very important. You should have a process to systematically **identify, correct, and prevent** violations. Performance of the compliance management program should be considered during **EMS management review** (see page 54). The box below describes some of the characteristics of a good compliance management program.

Environmental performance evaluation is an ongoing process



Regulators may provide incentives for effective compliance management programs, including self-reporting

(see the EPA’s Final Policy Statement - “Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations “ - December 22, 1995 Federal Register, Vol. 60, No. 246).

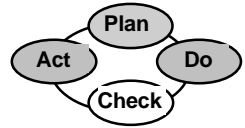


Employees should have a mechanism to report regulatory violations (or other EMS issues) without fear of retaliation by their employer.

Compliance Management Program Elements

- Organization policies and standards that describe how employees are to meet the regulations
- Assignment of responsibility for compliance oversight
- Processes to systematically ensure that policies and standards are carried out (e.g., monitoring and auditing)
- Appropriate incentives and disciplinary procedures
- Prompt disclosure of findings
- Prompt and appropriate correction of problems

(adapted from EPA’s final policy statement on self-

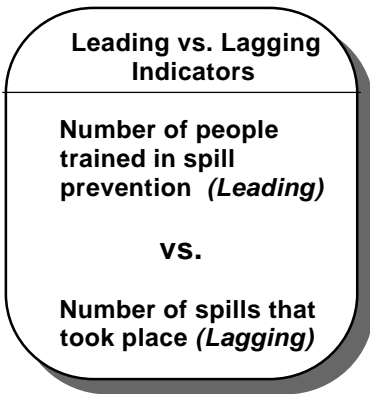


auditing; December 22, 1995)

- **Evaluating environmental performance:** Go back and look at your significant **environmental aspects** and the **objectives and targets** associated with those significant aspects. What information will you need to determine if the company is achieving its objectives and targets?

Focus on things that you can do something about!

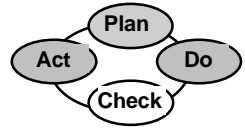
- Start by **selecting a few performance indicators** that are:
 - simple and understandable
 - objective
 - verifiable
 - relevant to what your organization does (i.e., its activities, products, and services)
- Make sure you can commit the necessary **resources** to track this information over time. It is OK to **start small** and build over time as your company gains experience in evaluating its performance. Keep in mind that **no single measurement** will tell your organization how it is doing in the environmental area.
- People respond best to information that is meaningful to “their world.” Putting environmental information in a form that is **relevant to their function** increases the likelihood they will act on the information. Be sure to link your measurement program with your **communications** program and other elements of the EMS (such as management reviews, as discussed later).
- The distinction between audits and environmental performance evaluation can be confusing. The figure below is intended to explain the two concepts. **Both are important to your EMS.**



Distinguishing Auditing from Environmental Performance Evaluation

Audits
<ul style="list-style-type: none"> • periodic • sample of data • independent • verifies conformance

EPE
<ul style="list-style-type: none"> • ongoing • frequent • line function • assesses performance

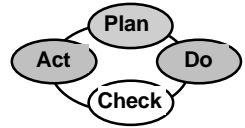


Example EMS Performance Indicators

- Pounds of VOC emitted per unit of production
- Pounds of hazardous waste generated per year
- Percentage of employees completing environmental training
- Average time for resolving nonconformities
- Energy use per unit of production
- Percentage of solid waste recycled / reused

Review: Have we ...

- identified key process characteristics and how to measure / monitor them?
- set up a process to regularly evaluate (through internal audits) compliance with laws and regulations?
- determined how to measure performance against our objectives and targets?
- established procedures to maintain and calibrate key monitoring equipment?



Nonconformance and Corrective / Preventive Action

What do we do when we find a problem?

Fixing EMS problems and avoiding them in the future

Nonconformance means.....

- system does not meet the EMS criteria (such as ISO 14001)

-or-

- implementation is not consistent with the EMS description

Recurring problems are expensive !

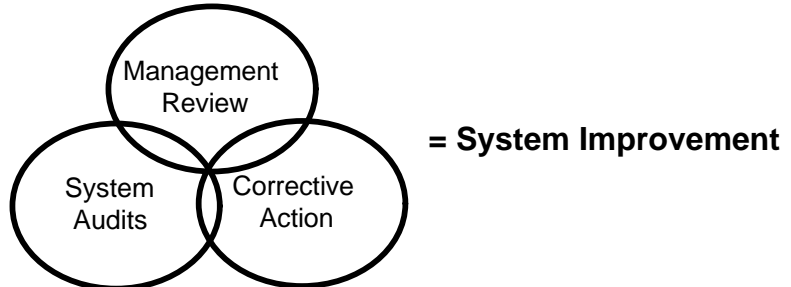


No EMS is perfect. You will probably find problems with your system, especially in the beginning (through audits, measurement, or other activities). Your EMS will also need to change as your organization changes and grows. **When system deficiencies are encountered**, your organization will need a process to ensure that:

- problems (including nonconformities) are **investigated**;
- root **causes are identified**;
- corrective **actions** are identified and **implemented**; and,
- corrective **actions** are tracked and **documented**.

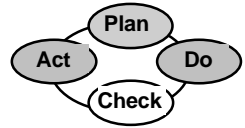
EMS nonconformities and other system deficiencies should be analyzed to detect patterns or **trends**. Identifying these trends will allow you to anticipate and **prevent** future problems.

Focus on correcting **and** preventing problems. Preventing problems is generally cheaper than fixing them after they occur (or after they reoccur). This approach is consistent with the **continual improvement** philosophy.



Hints:

- If your organization has an ISO 9000 management system, you should already have a corrective / preventive action process for **quality** purposes. You can use this as a model (or integrate with it) for EMS purposes.
- Small companies might find they can **combine** their management review and corrective action processes, especially if the same people are involved in both. At the very least, a strong link should exist between the two processes.
- The amount of planning and documentation needed for corrective / preventive actions can vary with the **severity** of the problem (and its potential environmental **impacts**). Don't go overboard with bureaucracy — simple methods often work best.



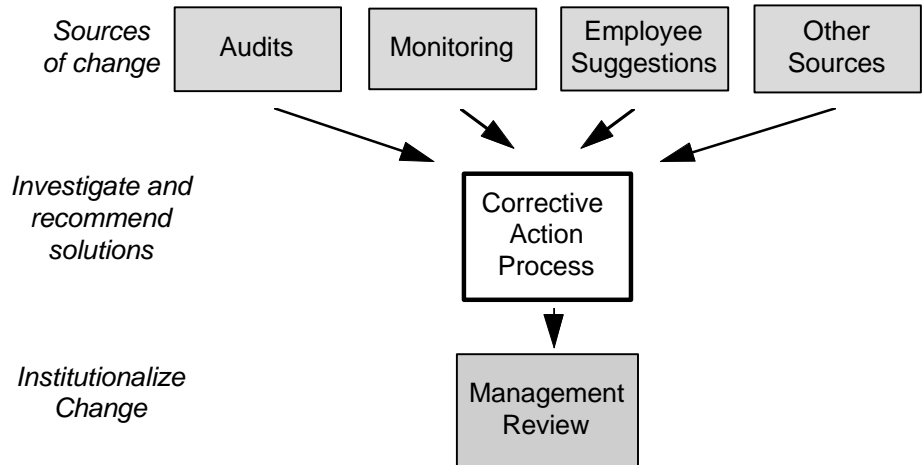
Why do EMS problems occur?
Typical causes include:


- poor communication
- faulty or missing procedures
- equipment malfunction (or lack of maintenance)
- lack of training
- lack of understanding (of requirements)
- failure to enforce rules


- Once you document a problem, the organization must be committed to resolving it. Corrective actions should be implemented **as quickly as possible**. Be sure that your corrective / preventive action process specifies **responsibilities and schedules**. Review your **progress** regularly and follow up on any deficiencies.
- Make sure you collect the right data / information to make good decisions. While many corrective actions may be “common sense,” you need to **look below the surface** to determine **why** a problem has occurred.
- Initially, most EMS problems may be identified by your auditors. However, over the long run, most problems and good ideas may come from the people in the shop doing the work. **This should be encouraged**. Find ways to get employees involved in the system improvement process (for example, via suggestion boxes, contests and incentive programs).

Key Steps:

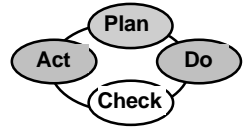
- identify the problem
- identify the cause (investigate)
- come up with solution
- implement solution
- document solution
- communicate solution



 People doing the work are often in the best position to see problems and suggest solutions.

 The **Tool Kit** contains a sample corrective action procedure and tracking log (see page 139).

- Review:** Have we ...
- developed procedures for investigating, correcting, and preventing system deficiencies?
 - set up a process for assigning responsibilities for and tracking completion of corrective actions?
 - set up a process to revise procedures or other EMS documents based on corrective / preventive actions?



Records

How do we prove that our EMS is working?

Evidence that the EMS is working properly



Records should be important to the operation of the EMS, including your regulatory compliance efforts.



The value of records management is fairly simple — you should be able to **prove** that your organization is actually implementing the EMS as designed. While records have value internally, over time you may need to provide evidence of EMS implementation to external parties (such as customers, a registrar, or the public). Records management is often viewed as bureaucratic, but it is hard to imagine a process or system **operating consistently** without keeping accurate records.

Basic records management is straightforward — you need to decide **what** records you will keep, **how** you will keep them and for **how long**. You should also think about how you will **dispose** of records once you no longer need them.

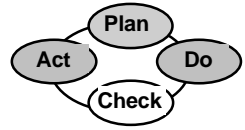
If your organization has an ISO 9000 management system, you should have a system for managing quality records.

Hints:

- **Focus on records that add value** — avoid bureaucracy. If records have no value, then don't collect them. The records you choose to keep should be **accurate and complete**.
- You may need to generate certain **forms** as you develop your EMS. These forms should be **simple and understandable**.
- **Consider combining** your records management processes for environmental and health & safety records.
- Establish a records retention policy and stick to it. Make sure that your policy takes into account **records retention requirements specified in applicable environmental regulations**.
- In designing your records management system, be sure to consider:
 - who needs access?
 - to what records?
 - in what circumstances?
- If your organization uses computers extensively, consider using an electronic EMS records management system. Maintaining records electronically can provide an excellent means for rapid retrieval of records as well as controlling access to sensitive records.
- Think about which records might require additional **security**. Do you need to restrict access to certain records? Should a back-up copy of critical records be

Key Questions:

- what records are kept?
- who keeps them?
- where are they kept?
- how are they kept?
- how long are they kept?
- how are they accessed?
- how are they disposed?



maintained at another location?

Types of Records You Might Maintain (Examples):

- legal, regulatory and other code requirements
- results of environmental aspects identification
- reports of progress towards meeting objectives and targets
- permits, licenses and other approvals
- training records
- EMS audit and regulatory compliance audit reports
- reports of identified nonconformities, corrective action plans and corrective action tracking data
- hazardous material spill / other incident reports
- communications with customers, suppliers, contractors and other external parties
- results of management reviews
- sampling and monitoring data
- maintenance records
- equipment calibration records

★ ISO 14001 requires that organizations have procedures for training records and the results of audits and reviews ★

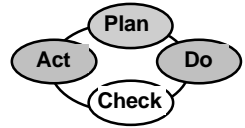


The **Tool Kit** contains a tool for organizing your filing system (see page

144). Copy the pages, cut out the tabs, and use them to set up your files.

Review: Have we ...

- identified records to be maintained?
- determined their retention times?
- set up a good storage and retrieval system?



EMS Auditing

Are we doing what we said we would do?

Objective evidence of conformance with EMS requirements

Audits are vital to continual improvement

EMS Audit:

“ A systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization’s environmental management system conforms to the environmental management system audit criteria set by the organization, and for communication of the results of this process to management.”

- ISO 14001

Once your organization has established its EMS, verifying the implementation of the system will be critical. To identify and resolve EMS deficiencies you must **actively seek them out**.

In a small organization, audits are particularly relevant since managers are often so close to the work that they may not see problems or bad habits that have developed. Periodic EMS audits will establish whether or not **all** of the requirements of the EMS are being carried out **in the specified manner**.

For your EMS audit program to be effective, you should:

- develop audit **procedures** and protocols;
- establish an appropriate audit **frequency**;
- **train** your auditors; and,
- maintain audit **records**.

The results of your EMS audits should be linked to the **corrective action** system (as described earlier).

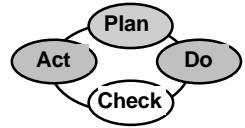
While they can be time-consuming, EMS audits are critical to EMS effectiveness. Systematic identification and reporting of EMS deficiencies to management provides a great opportunity to:

- maintain **management focus** on the environment,
- **improve** the EMS, and
- ensure its **cost-effectiveness**.

Getting Started:

- **How frequently do we need to audit?** In determining the frequency of your EMS audits, some issues to consider are:
 - the nature of your **operations**,
 - the significant environmental **aspects / impacts** (which you identified earlier),
 - the results of your **monitoring** program, and
 - the results of **previous audits**.

As a rule of thumb, all parts of the EMS should be audited **at least annually**. You can audit the entire EMS at one time or break it down into discrete elements for more frequent audits. (There may be advantages to more frequent audits, but the decision is up to you).

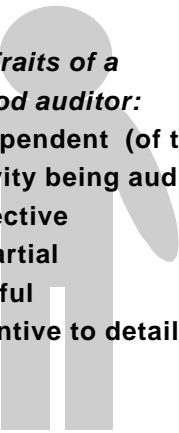


Audit procedures should describe:

- audit scope (areas and activities covered)
- audit frequency
- audit methods
- key responsibilities
- reporting mechanisms

Traits of a good auditor:

- Independent (of the activity being audited)
- Objective
- Impartial
- Tactful
- Attentive to detail



Sources of Evidence:

- interviews
- document review
- observation of work practices

- **Who will perform the audits?** You will need trained EMS auditors. Auditor training should be both **initial and ongoing**. Commercial EMS auditor training is available, but it might be more cost-effective to link up with businesses and other organizations in your area (perhaps through a trade association) to sponsor an auditor training course. A local community college might also provide auditor training.

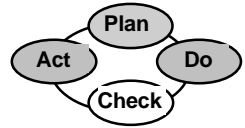
EMS auditors should be trained in **auditing techniques** and **management system** concepts. Familiarity with environmental regulations, facility operations, and environmental science is a big plus, and in some cases may be essential to adequately assess the EMS. Some auditor training can be obtained **on-the-job**. Your organization's first few EMS audits can be considered part of your auditor training program (but make sure that an **experienced auditor** takes part in those "training" audits).

If your company is registered under **ISO 9000**, consider using your internal ISO 9000 auditors as EMS auditors. Although some additional training might be needed, many of the required skills are the same for both types of audits.

- **How should management use audit results?** Management can use EMS audit results to **identify trends or patterns** in EMS deficiencies. The organization must also make sure that any identified system gaps / deficiencies are **corrected** in a timely fashion and that the corrective actions are **documented**.

Hints:

- Your EMS audits should focus on **objective evidence of conformance**. (If you cannot tell whether or not a particular procedure has been followed, then you should consider revising the procedure). During the actual audit, auditors should resist the temptation to evaluate **why** a procedure was not followed — that step comes later.
- During the course of the audit, auditors should **discuss identified deficiencies** with the people who work in the area. This will help the auditors verify that their understanding is correct. It can also serve as refresher training (on EMS requirements) for employees.
- If possible, train at least **two** people as internal auditors. This allows your auditors to work as a **team**. It also allows audits to take place when one auditor has a schedule conflict (which is unavoidable in a small organization!).



ISO has finalized three guidance standards for environmental auditing — ISO 14010, ISO 14011, and ISO 14012. These guidelines may help your organization to develop its EMS auditing program (see Annex B for additional information).

Some Options for Auditing

- Barter for audit services with other small companies
- Use external auditors
- Have office personnel audit production areas (and vice-versa)

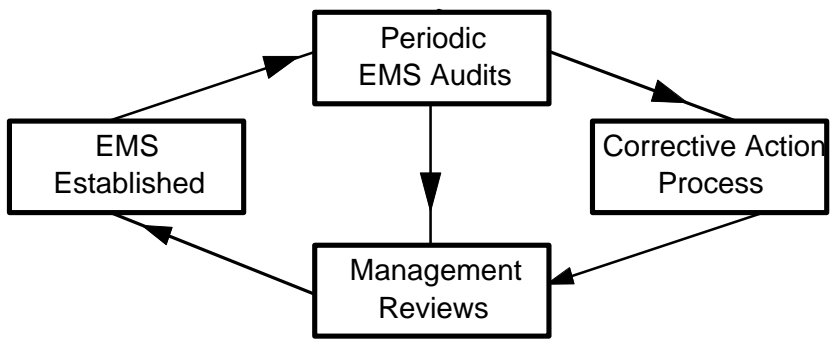
- **Before you start** an audit, be sure to communicate the audit scope, schedule, and other pertinent information with the people in the affected area(s). This will help avoid confusion and will facilitate the audit process.
- Consider **linking** your EMS audit program to your regulatory compliance audit process. **But** keep in mind that these audit programs have different purposes, **and** while you might want to communicate the results of EMS audits widely within your organization, the results of compliance audits might need to be communicated in a more limited fashion (in order to maintain attorney-client or attorney work product privilege, for example).
- The **Tool Kit** includes a sample EMS audit procedure (see page 148).



Results of regulatory compliance audits are often good indicators of EMS deficiencies. Use compliance audit findings to guide your EMS audit efforts.



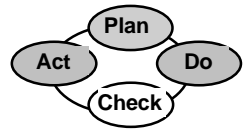
Even if you have an effective internal audit program, consider periodic external audits to ensure objectivity.

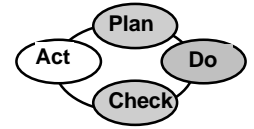


Linkages among EMS audits, corrective action and management reviews

Review: Have we ...

- developed an audit program?
- determined an appropriate audit frequency?
- selected and trained EMS auditors?
- conducted EMS audits as described in the program?
- developed a process to keep records of these audits?





Management Review

How do we ensure that our EMS will remain viable?

Closing the continual improvement loop

Management reviews can be used to demonstrate top management's ongoing support for the environment

Just as a person should have periodic physical exams, your EMS must be reviewed by management from time to time to stay "healthy." Management reviews are the **key to continual improvement** and to ensuring that the EMS will continue to meet your organization's needs over time.

Management reviews also offer a great opportunity to keep your EMS **efficient and cost-effective**. For example, some organizations have found that certain procedures and processes initially put in place were not needed to achieve their environmental objectives or control key processes. **If EMS procedures and other activities don't add value, eliminate them.**

The key question that a management review seeks to answer is:

"Is the system working?" (i.e., is the EMS suitable, adequate and effective, given our needs?)



Hints:

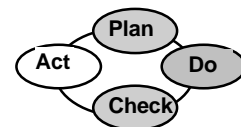
- There are two kinds of people who should be involved in the management review process:
 - people who have the right **information** / knowledge
 - people who can make **decisions**
- Determine the frequency for management reviews that will work best for your organization. Some organizations combine these reviews with other meetings (such as director meetings) while other organizations hold "stand-alone" reviews. For ISO 9000 purposes, management reviews are typically held once or twice per year.
- Regardless of what approach your organization takes, make sure that someone takes notes on what **issues** were discussed, what **decisions** were arrived at, and what **action** items were selected. Management reviews should be **documented**.
- The management review should assess how **changing circumstances** might influence the suitability, effectiveness or adequacy of your EMS. Changing circumstances may be **internal** to your organization (i.e., new facilities, new materials, changes in products or services, new customers, etc.) or may be **external** factors (such as new laws, new scientific information, or



Hold management reviews "after hours" so that production will not be affected.



*The **Tool Kit** contains a sample Management Review procedure (see page 154).*



Information sources to consider:

- audit results
- internal suggestions
- external communications
- progress on objectives and targets
- other environmental performance measures
- reports of emergencies, spills, other incidents
- new or modified legislation and regulations
- new scientific/ technical data on materials and processes used by the organization



The Internet is a good way to stay on top of changing laws, regulations, technologies, and other environmental information.

“Many of the benefits of an EMS cannot be anticipated beforehand. You will have to discover them as pleasant surprises at some point after implementation. They will be there.”

- Milan Screw Products

changes in adjacent land use).

- Once you have documented the action items arising from your management review, be sure that someone **follows-up**. Progress on these items should be tracked.
- As you evaluate potential changes to your EMS, be sure to consider your **other organizational plans and goals**. Environmental decision-making should be integrated into your overall management and strategy.

Questions to Ponder During Management Reviews

- Did we achieve our **objectives and targets**? (if not, why not?) Should we modify our objectives?
- Is our environmental **policy** still relevant to what we do?
- Are **roles and responsibilities** clear and do they make sense?
- Are we applying **resources** appropriately?
- Are the **procedures** clear and adequate? Do we need others? Should we eliminate some?
- Are we **monitoring our EMS** (e.g., via system audits)? What do the results of those audits tell us?
- What effects have **changes in materials, products, or services** had on our EMS and its effectiveness?
- Do changes in **laws or regulations** require us to change some of our approaches?
- What **stakeholder concerns** have been raised since our last review?
- Is there a **better way**? What else can we do to **improve**?

Review: Have we ...

- established a process for periodic reviews of our EMS?
- documented the results of such reviews?
- followed-up on action items to ensure closure?

CONGRATULATIONS !! YOU NOW HAVE ALL OF THE ELEMENTS OF AN EFFECTIVE EMS !!

Section 5 : The Registration Process

This section describes the registration process, and will help you to decide if your organization should pursue registration.

1st Party Audit

Internal Audit

2nd Party Audit

Customer audit of a supplier

3rd Party Audit

Audit by another party independent of a supplier and its customer

Environmental management system registration is the process whereby a non-biased “third-party” attests that an organization’s EMS conforms with the requirements of an EMS standard, such as ISO 14001. The third-party organization that performs the registration services is called a “**registrar**,” and is selected by the organization that desires registration services. The type of registration services that will be offered for ISO 14001 will be similar to those offered for the ISO 9000 series of quality management system standards. In North America, over 13,000 companies have been registered to ISO 9000.

A registrar can be “accredited” by a third-party accreditation body that is independent of the registrar. **Accreditation** is the process in which a registrar’s competence is evaluated by a third-party accreditation body with national or governmental recognition. Accreditation greatly enhances a registrar’s credibility.

“Registration” vs. “Certification”

Both terms can be used to describe the third-party process. In the U.S., the term “registration” is generally used for management systems, while the term “certification” is generally used for products.

ISO 14001 does not require that an organization implement the Standard at the corporate level. For example, one organization may choose to implement the Standard throughout the entire organization, while another may implement the Standard in one particular facility. An organization can elect to register the entire organization, a division(s), selected facilities, a particular facility, or selected operations within a facility. The key factor in choosing the organizational unit for registration purposes is that it has its own functions and administration.

Registrars may have different registration processes and may offer different types of services. The following is a description of a fairly typical registration program which is provided for illustrative purposes:

The Registration Process

Step 1: Application for Registration

The organization seeking EMS registration submits an application indicating the activities and facilities of the organization or site to be registered.

**Overview of
the Typical
EMS Registration
Process:**

1. Application
2. EMS Documentation Review - Desk Audit
3. On-site EMS Readiness Review
4. Registration Audit
5. Registration Determination
6. Surveillance

The ISO 14001 Standard does **not** require third-party registration, but market forces and regulatory incentives may provide strong encouragement for registration.

Step 2: Review of EMS Documentation / Desk Audit

The organization submits documentation of its EMS, which includes its environmental policy and documentation indicating how it meets each clause in the ISO 14001 Standard. The documentation is reviewed by a designated lead auditor. The auditor generates a written report which indicates conformance or nonconformance of the documented EMS to each clause of the Standard.

Step 3: On-site EMS Readiness Review

The lead auditor conducts an on-site visit in order to resolve any EMS documentation nonconformities and to verify that the facility is prepared for a full registration audit. The on-site visit is also used to assess the resources and logistics necessary for the full registration audit.

Step 4: Registration Audit

An audit team conducts an on-site audit to evaluate and verify through objective evidence (interviews, procedures, records, etc.) that the EMS conforms to the requirements in the ISO 14001 Standard, is effectively implemented, and has sufficient provisions to be maintained.

Step 5: Registration Determination

A final report containing the results of the registration audit is submitted to the organization. To receive a Certificate of Registration, an organization must successfully meet the requirements of the ISO 14001 Standard, as well as the registration policies of the registrar.

Step 6: Surveillance

Surveillance audits are typically performed semi-annually to verify continued conformance with the ISO 14001 Standard. During the surveillance audits, the audit team may only audit certain elements of the EMS. Over a three year period, however, all of the elements of the EMS must be reviewed to ensure continued conformance to the requirements of the ISO 14001 Standard.

Possible Registration Audit Results

There are three possible results from a registration or surveillance audit. The registrar can determine that the applicant is:

<p>Classification of Audit Findings:</p>
<p>Major Nonconformity — Absence or complete breakdown of an EMS element. A large number of minor nonconformities for one element may be considered a major nonconformity.</p>
<p>Minor Nonconformity — A single observed nonconformity.</p>

- ◆ Recommended for registration
There are no major nonconformities.

- or -

- ◆ Recommended for registration following verification of corrective action
There are one or more major nonconformities which can be corrected and verified without a full re-audit.

- or -

- ◆ Recommended for an on-site reassessment
There are several major nonconformities which indicate a breakdown of the EMS. Another full on-site audit is required.

Should Your Organization Pursue Registration?

There are numerous benefits associated with implementing an EMS; some of those benefits can be the result of external recognition. An organization that voluntarily implements an EMS standard, such as ISO 14001, may be able to demonstrate **externally** that it has made a commitment to environmental protection.

The ISO 14001 Standard does **not** require registration. An organization can demonstrate its commitment to proactive environmental management to its stakeholders and other interested parties in two ways:

- An organization can have its EMS audited and registered by an independent 3rd party, i.e. registrar;
- or —
- An organization can make a self-determination and self-declaration of conformance to an EMS standard.

<p>Registration Credibility</p>

An organization should carefully consider several factors in order to determine which approach is best. An organization’s reputation and relationship with its stakeholders and other interested parties may play a significant role in helping it to determine which option is most desirable. An organization that is weighing the pros and cons of self-declaration vs. registration should also consider the following factors:

- Strategic goals;
- Maintenance of current market position;
- Opportunities for a competitive advantage;
- Investor criteria for access to capital;
- Possible regulatory incentives; and
- The credibility of self-declaration.

“We concluded that eventually Quinn would have to be ISO 14001 certified to compete internationally.”

— K.J. Quinn

Hach Company will “wait and see” if market forces and potential regulatory incentives provide sufficient benefits to offset the costs of registration.

— Hach Company

“ ... as is the case with ISO 9000, some early indications are that ISO 14001 registration will be a prerequisite for doing business internationally, especially in Europe.”

— Globe Metallurgical Inc.

In certain cases, EMS registration **may be required by** customers or may be necessary to fulfill a contract requirement. Organizations that sell their goods or services internationally may find that EMS registration is a strong selling point in the global marketplace and may enable them to obtain preferred supplier status. For certain organizations, registration to the ISO 9000 series of quality management system standards has become a prerequisite for doing business domestically and internationally. EMS registration may be pursued by a wide variety of organizations, including those that have obtained quality management system registration. EMS registration may result in a **competitive advantage** for organizations that have achieved it.

An organization may pursue registration as a means to demonstrate to its **shareholders** that its EMS conforms to the requirements in an international EMS standard. Organizations that are striving for good **community relations** may use registration as a vehicle to improve or maintain their public image. Some **lenders** and **insurers** have indicated that organizations that have obtained EMS registration may be given preferential treatment because they are perceived to be a lower risk.

Regulators, both at the state and federal level, have indicated that they may provide incentives, in the future, for organizations that successfully implement an effective EMS. Regulatory agencies are currently evaluating the effectiveness of EMS implementation but have not committed to what types of regulatory incentives may be available. Examples of regulatory incentives could include streamlined permitting processes and reduced fines. Organizations that provide goods or services to **government agencies** may be granted preferred supplier status if they implement an effective EMS.

An organization evaluating whether or not registration is an appropriate goal should consider the following questions:

**Should Your
Organization Pursue
EMS Registration ?**

Consider:

- ✓ Strategic goals
- ✓ Customers
- ✓ Competitors
- ✓ Shareholders
- ✓ Local community
- ✓ Lenders/Insurers
- ✓ Regulatory agencies

The Organization

- 1) What is your organization's motivation for implementing ISO 14001?
- 2) Is your organization's senior management committed to ISO 14001 implementation?
- 3) How does environmental management fit into your organization's operating and strategic goals?

Customers

- 4) Have your customers indicated that they will require ISO 14001 registration?
- 5) Do your customers give preferential treatment to environmentally responsible suppliers?
- 6) Does your organization sell its products or services internationally (particularly in Europe or Japan)?
- 7) Are your competitors pursuing ISO 14001 registration?

Shareholders

- 8) Are your shareholders concerned about your environmental management practices?
- 9) Have your shareholders considered using your proactive environmental practices as a marketing tool?

Local Community

- 10) Has your local community raised concerns about your environmental practices?
- 11) Has your organization been looking for a means to demonstrate your proactive environmental management practices to your local community?

Lenders/Insurers

- 12) Will your lenders or insurers offer your organization better rates if it has a registered EMS?

Regulatory Agencies

- 13) Are your organization's activities highly regulated?
(Would any *potential* regulatory relief provide motivation for registration?)

The benefits of EMS registration may vary significantly among organizations. In addition, the costs associated with the registration process will vary significantly among organizations, depending on the size of the organization and the number of facilities/divisions they choose to register. A cost-benefit analysis may help your organization to weigh the costs associated with EMS registration with the benefits your organization can expect to achieve. Your organization should determine if registration will **add value to your business**.

Choosing a Registrar

If your organization chooses to pursue EMS registration, you may want to consider the following factors when choosing a registrar:

- 1) Are they accredited? Major accreditation bodies include: the American National Standards Institute (ANSI); the Registrar Accreditation Board (RAB); and the Raad voor Accreditatie (RvA) (the Dutch Council for Accreditation).
- 2) How many years have they been in business?
- 3) Do they provide registration services for quality management systems (ISO 9000)? (*May be helpful if your organization is pursuing registration to both ISO 9000 and ISO 14001.*)
- 4) What is the experience base of the auditors? Do they have experience in quality management systems and environmental management? Do they have experience in your particular industry?

- 5) How many clients do they have? Can they provide you with a list of customers/references?
- 6) Are they accredited in your Standard Industrial Classification (SIC) Code?
- 7) Do they have experience working with small and medium-sized organizations?
- 8) Are they geographically convenient to your operations? Can they provide you with a lead auditor who is located close to your organization? (*Geographic proximity can reduce travel expenses.*)
- 9) Is registration “continuous” or does it expire? (*Is a full registration audit required again after a period of time?*)
- 10) What are their costs over a four-year period?

Section 6: Sources of Assistance

This section describes where your organization can find additional help.

There are many free or inexpensive resources available to help your organization develop and implement an EMS. The following is a description of some of these resources. **A list of contacts is included in Annex C of this Guide.**

Federal Government Agencies

The U.S. Environmental Protection Agency (USEPA) provides information on a number of topics that can be useful in the development and implementation of an EMS. Some of these resources include: assistance with interpretation of environmental laws and regulations; information on pollution prevention technologies; case studies; fact sheets; and hotlines to answer questions about environmental issues.

The USEPA's Office of Compliance has established telecommunications-based national Compliance Assistance Centers for four specific industry sectors (and is currently working on two new centers). The existing centers include: the National Metal Finishing Resource Center (NMFRC); Printer's National Compliance Assistance Center (PNEAC); GreenLink™ - the Automotive Compliance Information Assistance Center; and the National Agriculture Compliance Assistance Center. Office of Compliance staff is planning to develop a Chemical Manufacturers' Center and Printed Wiring Board Center.

The Small Business Administration (SBA) provides assistance to small and medium-sized organizations. The SBA can provide information and assistance related to: operation and management of a business; sources of financial assistance; international trade; as well as laws and regulations.

State Agencies

Your state environmental regulatory agency can provide assistance with the development of an EMS. Contact your state environmental agency and inquire about education and outreach programs for businesses that are developing an EMS. Many state environmental agencies can also provide publications, pamphlets, and on-line help related to environmental laws, innovative pollution prevention technologies, waste reduction, and permitting. Some states, such as Minnesota and Pennsylvania, are developing programs specifically designed to help organizations seeking ISO 14001 registration.

Associations

Industry trade associations can provide assistance with the development of an EMS. These organizations can provide information on a number of industry-specific environmental management issues, and can be instrumental in placing you in contact with other organizations that can share their experience and expertise in EMS implementation.

Your local or state chamber of commerce can be helpful in providing information about legislative and regulatory issues that affect environmental management for small and medium-sized organizations. Other services that are commonly offered include handbooks, workshops, conferences and seminars.

Non-Profit Organizations

Another resource to consider is the Manufacturing Extension Partnership (MEP), which is a growing nationwide system of services that provide technical support to businesses interested in assessing and improving their current manufacturing processes. The MEP is a partnership of local manufacturing extension centers which typically involve federal, state, and local governments, educational institutions, and other sources of information and funding support. The MEP can also often provide assistance with quality management, development of training programs and business systems.

The Industrial Technology Institute (ITI) is a non-profit organization dedicated to expanding technology access and technology management among U.S. manufacturers. ITI provides technical assistance to small and medium-sized organizations through the Michigan Manufacturing Technology Center. ITI also has experience with the development of business performance tools and provides services for energy, environment, and manufacturing assessments; as well as, QS 9000 and ISO 14000 training and implementation.

Other Companies

Another recommended source of information and expertise is the companies with which you do business. It is likely that your suppliers and customers have experience with many of the aspects of an EMS, and are willing to share their experiences and provide advice to your organization.

On-line Resources

There is a wealth of information related to EMS implementation available electronically via the Internet. Many state, federal, and local agencies have home pages on the Internet containing information that can be useful to your organization. Numerous non-governmental organizations have home pages that contain information on topics such as ISO 14000, pollution prevention, recycling and waste minimization, environmental laws and regulations, innovative manufacturing technologies, and materials substitution. If your organization does not have Internet access, contact your local library to see if it provides Internet access to its users.

Appendix A

Case Studies

MILAN SCREW PRODUCTS

Background

Milan Screw Products is a small manufacturing firm located in southeastern Michigan that **employs 32** individuals. Milan Screw Products manufactures precision fittings for the fluid power, automotive, and refrigeration industries, and is **registered to the ISO 9002 quality management system Standard**. There are approximately 1,500 companies in the United States in the screw-machine products industry. Most of these companies are family-owned and family-managed, and typically have approximately 50 employees.

While there are generally few hazardous materials used in the screw-machine industry, there are **environmental issues** associated with the containment of coolants and cutting oils, the substitution of chlorinated solvents, and the disposal of waste oils. The most persistent environmental challenge is the containment of cutting oil within production machines. Many screw-machine shops have production equipment that was manufactured in the 1950s, which may have leaky gearbox covers and inadequate oil splash guards. The cutting oils also create cleaning and disposal issues (e.g., stained carpets; waste bins filled with saturated oil absorbents swept from the shop floor; and liquid wastes from the solvents and soaps used in cleaning).

While many shops have simply accepted the oily film that soon coats everything from the light fixtures to the floors, Milan Screw Products decided that it was going to improve the management of its environmental issues. Top management recognized that a clear environmental policy, objectives and targets, written procedures, training, and corrective action (elements similar to its quality management system), would help them to proactively manage their environmental practices. The motivation to implement an EMS was derived from the company's desire to improve its environmental performance, and in light of the company's quality management system experience, the EMS approach seemed to be the best way to achieve it. **Milan Screw Products was soon committed to implementing an environmental management system.**

EMS Implementation

One of the **first steps** in the implementation of the EMS at Milan Screw Products was the establishment of a cross-functional **environmental task group**. Top management appointed five representatives from production, support, and management. The environmental task group is responsible for assuring continued regulatory compliance (including the submission of all permits/forms to federal, state, and county environmental agencies), and improving the company's environmental performance. Milan Screw Products found that **participation of shop-floor employees is essential** to the successful implementation of an EMS because it encourages their ownership of the process. Top management was pleased with the heightened environmental awareness among task group members and their growing

understanding of the company's environmental responsibilities. In addition, environmental compliance activities were soon effectively managed by the environmental task group and would only require top management review.

While progress had been made, the organization was lacking a structure for its EMS program and had no means to measure progress. In March 1995, Milan Screw Products joined the EPA-sponsored EMS Demonstration Project at NSF International. One of the first steps in the project was the self-assessment process. Milan Screw Products completed NSF's **EMS Self-Assessment Tool**, which is a checklist that enables an organization to determine how its EMS measures up against an EMS standard, such as ISO 14001. Milan Screw Products' score was very low because they did not have a formal EMS in place. The score did not discourage Milan Screw Products and the company set a goal for itself — complete EMS implementation by June 1996.

Policy

Milan Screw Products developed an **environmental policy** that includes a commitment to regulatory compliance, continual improvement, and the prevention of pollution. The environmental policy was modeled after the organization's quality policy, which was developed with the help of a consultant.

Planning

In order to determine the company's **environmental aspects**, the environmental task group members set up an easel and participated in a brainstorming session. The task group listed all of the company's inputs (e.g. energy, water), outputs (e.g. oil mist, noise), and conversions (e.g. steel bars to chips, and cutting oils to mist). The task group examined the company's purchases, processes, and waste streams. The task group also identified the company's stakeholders. Some of the stakeholders were interviewed so that the company could gain a better understanding of their environmental concerns. These stakeholder concerns were added to the list of environmental aspects. A neighbor reported that their only concern was that oil from the shop could damage their lawn. A supplier's sales representative reported that the oil on his shoes was a nuisance. Customers were pleased to learn that the company was implementing an EMS because they want to be assured of continued production (fines imposed on a small company could result in a shut down). The task group also interviewed employees and some of their family members. All in all, the environmental task group had done an excellent job at identifying their environmental aspects. The task group then rated the probability of an environmental impact occurring against the severity of the impact. They then grouped the environmental aspects/impacts in general categories (e.g. oil-related problems).

It soon became clear that the company's primary **objective** was oil recovery. The top management at Milan Screw Products had been contemplating the need for a new facility. The identification of the company's environmental aspects/impacts provided additional motivation for the development of a new facility. The environmental aspects/impacts that were identified and the company's EMS have played a role in determining how the new facility will be built. The company will continue to perform oil recovery practices, but will not set numerical **targets** until the new facility is complete. Milan Screw Products started its first EMS cycle with reasonable objectives that focus on its manufacturing practices. Over time, the company will continually improve its EMS, and hopes to include objectives such as the recycling of office paper.

The environmental task group will continue to be responsible for keeping Milan Screw Products fully in compliance. The company has found that its trade association has been a tremendous help in keeping them abreast of **environmental compliance** issues.

Milan Screw Products intends to develop its **environmental management program** at its current facility and will improve the EMS at the new facility. The new facility will help the company to achieve its environmental objectives and targets.

Implementation and Operation

Milan Screw Products has found that the **structure and responsibility** requirements of the ISO 14001 Standard are easier to manage in a small company. Milan Screw Products has developed six teams (each composed of individuals with similar job descriptions) for the quality management system; the teams have been given more decision-making authority and have been an effective element of the quality management system. These teams will help with environmental issues over time. The environmental task group will spearhead the EMS program — the owner, plant manager, quality manager, safety manager, plant supervisor/environmental coordinator, and a representative from production staff are actively involved. The key to success in a small company appears to be the **team approach**, since there is often no one that can be solely dedicated to managing environmental affairs.

Since finding the time to do employee **training** can be a challenging aspect of running a small business, Milan Screw Products has scheduled training sessions a half hour before or after the employees' normal shift. Their best success has been with "brown bag" sessions where the employees bring their lunches, listen to the training presentation, and remain "on-the-clock" for their lunch/training period. Milan Screw Products has also found that videotaping training sessions can be helpful for new-hire training. The environmental task group has helped with training by gathering training materials.

The team approach that has been developed at Milan Screw Products has been an effective means of fostering good **internal communication** procedures. In addition, Milan Screw Products has gone beyond the requirements of the ISO 14001 Standard by soliciting the opinions of **external interested parties**. The company has found that a good external communication program has resulted in a lot of benefits because it builds trust. The company has been straightforward with its community about potential oil problems, and the community has been very supportive of their efforts and of their plans for a new facility. The external communication program helped them identify some of their environmental aspects, and has helped them to communicate with their customers. Milan Screw Products' customers appreciate that it is an environmentally-responsible company that is a leader in its industry.

Since Milan Screw Products has a registered quality management system, they have a sound **document control** program in place. As mentioned previously, a quality management system consultant helped the company with their ISO 9002 implementation, and the document control procedures for quality will be adapted where applicable for the EMS. Milan Screw Products is still in the process of establishing its EMS documentation.

As part of their brainstorming session, the environmental task group also listed potential emergencies. The company used this information when it reviewed its **emergency preparedness and response** procedures. The EMS implementation process helped the

company to consider possible areas of liability that it had previously overlooked (e.g. a delivery truck leak).

Checking and Corrective Action

Milan Screw Products has made some preliminary calculations of some of its environmental aspects. The new facility will facilitate the quantification of its environmental aspects and impacts. The company intends to build on its quality management system **corrective and preventive action** procedures to help them develop their EMS. In addition, the company intends to utilize some of the lessons it has learned about data collection and **monitoring and measurement** through its quality operating system and will apply these lessons to the EMS over time.

Milan Screw Products has gained experience with management system audits through its quality management system implementation. Top management has performed quality management system audits with the help of an auditor training guide that their quality management system consultant developed for their organization. The company has done in-house auditor training with the help of the guide and has used the auditor training guide for its **EMS audits** where applicable. Top management and the plant supervisor/environmental coordinator have performed an EMS audit, even though they have not yet fully implemented the ISO 14001 Standard.

Management Review

Milan Screw Products Management Review Board meets monthly. The company also performs an annual review of its operations. A third-party (consultant) is used to verify the results of the company's annual in-house review. The EMS is being incorporated in the management review process of the company.

The Milan Screw Products' Experience

While Milan Screw Products has not completely implemented its EMS, it has made **significant progress over 1 ½ years**. Due to the groundbreaking for the new facility in June 1996, the organization had to shift its priorities to new construction (it is now hoping to completely implement its EMS by April 1997). Top management at Milan Screw Products stated that organizations that choose to implement an EMS **should not get discouraged** if the EMS implementation needs to be set aside occasionally. You can start, stop, and resume your efforts as needed — your aspects won't change unless you change your processes or products — and any progress that you have made will still be there.

Milan Screw Products' top management believes that there are **numerous potential benefits** associated with a successful EMS. Specifically, the company determined that an EMS could improve employee retention, new hire selection, working conditions, and the perceptions of its suppliers, lenders, customers, neighbors, and regulators. The EMS will also ease management concerns that an environmental problem could arise from simple ignorance or lack of training. The company's top management has stated that it may be **difficult to perform a cost/benefit analysis** on the value of EMS implementation because several of the potential benefits are intangible and cannot be given a monetary value. Milan Screw Products'

proactive environmental program has improved its stature and **fostered communication with regulatory agencies**. Top management also believes that the company will benefit from being one of the first in their industry to successfully implement an EMS — it may encourage their customers to perceive the company as being more innovative, more responsible, and perhaps more desirable than their competitors. Top management has reported that it is **impossible to tally citations that are not written, fines that are not levied, nor lawsuits that are not filed**. Milan Screw Products' top management has also stated that many of the benefits of an EMS cannot be anticipated beforehand, and that an organization will discover them as pleasant surprises at some point after implementation.

To date, the **biggest challenge** that Milan Screw Products has encountered while implementing an EMS has been allocating the **human resources** to the EMS project while production demands are high. The company has also had to overcome old practices by explaining the rationale behind its desire to successfully implement an EMS.

Milan Screw Products has not calculated the **costs** of EMS implementation to date. Top management reports that it is difficult to attribute costs/benefits at this stage of EMS implementation, particularly since the company is in a transition phase due to the new construction. While it is too early to quantify costs and benefits, top management is confident that the benefits will outweigh the costs — early projections of their oil recovery savings at the new facility are estimated to be \$20,000 per year.

Milan Screw Products **will integrate its ISO 9002 quality management system with its ISO 14001 EMS**. The company is developing one manual that will incorporate both quality and environmental management system elements. For example, the organization has a quality policy on white paper and its environmental policy on blue paper on facing pages. The documents also refer to one another where appropriate. The document control programs for both systems will be fully integrated as well. In addition, the audit function will be integrated once auditor training for the EMS is complete.

Top management at Milan Screw Products has not determined if the company will pursue **EMS registration** in the future. Top management has stated that it will depend on factors such as costs and customer demand. The company intends to completely implement its EMS and will evaluate the need for registration next year. Top management has stated that obtaining EMS registration would be a great satisfaction and it may improve their customers' perception of the company, but it has not determined whether or not it can justify the costs.

Milan Screw Products encourages other small companies to implement an EMS because it believes that small companies may not have sufficient resources to mitigate environmental problems. An EMS can help a small or medium-sized organization **prevent** environmental problems which may keep a small company in business. Top management at Milan Screw Products has stated that an EMS enables an organization to look at its business from another perspective. Organizations have considered quality, safety, etc., as integral parts of their business and should look at their business from the environmental perspective as well. All of the various perspectives result in **greater opportunities for improving the organization as a whole**.

HACH COMPANY

Background

Hach Company is an international manufacturer and distributor of instruments and reagents for colorimetric testing, with annual sales over \$100 million. Hach Company manufactures spectrophotometers, colorimeters, turbidimeters, and portable testing equipment for the water and wastewater markets. The company manufactures instruments at its headquarters in Loveland, Colorado, and has a chemical manufacturing and distribution plant in Ames, Iowa. The Hach Company is **registered to ISO 9001 and is a member of the Chemical Manufacturers Association's Responsible Care® program.**

Hach Company participated in the EPA-sponsored EMS Demonstration Project at NSF International, and decided to pilot EMS implementation at its Ames facility. The Ames facility has approximately **300 employees** and faces environmental management challenges due to its many chemical production processes. The Ames facility is the only Hach facility that is currently participating in the CMA's Responsible Care® program. Hach Company **decided to implement an EMS at its Ames facility for several reasons.** The company felt that a sound EMS would: 1) provide assurance to the officers, board of directors, and company stockholders that the company will continue to meet regulatory compliance requirements and is prepared to handle other environmental issues; 2) provide a framework to maintain support and resources from senior management to meet environmental objectives and targets; 3) help create market opportunities for the organization; 4) be a mechanism to gauge environmental performance; and 5) help the company identify its responsibilities beyond compliance in order to meet the needs of stockholders, employees, neighbors, customers, vendors, and suppliers.

EMS Implementation

In order to examine the Ames facility's environmental strengths and weaknesses, the facility's Quality Director performed an **initial self-assessment** of the EMS. The Quality Director reviewed the EMS standard and interviewed the environmental safety and health staff at length. The Quality Director determined that the facility's EMS complied with approximately 30 percent of the EMS standard, which was consistent with the expectations of the Environmental, Safety and Health (ESH) staff at this early stage of EMS implementation. This process provided the ESH staff with a benchmark from which they could measure progress as they continued to improve the facility's EMS.

Policy

Hach Company had previously developed an environmental policy but added additional policies to completely fulfill the CMA's Responsible Care® Program's objectives, and the policy requirements of the EMS. Hach Company has issued its Corporate Environmental and Safety Policies which address continuous improvement, periodic assessments, product stewardship, regulatory compliance, operations, facilities, and employee health and safety. In addition, the President of Hach Company has issued The President's Commitment, which expresses top

management's commitment to environmental stewardship and safety for employees and customers.

Planning

In order to determine the Ames facility's **environmental aspects**, the environmental safety and health department reviewed the table of contents of their new ESH manual. The table of contents helped them to develop an informal environmental effects register and a safety register. The group then examined how environmental regulations affect their company; they examined federal requirements (e.g. Clean Water Act, Safe Drinking Water Act, Clean Air Act, etc.), in addition to state and local environmental regulations. The ESH staff proceeded to explore the facility's environmental aspects and resulting **impacts beyond those addressed by environmental regulations**. They always strive to *do the right thing* — even if it is not required by law. The group developed a three to four page document that focused on the facility's operations and processes and less on aspects such as energy use.

The group developed their environmental effects register to help them set **objectives and targets**. The ESH staff is taking a systematic approach to setting objectives and targets. While the EMS is still being developed, the objectives are focused at maintaining compliance and tackling issues that had previously been unresolved, such as waste disposal costs. One particularly important environmental issue for the company is determining the impact that the company's chemical products have on its international customers (35% of the company's products are sold internationally). These impacts will also be considered when setting objectives and targets.

The ESH staff have access to copies of federal and state regulations, manuals, journals, on-line resources, and software packages that help them to keep abreast of all pertinent environmental regulations and statutory requirements. While the company is very good at maintaining regulatory compliance, the procedures that they have developed for their **legal and other requirements** have helped to make their compliance activities more focused and efficient. The procedures that they follow to ensure compliance are properly documented and will protect the company in the event of employee turnover. The ESH staff at the Ames facility is developing extensive written procedures to address their compliance activities that are above and beyond those required by the ISO 14001 Standard.

Hach Company has staff members that are dedicated to managing the company's environmental, health, and safety issues; hence, the company rarely uses outside consultants. The **environmental management program** at the Ames facility is well positioned to meet its environmental objectives and targets.

Implementation and Operation

The ESH staff at the Ames facility believes that the **structure and responsibility** requirements of an EMS are easier to achieve in a medium-sized organization than in a large one. The staff at the Ames facility has been given the autonomy to implement an EMS at their facility without extensive corporate supervision. This has made the process easier because the lines of communication are shorter and the EMS can be focused on the operations of one facility.

The Ames facility has an excellent **training** program due in part to the commitment of resources in this area (the facility has a full-time ESH training coordinator). Implementing the

EMS has helped with the facility's ESH training by helping to define training objectives. The ESH staff is also developing procedures for all ESH training curricula. The documented procedures will describe the goals and objectives of training and establish a curriculum for applicable programs.

Internal communication within the Ames facility has improved due to EMS implementation. The ESH staff are working with members of the operations, design, and purchasing departments so that the groups can work together to set reasonable objectives and targets that complement the goals set by other departments within the organization. **Environmental issues are becoming an integral part of the business.**

The Ames facility is still in the process of completing its **EMS documentation**. The ESH staff started to develop an ESH manual in September 1995. The group was hoping to have the manual completed in one year; they now expect to complete it by May 1997. The ESH manual that is being developed by the Ames facility staff is somewhat unique in that it must be able to accommodate the extreme diversity of their operations — the manual must address over 6,500 chemicals (the Chemical Hygiene Program alone is described in approximately 90 pages).

The ESH staff at the facility includes two college students that are working at the facility as **temporary employees** to develop some of the documentation (i.e. procedures) necessary for a successful EMS. The students have been very helpful — they ask a lot of questions and explain the procedures clearly and without jargon. The ESH staff has also run some mock-drills or table-top exercises of its procedures.

Because Hach Company is registered to ISO 9001, the ESH staff has been able to learn valuable lessons from the quality management system staff, including information about **document control** practices. As the ESH staff began implementing their EMS, they discovered that they were not as good at document control as they had previously believed. The ESH staff has indicated that a sound document control system is crucial to a successful EMS — without it, sooner or later someone will be working from an old version of a procedure. The ESH staff has not used any software packages to revise their document control system; the system is managed electronically by a top ESH staff member.

Checking and Corrective Action

As mentioned previously, the ESH staff at the Ames facility are developing extensive written procedures to address their compliance activities including those that pertain to **monitoring and measuring activities**. These procedures will be included in the ESH manual. The ESH staff has the opportunity to build upon the facility's quality management system **corrective and preventive action** procedures to help them develop and successfully implement their EMS.

After the initial self-assessment audit which was performed by the Quality Director, the ESH staff performed an informal interim audit. The Quality Director performed a second formal **audit** of the EMS after one year of implementation. The ESH staff was pleased with the audit process because the quality management system staff had extensive experience with auditing management systems. The Quality Department acted as an independent party and performed a very thorough audit. The Quality Department has stressed that the ESH staff **must document how they do things**. There were times when the EMS element was in place but needed to be documented.

Management Review

The management review requirements in the ISO 14001 Standard have not been implemented at the Ames facility. The ESH staff members at the facility do not intend to fulfill the requirements of the management review section of the standard unless they decide to pursue EMS registration. They do not believe that the management review process adds value to the EMS until registration is sought. Hach Company believes that all other elements of an EMS can be implemented without management review.

The Hach Company Experience

The initial assessment of the Ames facility's EMS showed that the EMS complied with approximately 30 percent of the EMS Standard. After six months of fairly dedicated implementation efforts, the ESH staff successfully implemented approximately 58 percent of the Standard, and **after one year of implementation they have successfully implemented approximately 71 percent of the ISO 14001 Standard.** During this time, the ESH staff's primary goal was to continue to ensure regulatory compliance. EMS implementation efforts were carried out whenever time permitted.

Hach Company believes that there are numerous potential **benefits** associated with the successful implementation of an EMS (e.g. assurances to stakeholders; a framework to maintain support and resources from senior management; market opportunities; a mechanism to gauge environmental performance and to identify responsibilities beyond compliance). During the EMS implementation process, the Ames facility started to observe improvements in its environmental performance. Waste disposal costs dropped 70 percent in one year. The EMS was a contributing factor to the cost reduction, along with the company's quality focus and continuous improvement efforts.

Since the EMS has not been completely implemented and the system is relatively new, the **benefits have been hard to quantify, but they are there.** The EMS program helped to spearhead a major renovation program within the facility for safety and environmental improvements. Employees have started to ask questions and are carefully following procedures. In addition, the ESH Department is getting additional respect from other business units. The ESH staff will continue to ensure compliance and they are working closely with plant managers to minimize the impact of compliance activities on production. The ESH staff is now in the position to discuss why they want to go beyond compliance and what the business reasons are for doing so.

One of the **challenges** that the ESH staff at the Ames facility experienced as they implemented the EMS, was the difficulty they had driving the EMS down through the organization and up through the management. The ESH function is often viewed as a separate entity in many organizations and not an integral part of the business. This perception was initially a barrier to EMS implementation. ESH is now viewed as a more integral part of the operation.

The implementation of the EMS and its associated **costs** can be difficult to quantify. The ESH staff does not intend to complete a comprehensive analysis of EMS implementation costs

unless the organization chooses to further explore EMS registration. To date, the most significant costs are due to personnel expenditures and office supplies. The ESH staff at the Ames facility has estimated that if the facility had to start from scratch, EMS implementation over a two-year period would cost approximately \$20,000 - \$30,000 per year. Hach Company estimates that a company must be willing to commit at least one person-year to implementation of an EMS. The ESH staff cautioned that some of the costs of implementation can be hidden, but must be accounted for (e.g., indirect labor, training, etc.). The Ames facility spent approximately \$5,000 on supplies and printing costs for EMS implementation. The ESH staff reported that initially the costs of EMS implementation can outweigh the benefits, but an EMS can help prevent an environmental problem and strengthen an organization's commitment to be a good corporate citizen.

Currently, there are **no plans to integrate the ISO 14001-based EMS and ISO 9001 programs** at the Ames facility. The quality management system staff has suggested that operating parallel systems is the best approach for both the ESH and quality departments at this time. The quality management system was adapted from existing procedures and could possibly be more efficient; the EMS has the opportunity to start from scratch and may be able to develop elements that are more effective and more appropriate for ESH issues. In addition, the quality management system staff are hesitant about fully integrating an "immature" EMS into their quality management system in the event that it might jeopardize the company's ISO 9001 registration status. In the event that the company chooses to pursue EMS registration, the issue of integration will be revisited, because integration could result in synergy and cost-savings for both programs.

Hach Company has not determined if it will pursue **EMS registration**. The company will "wait and see" if market forces, particularly demands from their international customers, and potential regulatory incentives will provide sufficient benefits to offset the costs of registration. The ESH staff may not attempt to comply with the remaining 20 - 25 percent of the ISO 14001 Standard unless the company decides to pursue EMS registration. In the event that the company decides to pursue EMS registration, the ESH staff is confident that it will be easy to put the remaining elements in place, given sufficient notice, time, and planning.

While questions remain about the value of EMS registration, Hach Company has been able to make some conclusions about EMS implementation at its Ames facility. There were concerns initially about the EMS fitting within the company's culture, but the ESH staff is pleased to report that the EMS has helped to bring about a positive culture change within the organization. The EMS approach agrees with the company's audit policies and procedures, because it fosters a systematic approach that lends itself to reevaluation. In addition, the process of evaluating the strengths and weaknesses of the facility's EMS has identified opportunities for improvement. **Hach Company believes that it has benefited from assessing and improving the EMS at its Ames facility.**

Appendix B

Background on EMS Standards

The Development of ISO 14000

The **International Organization for Standardization (ISO)** is responsible for the development of the ISO 14000 series of international environmental management standards. ISO was founded in 1946 and its headquarters is located in Geneva, Switzerland. ISO has developed international voluntary consensus standards for manufacturing, communication, trade, and management systems. Its mission is to promote international trade by harmonizing standards. Over 100 countries have national standards bodies that are members of ISO. The American National Standards Institute (ANSI) is the U.S. representative to ISO.

In June 1991, ISO created the **Strategic Advisory Group on the Environment (SAGE)**. SAGE assessed the need for international environmental management standards and recommended that ISO move forward with their development. In January 1993, ISO created **Technical Committee 207 (TC 207)** which is charged with the development of the ISO 14000 series of standards. TC 207 is comprised of various subcommittees and working groups. Representatives from the ISO member countries contribute their input to TC 207 through national delegations.

In the United States, the **U.S. Technical Advisory Group (U.S. TAG)** develops the U.S. position on the various ISO 14000 standards. The U.S. TAG is comprised of approximately 500 members representing industry, government, not-for-profit organizations, standards organizations, environmental groups, and other interested stakeholders. The U.S. TAG has the largest number of members of any ISO member delegation. There are several organizations involved in the administration of the U.S. TAG's input to TC 207, including: ANSI; the American Society for Testing and Materials (ASTM); the American Society for Quality Control (ASQC); and NSF International.

TC 207 is developing the ISO 14001 Standard which specifies requirements for an environmental management system (the ISO 14001 Standard is the standard to which an organization's EMS would be registered). In addition to ISO 14001, several guidance documents are also being developed by TC 207. (See Annex B, Table I). The documents being produced are in various stages of development. ISO 14001, ISO 14004 (an EMS guidance document), and three environmental auditing guidelines (ISO 14010, ISO 14011, and ISO 14012), were finalized and published in September 1996. Published ISO standards must be reviewed and revised every five years.

The Emergence of EMS Standards

Numerous factors have contributed to the emergence of EMS standards. The following is a

brief overview of some of the major contributing factors.

ISO 9000

The ISO 9000 series of international quality management standards was published in 1987. The standards were created to promote consistent quality practices and to facilitate international trade. The ISO 9000 series of standards has been adopted by more than 80 countries and is used as a benchmark for quality management by industry and government bodies worldwide. In some cases, ISO 9000 registration has become a prerequisite for doing business domestically and internationally. In North America, over 13,000 companies are registered to ISO 9000.

The quality management system framework can serve as a foundation for environmental management systems. In essence, an EMS is the application of quality management system principles to the management of environmental affairs. While the ISO 9000 and ISO 14001 standards have different focuses, they share similar requirements. (See Annex B, Table II). The three specification documents for ISO 9000 series are ISO 9001, ISO 9002, and ISO 9003. The key difference between ISO 9000 and ISO 14001 is that ISO 14001 requires planning steps to identify environmental aspects and significant environmental impacts which become the basis of continual improvement, whereas ISO 9000 focuses on consistency of process.

Sustainable Development

In 1987, the World Commission on Environment and Development (**Brundtland Commission**) coined the term “sustainable development” in its report entitled *Our Common Future*. This report emphasized the need to balance environmental protection and economic growth.

In 1991, the **International Chamber of Commerce (ICC)** created the ***Business Charter for Sustainable Development***. The ICC Charter is comprised of sixteen Principles for environmental management that foster sustainable development. The Principles in this document include some of the basic elements of environmental management systems.

In 1992, the United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro. The conference, also called the Earth Summit (or Rio Summit), resulted in two noteworthy documents — *Agenda 21* and the *Rio Declaration*. ***Agenda 21*** is a comprehensive guidance document for sustainable development, while the ***Rio Declaration*** is a set of 27 principles for achieving sustainable development.

The international initiatives on sustainable development marked the dawning of a new age in environmental protection. The business community worldwide was asked to consider its impact on the environment and to take steps to mitigate that impact.

Private Sector Programs & Public Concern for the Environment

Private sector programs, such as the Chemical Manufacturers Association’s Responsible Care[®] program, the Global Environmental Management Initiative (GEMI), and the Coalition for Environmentally Responsible Economies (CERES) Principles (formerly the Valdez Principles),

resulted in model codes of conduct that encourage environmental stewardship. In addition, public concern for the environment has provided strong motivation for the development of EMS standards.

National EMS Standards & Regional EMS Legislation

In 1992, the British Standards Institute published **BS 7750**, the first national standard for environmental management systems. The British Standards Institute had previously published BS 5750 (a national quality management system standard) which was a significant contribution to the development of ISO 9000. ISO 14001 was largely based on BS 7750, and the two standards share many similar requirements. The BS 7750 Standard, however, is viewed by many to be more stringent than ISO 14001. For example, BS 7750 requires that an organization compile a register of its significant environmental effects, and a register of all legislative, regulatory, and other policy requirements. In addition, BS 7750 requires an organization to make its environmental objectives publicly available.

Following the publication of the United Kingdom's BS 7750, a proliferation of national EMS standards emerged, including standards from Ireland, France, South Africa, and Spain. The various EMS standards did not all share the same requirements, and in some cases the requirements were contradictory. It became clear that in order to facilitate international trade, there would have to be one international EMS standard that would be accepted around the globe.

In addition to the national EMS standards, regional EMS legislation was developed. The **Eco-Management and Audit Scheme (EMAS)** was adopted by the European Union (EU) in 1993. EMAS is a regulation that enables industries to voluntarily implement formal environmental management systems in order to improve their environmental performance. While ISO 14001 and BS 7750 apply to organizations (or parts thereof), EMAS is restricted to site-specific industrial activities. EMAS participants must prepare an environmental statement specific to each site concerned, and provide information to the public about their environmental aspects. Third-party verification of the EMS is an essential component of EMAS. Participating organizations are included on the EU list of participating sites.

Documents Being Produced by TC 207's Subcommittees and Working Groups:

ANNEX B, TABLE I

Subcommittee	Document #	Title
1	14001	<i>Environmental Management Systems - Specification with Guidance for Use</i>
	14004	<i>Guidelines on Environmental Management Principles, Systems, and Supporting Techniques</i>
2	14010	<i>Guidelines for Environmental Auditing - General Principles on Environmental Auditing</i>
	14011	<i>Guidelines for Environmental Auditing - Audit Procedures for Environmental Management Systems</i>
	14012	<i>Guidelines for Environmental Auditing - Qualification Criteria for Environmental Auditors</i>
	14015	<i>Environmental Site Assessments</i>
3	14020	<i>Goals and Principles of All Environmental Labeling</i>
	14021	<i>Environmental Labels and Declarations - Environmental Claims - Terms and Definitions</i>
	14022	<i>Environmental Labels and Declarations - Self Declaration Environmental Claims - Symbols</i>
	14023	<i>Environmental Labels and Declarations - Self Declaration Environmental Claims - Testing and Verification</i>
	14024	<i>Environmental Labels and Declarations - Environmental Labeling Type 1 - Guiding Principles and Procedures</i>
	14025	<i>Type III Labeling</i>
4	14031	<i>Evaluation of Environmental Performance</i>
5	14040	<i>Life Cycle Assessment - Principles and Framework</i>
	14041	<i>Life Cycle Assessment - Life Cycle Inventory Analysis</i>
	14042	<i>Life Cycle Assessment - Impact Assessment</i>
	14043	<i>Life Cycle Assessment - Interpretation</i>
6	14050	<i>Terms and Definitions</i>
Working Group 1	ISO Guide 64	<i>Guide for the Inclusion of Environmental Aspects in Product Standards</i>

Linkages Between ISO 9000 and ISO 14001

ANNEX B, TABLE II

ISO 9000 (9001[*], 9002^{**}, or 9003^{***}) Quality Management Systems	ISO 14001 Environmental Management Systems
Quality Policy	Environmental Policy
Resources	Resources
Organization	Structure & Responsibility
Training	Training
Management Representative	Management Representative
Process Control	Operational Control
System Documentation	System Documentation
Document Control	Document Control
Inspection & Testing	Monitoring & Measurement
Corrective & Preventive Action	Non-conformance and Corrective & Preventive Action
System Audits	System Audits
Management Review	Management Review

^{*} ISO 9001: *Quality Systems – Model for Quality Assurance in Design/Development, Production, Installation and Servicing.*

^{**} ISO 9002: *Quality Systems – Model for Quality Assurance in Production, Installation and Servicing.*

^{***} ISO 9003: *Quality Systems – Model for Quality Assurance in Final Inspection and Test*

Note: This table does not represent a comprehensive comparison of ISO 9000 and ISO 14001.

Appendix C

Sources of Information and Other Contacts

(Note: This list is not intended to be comprehensive. Appearance on this list should not be construed as an endorsement by NSF of any products/services listed here.)

FEDERAL AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
	<i>Hotlines</i>		
US EPA	Center for Environmental Research Information	513/569-7562	
	Small Business Compliance Assistance Centers:	General Information: 202/564-7066	Centers are Internet Web Sites with:
	<ul style="list-style-type: none"> ■ National Metal Finishing Resource Center 	202/564-7013 http://cai.eclipse.net/home2.htm	Comprehensive environmental compliance, technical assistance, & pollution prevention information for metal finishing industry.
	<ul style="list-style-type: none"> ■ Printers' National Compliance Assistance Center 	202/564-7041 http://www.hazard.uiuc.edu/pneac/pneac.html	Complete compliance assistance & pollution prevention information for printing industry.
	<ul style="list-style-type: none"> ■ GreenLink™ - The Automotive Compliance Information Assistance Center 	1-888-GRN-LINK - or - 202/564-7032 for voice, facsimile or mailed information. http://www.ccar-greenlink.org	Information on a variety of topics, e.g., used oil management, storm water, USTs, antifreeze, hazardous waste, and pollution prevention alternatives.
	<ul style="list-style-type: none"> ■ The National Agriculture Compliance Assistance Center 	913/551-7207 http://es.inel.gov/oeca/ag/aghmpg.html	Environmental compliance and pollution prevention information for the agriculture community.
	(Planned Centers:		
	<ul style="list-style-type: none"> • Chemical Manufacturers Center • Printed Wiring Board Center) 	202/564-7071 202/564-7124	
	Pollution Prevention Clearinghouse	202/260-1023	Technical Information on materials and processes, including publications related to waste minimization and pollution prevention.

FEDERAL AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
	Public Information Center	202/260-7751	General information about EPA programs.
	RCRA / Superfund Hotline	800/424-9346 202/382-3000	Provides information about hazardous waste regulations and handles requests for federal documents and laws.
	Small Business and Asbestos Ombudsman	800/368-5888 202/557-1938	Information and advice on compliance issues for small quantity generators of hazardous waste.
	Technology Transfer and Support Division	513/569-7562	Access to the Office of Research and Development's research information and publications.
	TSCA Hotline	202/554-1404	Assistance and guidance on TSCA regulations.
	<u>Internet and On-line Resources</u>		
	Enviro\$en\$e	http://es.inel.gov/	Solvent alternatives, international, federal and state programs, other research and development. Also, environmental profiles of various industrial categories.
	US EPA Home Page	http://www.epa.gov	Information about EPA regulations, initiatives, and links to the home pages of other governmental agencies and EPA regional offices.
	<u>Hotlines</u>		
U.S. Small Business Administration	SBA Answer Desk	1-800-8-ASK-SBA	Information about SBA programs, and telephone numbers for local offices.

FEDERAL AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
	<u>Internet and On-line Resources</u>		
	SBA Home Page	http://www.sbaonline.sba.gov/	Information about business services available to your organization, with links to other related sites.
	<u>Hotlines</u>		
Government Printing Office	GPO Superintendent of Documents	202/512-1800	Information about available documents and instructions on ordering GPO publications.
	<u>Internet and On-line Resources</u>		
US Department of Energy	Pollution Prevention Information Clearinghouse	http://www.er.doe.gov/production/esh/epic.html	Pollution prevention and environmental design information.

STATE AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
State Environmental Protection Agencies	Environmental Assistance Programs	Contact your state's Environmental Protection Agency	Many state environmental protection agencies provide publications, technical assistance, and information on pollution prevention technologies, waste reduction, and regulatory compliance, at little or no charge.
	Small Business Assistance Programs (Mandated under Title V of the Federal Clean Air Act).	Call the EPA Small Business Ombudsman (800/368-5888) for the phone number and address of the Small Business Assistance Program in your state.	Provides information and technical assistance to small businesses regulated under the Clean Air Act.
	State and Local Pollution Prevention Programs	Contact the National Pollution Prevention Roundtable (202/466-7272) for the phone number and address of the pollution	Provides information and technical assistance on pollution prevention.

STATE AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
		prevention program in your state.	
	<u>Internet and On-line Resources</u>		(The following is only a sample of the information available on the Internet from state agencies. Ask your state environmental protection agency if they have on-line resources, or access these agencies through the EPA home page.)
State Environmental Protection Agencies (cont'd)	Michigan Department of Environmental Quality	http://www.deq.state.mi.us	Fact sheets, training, and technical assistance.
	Minnesota Technical Assistance Program	http://es.inel.gov/techinfo/facts/mpca/mpca.html	Fact sheets on pollution prevention, materials substitution.
	Ohio Department of Environmental Protection	http://arcboy.epa.ohio.gov	Fact sheets on pollution prevention, materials substitution.
	Wisconsin Department of Natural Resources	http://es.inel.gov/techinfo/facts	Fact sheets on pollution prevention, materials substitution.

TRADE ASSOCIATIONS

Association	Telephone Number	Description
American Electroplaters & Surface Finishers Society	407/281-6441	An International professional organization of electroplaters and surface finishers.
American Gas Association	703/841-8400	Comprised of individuals and companies in the gas, pipeline, and utility industries.
American Paper Institute	212/340-0600	Association of over 175 pulp and paper manufacturers.
American Petroleum Institute	202/682-8000	Maintains a collection of journals, industry publications, and research reports.

TRADE ASSOCIATIONS

Association	Telephone Number	Description
Cement Kiln Recycling Coalition	202/789-1945	Promotes energy recovery of combustible hazardous wastes in cement kilns.
Chemical Manufacturers Association	703/741-5000	Association of over 180 chemical manufacturers that work to promote environmental, occupational safety, and other issues.
The Chlorine Institute	202/775-2790	Association of companies that produce, process, package, transport, and use liquid and gaseous phase chlorine.
Council for Solid Waste Solutions	202/371-5319	A plastics industry organization that promotes reuse and recycling of plastic.
Electric Power Research Institute	415/855-2000	Provides information related to all aspects of electric power.
Governmental Refuse Collections & Disposal Association	301/585-2898	Association of officials from public agencies and private corporations that work towards improvements in solid waste management.
Institute of Chemical Waste Management	202/244-4700	Industry and public agency officials that deal with chemical waste.
National Association of Chemical Recyclers	202/986-8150	Association of hazardous waste recycling companies that promote environmentally-friendly recycling technologies.
The National Pollution Prevention Roundtable	202/466-7272 http://es.inel.gov/nppr	The largest membership organization in the United States devoted solely to pollution prevention. Provides publications related to pollution prevention.
National Solid Waste Management Association	202/244-4700	Association of 2,500 private organizations involved in the solid waste industry.
Precision Machined Products Association	216/526-0300 http://www.pmpa.org	Association of over 500 metal-turning companies.
The Society of the Plastics Industry	202/371-5200	Serves as the voice of the plastics industry.

PROFESSIONAL ASSOCIATIONS

Association	Telephone Number	Description
Air and Waste Management	412/232-3444	An international technical, scientific and educational organization that

Association

provides a forum for viewpoints on environmental issues. Endorses the Qualified Environmental Professional credential.

PROFESSIONAL ASSOCIATIONS

Association	Telephone Number	Description
Institute for Hazardous Materials Management	301/984-8969	An organization that promotes professional practice in the field of hazardous materials management. Provides recognition (via credentials) to professionals working in environmental health and safety fields.
National Association of Environmental Professionals	202/331-9659	An international professional association dedicated to the promotion of ethical practice, technical competency, and professional standards in the environmental field. Endorses the Certified Environmental Professional credential.
National Environmental Training Association	602/956-6099	An international professional association that promotes quality, standards, and competency in the environmental training field. Operates the Certified Environmental Trainer program.
National Registry of Environmental Professionals	847/724-6631	An organization that provides a variety of professional credentials in the environmental field.

NON-PROFIT ORGANIZATIONS

Organization	Address	Phone Number	Description
Industrial Technology Institute (ITI)	2901 Hubbard Road P.O. Box 1485 Ann Arbor, Michigan 48106-1485	1-800-292-4484 Fax: 1-313-769-4064	Offers technical assistance to small and mid-sized manufacturers. Performs energy, environment, and manufacturing assessments, as well as performance benchmarking, and QS 9000 and ISO 14000 implementation assistance and training.
Manufacturing Extension Partnership (MEP)	Building 301, Room C121 National Institute of Standards and Technology Gaithersburg, Maryland 20899-	1-301-975-5020 1-800-MEP-4MFG Fax: 1-301-963-	Assists manufacturers with assessing technological needs, and works to help small manufacturers solve environmental problems

OTHER INTERNET AND ON -LINE RESOURCES

Resource	Internet Address	Description
ANSI Online	http://www.ansi.org	Contains information related to the American National Standards Institute, including meetings, events, and standards information databases.
Business Resource Center	http://www.kciLink.com/brc	Provides information on a variety of topics, including tips on management, recycling, and financing.
Canadian Standards Association	http://www.csa.ca/isotcs	A center for information and services related to ISO 9000 and ISO 14000, maintained by the Canadian Standards Association.
Clean Technologies Center (UCLA)	http://cct.seas.ucla.edu	Innovative technologies for pollution prevention.
Consortium on Green Design and Manufacturing (UC-Berkeley)	http://euler.berkeley.edu/green/cgdm.html	Environmental design and sustainable development.
Environmental Technology Gateway	http://iridium.nttc.edu/environmental.html	Access to other environmental links and information, environmental technologies.
Industrial Technology Institute Home Page	http://www.iti.org	Information about ITI, how to find environmental information on the Internet, and links to other organizations.
ISO 14000 Information Center	http://www.iso14000.com	Answers to questions on ISO 14000 standards.
ISO 14000 Integrated Solutions (ANSI/GETF)	http://www.gnet.org	Will provide training, conferencing, on-line information services and publications on a fee basis.

ISO Online	http://www.iso.ch	The ISO homepage provides information on ISO, its structure, members, technical committees, meetings, and events.
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OTHER INTERNET AND ON -LINE RESOURCES

Resource	Internet Address	Description
National Environmental Information Resources Center (NEIRC)	http://www.gwu.edu/~greenu/	Provides access to a wide variety of information about environmental matters, with links to hundreds of organizations.
NSF Home Page	http://www.nsf.org	Contains information on NSF International and its pilot projects in EMS implementation. NSF is one of the administrators of the U.S. Technical Advisory Group to TC 207 and one of the official sources of the ISO 14000 standards.
SM Stoller	http://www.stoller.com	Maintained by SM Stoller, this homepage contains updates on ISO 14000.

PUBLICATIONS

Title	Source	Telephone Number	Description
<i>Business Waste Reduction - Creating an Action Plan</i>	Michigan Department of Environmental Quality - Environmental Assistance Division	1-517-373-9400	A workbook with sections on Organization and Policy, Data Collection and Analysis, Identifying Waste Reduction Opportunities, Monitoring and Evaluating Program Success; and Implementation Resources.
<i>EMS Self-Assessment Tool for ISO 14001</i>	NSF International	1-800-NSF-MARK	A tool to help organizations benchmark their environmental management systems against the requirements of ISO 14001. The tool contains all the requirements

from the Standard in exact language.

PUBLICATIONS

Title	Source	Telephone Number	Description
<i>Environmental Help for Small Manufacturers</i>	Michigan Manufacturing Technology Center/Small Business Development Center	1-313-769-4554 Fax: 1-313-769-4064	Contains information about integrated environmental management, regulatory issues, pollution prevention, spill prevention, and environmental checklists.
<i>The ISO 14000 Handbook</i>	CEEM Information Services	1-800-745-5565 1-703-250-5900 Fax: 1-703-250-5313	A comprehensive guide to ISO 14000 implementation and EMS certification.

AUTHORIZED SOURCES OF THE ISO 14000 STANDARDS

NSF International (NSF)	Phone: 1-800-NSF-MARK Fax: 1-313-769-0109	Orders by mail: Attn: Publications P.O. Box 130140 Ann Arbor, MI 48113-0140
American National Standards Institute (ANSI)	Phone: 1-212-642-4900 Fax: 1-212-398-0023	11 West 42 nd Street New York, NY 10036
American Society for Quality Control (ASQC)	Phone: 1-414-272-8575 Fax: 1-414-272-1734	Milwaukee, WI
American Society for Testing and Materials (ASTM)	Phone: 1-610-832-9585 Fax: 1-610-832-9555	West Conshohocken, PA

Glossary of Acronyms

ANSI	American National Standards Institute
API STEP	American Petroleum Institute's "Strategies for Today's Environmental Partnership"
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERES	Coalition for Environmentally Responsible Economies
CFC's	Chlorofluorocarbons
CMA	Chemical Manufacturers Association
CWA	Clean Water Act
EHS	Environment, Health and Safety
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
EPA	(Also USEPA) U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
HMTA	Hazardous Materials Transportation Act
ICC	International Chamber of Commerce
ISO	International Organization for Standardization
ITI	Industrial Technology Institute
MEP	Manufacturing Extension Partnership
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
SBA	U.S. Small Business Administration
SPCC	Spill Prevention Control and Countermeasure
TC 207	Technical Committee 207 (of ISO)
TSCA	Toxic Substances Control Act
TQM	Total Quality Management
USTAG	U.S. Technical Advisory Group (to TC 207)
VOC's	Volatile Organic Compounds

Bibliography

- Canadian Standards Association, *Competing Leaner, Keener and Greener: A Small Business Guide to ISO 14000*, 1995.
- Cascio, Joseph, editor. *The ISO 14000 Handbook*. CEEM Information Services with ASQC Quality Press, 1996.
- Diamond, Craig P., "Voluntary Environmental Management System Standards: Case Studies in Implementation." *Total Quality Environmental Management*, (Winter 1995/1996), pp. 9-23.
- Institute of Quality Assurance, *Quality Systems in the Small Firm: a Guide to the Use of the ISO 9000 Series*, March 1995.
- International Organization for Standardization, *ISO 14001: Environmental Management Systems - Specification with Guidance for Use*. 1996.
- International Organization for Standardization, *ISO 14004: Environmental Management Systems - General Guidelines on Principles, Systems, and Supporting Techniques*. 1996.
- Kuhre, W. Lee, *ISO 14001 Certification: Environmental Management Systems* , Prentice Hall, 1995.
- Michigan Department of Commerce and Natural Resources, Environmental Services Division, *Business Waste Reduction: Creating An Action Plan*. November 1994.
- Tibor, Tom with Ira Feldman, *ISO 14000: A Guide to the New Environmental Management Standards* , Irwin Professional Publishing, 1996.
- The United Nations Environment Programme (UNEP), the International Chamber of Commerce (ICC), and the International Federation of Consulting Engineers (FIDIC). *Environmental Management System Training Resource Kit*. Version 1.0, December 1995.
- The United States Postal Service, *Environmental Resources Handbook*. November 1995.
- Voehl, Frank; Jackson; and Ashton, *ISO 9000: An implementation Guide For Small and Mid-Sized Businesses* , St. Lucie Press, 1994.

APPENDIX D

TOOL KIT

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Sample Environmental Policies

NEO INDUSTRIES

HEALTH, SAFETY AND ENVIRONMENTAL POLICY

Neo Industries is committed to managing health, safety and environmental (HS&E) matters as an integral part of our business. In particular, it is our policy to assure the HS&E integrity of our processes and facilities at all times and at all places. We will do so by adhering to the following principles:

Compliance

We will comply with all applicable laws and regulations and will implement programs and procedures to assure compliance. Strict compliance with HS&E standards will be a key ingredient in the training, performance reviews and incentives of all employees.

Where existing laws and regulations are not adequate to assure protection of human health, safety and the environment, we will establish and meet our own HS&E quality standards.

Prevention

We will employ management systems and procedures specifically designed to prevent activities and / or conditions that pose a threat to human health, safety or the environment. We will minimize risk and protect our employees and the communities in which we operate by employing safe technologies and operating procedures, as well as being prepared for emergencies.

We will strive to prevent releases to the atmosphere, land or water. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste.

Communication

We will communicate our commitment to HS&E quality to our employees, vendors and customers. We will solicit their input in meeting our HS&E goals and in turn will offer assistance to meet their goals.

Continuous Improvement

We will continuously seek opportunities to improve our adherence to these principles, and will periodically report progress to our stakeholders.

{Signature}
Neil K. Holt
President

March 1995

Pacific Gas and Electric Company

Environmental Quality Policy Statement

PG&E is committed to a clean, healthy environment. We will provide our customers with safe, reliable, and responsive utility service in an environmentally sensitive and responsible manner. We believe that sound environmental policy contributes to our competitive strength and benefits our customers, shareholders, and employees by contributing to the overall well-being and economic health of the communities we serve.

We will:

Comply fully with the letter and spirit of environmental laws and regulations, and strive to secure fundamental reforms that will improve their environmental effectiveness and reduce the cost of compliance.

Consider environmental factors and the full acquisition, use, and disposal costs when making planning, purchasing, and operating decisions.

Work continuously to improve the effectiveness of our environmental management.

Provide appropriate environmental training and educate employees to be environmentally responsible on the job and at home.

Monitor our environmental performance regularly through rigorous evaluations.

Seek to prevent pollution before it is produced, reduce the amount of waste at our facilities, and support pollution prevention by our customers and suppliers.

Manage land, water, wildlife, and timber resources in an environmentally sensitive manner.

Use energy efficiently throughout our operations, and support the efficient use of gas and electricity by our customers and suppliers.

Re-use and recycle whenever possible.

Use environmentally preferred materials.

Clean up residual pollution from past operations in a cost-effective manner.

Work cooperatively with others to further common environmental objectives.

Communicate and reinforce this policy throughout the company.

September 1995

(Actual policy is printed on recycled paper)

Sample Policy — Actual policy reproduced with permission. Policy is not in original format.

EMS Addendum

Statement of Corporate Environmental Policy

Milan Screw Products Inc. is committed to continual improvement of its Environmental Management System (EMS), which includes waste minimization, the prevention of pollution, and compliance with all relevant federal, state, and local environmental legislation and regulations. The company will meet or exceed the environmental requirements of other organizations to which Milan Screw Products subscribes. To sustain this commitment, the requirements of the Environmental Management System described in this Manual applies to all activities, equipment, material and employees.

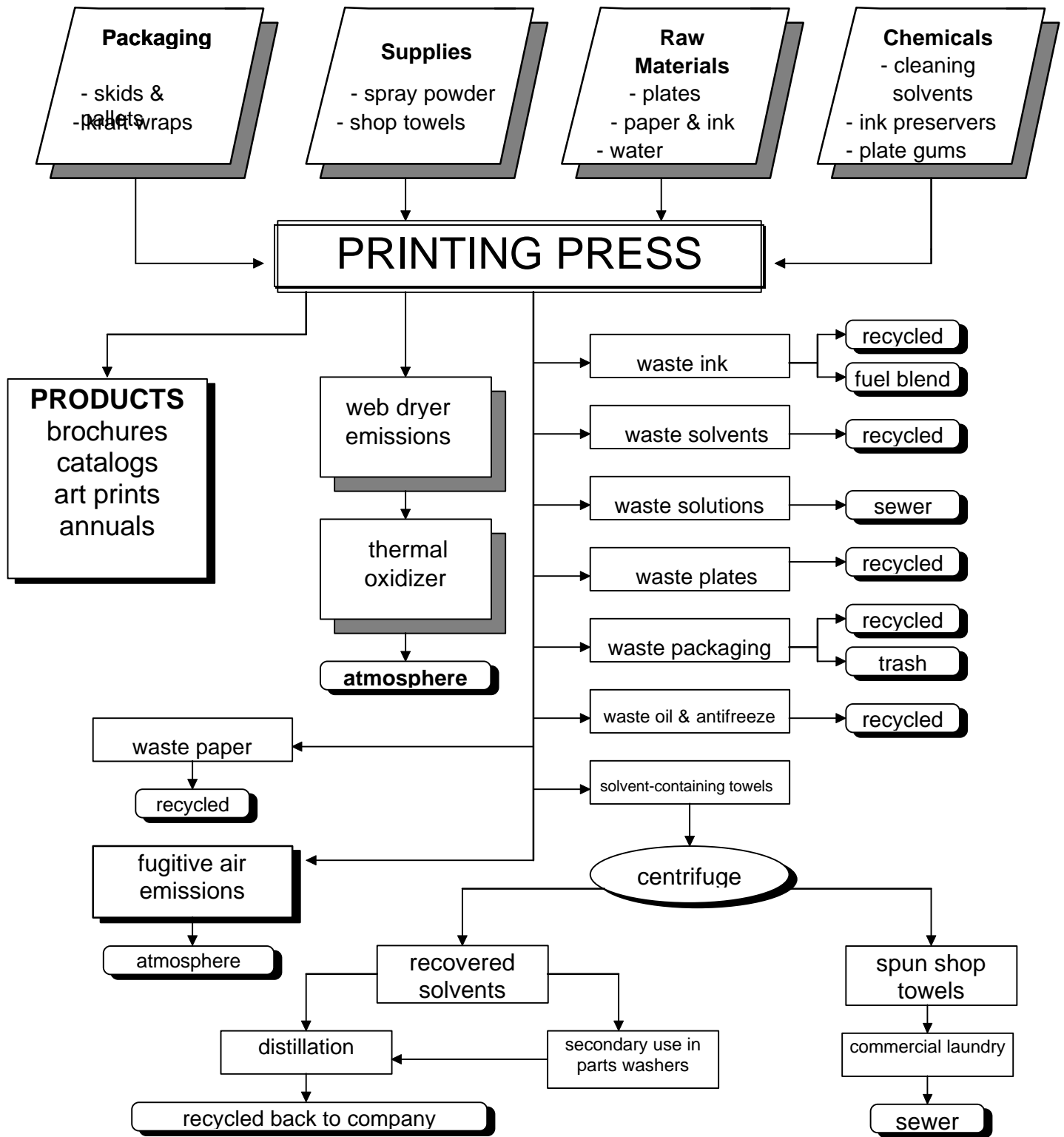
The company's Environmental Compliance Officer is the company's EMS Management Representative who has the responsibility and authority to plan, enforce, and maintain the company's Environmental Management System. This responsibility also includes stoppage of activities that deviate from the requirements of this Manual. The Environmental Compliance Officer, with the assistance of the Environmental Task Group, will propose annual targets and objectives to be approved by the Management Review Board.

The EMS Management Representative may delegate some of this authority downward through the organization in order to effectively implement the system.

Charles Tellas
President and CEO

December 10, 1995

Sample Process Flow Chart



Descriptions of Environmental Aspect Identification Techniques

TECHNIQUES FOR IDENTIFYING AND EVALUATING ENVIRONMENTAL IMPACTS

Process Hazard Analysis	Used to identify and assess potential impacts associated with unplanned releases of hazardous materials. Methods in common use (due to OSHA Process Safety Management regulations), but some subjective. Typically uses team approach to identify and rank hazards.
Emission Inventory	Used to quantify emissions of pollutants to the air. Some data may already be available to the organization, based on EPCRA requirements and CAA Title V permitting program.
Environmental Impact Assessment	Used to satisfy requirements of National Environmental Policy Act (NEPA) regarding the evaluation of environmental impacts associated with proposed projects. Methodology is in common use, but is not typically used to assess environmental impacts associated with existing operations.
Life Cycle Assessment	Used to assess full range of impacts from products, from raw material procurement through product disposal. Emerging methods somewhat subjective and can be resource intensive. Methods will be described in developing ISO 14000 standards.
Design for the Environment	Used to incorporate environmental considerations into product design. Methods currently under development.
Pollution Prevention or Waste Minimization Audits	Used to identify opportunities to reduce or eliminate pollution at the source and to identify recycling options. Requires fairly rigorous assessment of facility operations. Typically does not examine off-site impacts.
Environmental Property Assessments	Used to assess potential environmental liabilities associated with facility or business acquisitions or divestitures. Scope and level of detail is variable. Typically does not assess impacts associated with products or services.
Risk Assessment	Used to assess potential health and/or environment risks typically associated with chemical exposure. Variety of qualitative and quantitative methods in common use.
Environmental Cost Accounting	Used to assess full environmental costs associated with activities and/or products. Emerging protocols require comprehensive assessment to quantify costs.
Environmental Compliance Audits	Used to assess compliance with federal, state and local environmental regulations. Methods in common use. Scope and detail vary, but typically not directed at examining environmental impacts (particularly for products).
Project Safety / Hazard Reviews	Used to assess and mitigate potential safety hazards associated with new or modified projects. Methods in

	common use, but do not typically focus on environmental issues.
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Sample Procedure: Environmental Aspects Identification

EMS Procedure: Environmental Aspects Identification

I. Purpose

To identify the environmental aspects of the organization's activities, products and services in order to determine those which may have a significant impact on the environment.

II. Scope

This procedure covers all activities, services and products of the organization. For purposes of evaluation, activities, services and products with similar characteristics may be grouped.

A baseline evaluation will be conducted of existing products, activities, and services. The need for follow-up evaluations is determined based on changes in evaluation methodology or significant changes in the organization's mission, products, or processes.

III. Definitions

Environmental aspects- Components of the organization's activities, products and services that are likely to interact with the environment.

Environmental impact- Any change to the environment, whether adverse or beneficial, wholly or partially resulting from the activities, products and services of the organization.

IV. General

This procedure covers those environmental aspects of activities, products and services that the organization can control or over which it can be expected to have an influence. Significant environmental aspects identified through this process are considered in the setting of environmental objectives and targets.

The procedure consists of an initial screening of activities, products and services, based on available data by a cross-functional team of organization personnel. The cross-functional team assesses the environmental aspects, determines which of these might result in significant impacts, then sets priorities for further analysis, as needed.

The Company reviews the information developed during the evaluation on a regular basis to ensure that it is up-to-date.

V. Procedure

- A. The environmental manager assembles a cross-functional team to perform the evaluation. The team may include representatives from environmental, health & safety, product design, engineering, line management, maintenance, and shipping / receiving, or other functions as appropriate. Separate teams may be formed to evaluate particular groups of products, activities and services. The team may call upon other individuals in the organization, as needed.
- B. The team considers each of the stages in the life cycle of the organization's products, services and activities, including (where appropriate):
- pre-production or service strategy (design, procurement, etc.),
 - manufacturing,
 - production/distribution,
 - use / service, and
 - disposal / waste management.

Each product, service or activity is evaluated for environmental impacts in each of these areas; however, products, services or activities may be "grouped" such that those with similar characteristics can be evaluated concurrently. The team rates the product, service or activity (or groups of same) against the factors shown on Table 1 to identify those that may result in significant impacts.

- C. For purposes of this evaluation, "activities" are those activities that are not directly linked to a specific product, service or activity (such as equipment maintenance). Activities that are directly linked to the manufacture of a particular product are evaluated when that product is evaluated.
- D. Results of team findings are documented. If the team determines that additional information is needed to evaluate a particular product or activity, the Team Leader assigns the responsibility for collecting that information to an appropriate team member.
- E. The environmental manager is responsible for working with plant management to ensure that significant environmental aspects identified by the team are considered in setting environmental objectives and targets for the site. (See Procedure #).
- F. The results of the most recent environmental aspect / impact identification are reviewed as part of the Management Review process (See Procedure #). Based on this review, the organization's management determines the need to update the environmental impact evaluation. Factors such as improved assessment methodologies, or major changes to the organization's mission, products, and processes are considered in determining the need to update the assessment.

TABLE 1. SCORING GUIDE FOR ENVIRONMENTAL ASPECTS EVALUATION

For each product, service or activity (or group of products, services or activities), each element in the table will be assigned two scores:

Degree of Impact

- 4 = serious (likely to result in severe or widespread damage to human health or the environment)
- 3 = moderate
- 2 = minor
- 1 = no impact (unlikely to have an adverse impact on human health or the environment)

Frequency of Impact

- 4 = continuous (impact occurs on an on-going basis)
- 3 = frequent (impact occurs more than once / month)
- 2 = infrequent (impact occurs more than once / year, less than once / month)
- 1 = improbable / never (impact has never occurred or is highly unlikely)

<u>Category</u>	<u>Indicator</u>	Pre-Production	Manufacturing	Production/ Distribution	Use / Service	Waste Management
Human Health	Employees					
	Surrounding Community					
	Global					
Environment	Air Quality					
	Surface Water					
	Ground Water					
	Land / Soil					
	Ecosystem Effects					
	Noise					
Resource Use	Fuels					
	Water					
	Raw Materials					

Resources for Tracking Environmental Laws and Regulations

Resources for Tracking Environmental Laws and Regulations

(Note: This table describes a variety of commercial and non-commercial sources of information on federal and state environmental laws and regulations. This list is not intended to be comprehensive. Appearance on this list should not be construed as an endorsement by NSF of any commercial products listed here).

Source	Description
USEPA 1-800-368-5888	Regulatory explanations and guidance, research, case studies, contacts for additional information. Variety of hotlines available for particular statutes (such as RCRA). Internet access also available (http://www.epa.gov)
Small Business Assistance Programs (various states)	Guidance on regulations and compliance issues. Initially focused on clean Air Act requirements, but expanding into other environmental media.
US Small Business Administration	Various services available to small businesses in the US.
US Government Printing Office 1-202-512-1800	Federal Register published daily with all federal proposed and final rules. (Also available on line via <i>GPO Access</i>)
Trade and Professional Associations (various)	Provide a variety of services related to environmental laws and regulations, including regulatory updates and training. Contact individual associations for details.
Counterpoint Publishing 1-800-998-4515	CD-ROM and Internet dial-up access to legal / regulatory information for federal government and all 50 states, updated daily.
Bureau of National Affairs 1-800-372-1033	Information on EHS laws, regulations and activities at international, national, and state level. Paper and electronic access available.
Thompson Publishing Group 1-800-677-3789	Manuals on a variety of federal and state environmental programs with monthly updates and newsletters.
Achieve Technology, Inc.	Access to federal and state regulations with monthly, quarterly or annual updates on available on CD-ROM or diskette.
Business and Legal Reports, Inc. 1-800-727-5257	Access to federal and state regulations with monthly, updates on available on CD-ROM.
Elsevier Science, Inc. 1-212-633-3950	Publishes compliance manuals with regular update service for RCRA and Clean Air Act.

Sample Procedure: Tracking Environmental Laws and Regulations

EMS PROCEDURE: REGULATORY TRACKING AND ANALYSIS

I. Purpose

To ensure that the organization identifies, has access to, and evaluates laws, regulations, and internal organizational requirements that apply to the environmental aspects of its activities, products, and services.

II. Scope

This procedure covers laws, regulations, and other requirements established at the federal, state, and local level that apply to the environmental aspects of the organization's activities, services and products. The organization takes these requirements into account when setting its environmental objectives, as discussed in Procedure #.

III. Definitions

Applicable laws and regulations- Legal requirements promulgated by federal, state or local government authorities that apply to environmental aspects of the organization's products, activities or services.

IV. Procedure

- A. The environmental manager is responsible for tracking applicable laws and regulations, identifying those related to the organization 's activities, products and services. The environmental manager is also responsible for evaluating the potential impacts of these laws and regulations on the organization and its products, activities and services.
- B. The environmental manager employs a variety of techniques and information sources to track, identify and evaluate applicable laws and regulations. These include, but are not limited to: commercial services / databases; information provided by its trade association; communications with federal and state regulatory agencies; company environmental meetings; and periodic environmental refresher training. The environmental manager monitors these information sources on a regular basis to ensure that new issues are identified on a timely basis.
- C. As necessary, "off-site" resources (such as consultants and attorneys) may be called upon to assist the environmental manager in evaluating applicable laws and regulations or in developing programs in response to applicable laws and

regulations. Where off-site resources are used in this manner, the organization's environmental manager coordinates such efforts.

IV. Procedure (cont'd.)

- D. The environmental manager disseminates information on applicable laws and regulations (and their potential impacts on the organization's activities, products and services) to appropriate personnel. The determination of which organization personnel must be informed and the method for providing this information is at the discretion of the environmental manager, based on the circumstances of the case.
- E. The environmental manager compiles and maintains copies of significant applicable environmental laws and regulations. Where copies of such laws and regulations are not maintained at the organization's offices, the environmental manager ensures that ready access is available from other sources, such as those listed above.
- F. If site audits indicate that additional laws and regulations must be tracked and evaluated, the environmental manager ensures that these activities take place.

Worksheet: Setting Objectives & Targets

Worksheet: Setting Objectives and Targets

Step 1: A **cross-functional team** is a good way for your organization to set realistic objectives and targets. **List here** who needs to be involved on the team:

<u>Name</u>	<u>Contacted?</u>
<ul style="list-style-type: none"> • • • • • • 	<ul style="list-style-type: none"> • • • • • •

Step 2: Think about what **information sources** your team will need to establish objectives and targets. Pull together information sources such as:

<u>Information Sources</u>	<u>How they will help</u>
<ul style="list-style-type: none"> • process maps • waste, and emission data • site maps • compliance audit reports • descriptions of identified environmental aspects • communications from interested parties • others?? • • <p><i>(you may also want to do a plant tour or “walk through” to identify other issues)</i></p>	<p style="text-align: center;">e.g.,</p> <ul style="list-style-type: none"> • <i>identify process steps with environmental aspects</i> • <i>determine current wastes and sources</i> • <i>etc.</i>

Step 3: Is there other information that might be helpful to the team?

<u>Other Information Needed</u>	<u>Where we will get it</u>
<ul style="list-style-type: none"> • • • 	<ul style="list-style-type: none"> • • •

Step 4: List the significant environmental impacts (you identified these earlier).
Categorize these impacts by type:

<u>Energy Use</u>	<u>Raw Materials</u>	<u>Air Impacts</u>	<u>Water Impacts</u>	<u>Waste Impacts</u>	<u>Land Issues</u>	<u>Other (specify)</u>

Step 5: Look at **processes** (such as plating or assembly) and **activities** (such as shipping or purchasing). Are there any **other issues** the team should consider, in addition to those listed above as significant impacts? (For example, you might want to establish an objective to reduce spills of hazardous materials at the loading dock, even if this was not identified as a potentially significant environmental impact.)

<u>Process or activity</u>	<u>Issues</u>	<u>Possible Objectives & Targets</u>

Step 6: List any new **regulatory requirements** that affect the facility (or other regulations for which the need for additional actions has been identified).

<u>Regulations, other requirements</u>	<u>Possible Objectives & Targets</u>

Step 7: List communications with **interested parties**. Any need for additional objectives related to views of neighbors, community groups or other parties?

<u>Communications With Interested Parties</u>	<u>Possible Objectives & Targets</u>

Step 8: Look at the lists of **possible objectives developed in Steps 4 -7.**
Brainstorm with the team on whether these objectives are:

- reasonable
- technologically feasible
- consistent with the business plan
- affordable.

List preliminary objectives and targets based on this exercise:

<u>Selected Preliminary Objectives</u>
<ul style="list-style-type: none"> • • • • •

Step 9: Determine how you will **measure** each of the selected preliminary objectives.
 (If you cannot establish an effective way to measure it, put that objective “on-
 hold” for later consideration).

<u>Selected Objectives</u>	<u>Performance Indicator(s)</u>

Step 10: For each objectives that you selected, determine **who** is going to develop the
action plan (who, what , when, where, how). List these names below:

<u>Selected Objectives</u>	<u>Responsibility for Action Plan</u>

Sample Procedure: Setting Objectives & Targets

EMS PROCEDURE: SETTING AND TRACKING OF ENVIRONMENTAL OBJECTIVES AND TARGETS

I. Purpose

The purpose of this procedure is to ensure that the organization establishes and maintains documented environmental objectives and targets.

II Scope

This procedure applies to environmental objectives and targets set at all relevant levels within the organization.

III. Definitions

Environmental (or environmental) objective- A site goal that is consistent with the environmental policies and considers significant environmental impacts and applicable laws and regulations. Objectives are quantified wherever practicable.

Environmental (environmental) target- A detailed performance requirement (quantified wherever practicable) based on an environmental objective. A target should be met in order for the underlying objective to be achieved.

IV. General

The organization establishes environmental objectives and targets in order to implement the environmental policies. Objectives and targets also provide a means for the organization to measure the effectiveness of its environmental efforts and improve the performance of the environmental management system. In establishing environmental objectives, the organization considers:

- applicable laws and regulations (and requirements of other programs, such as ...);
- environmental aspects of the organization's activities and products;
- technological, financial, operational, and other business requirements; and,
- the views of employees and other interested parties.

Based on the organization 's environmental objectives, targets are established for different functions within the organization and for different areas of the plant. For example, the organization may establish an environmental objective to "reduce waste generation by 10% per year". Based on this objective, different areas of the plant might set targets for reducing individual waste streams in order to ensure that the organization's objective was achieved. An organization-wide environmental objective might also be translated into individual projects (such as

changes in production processes, materials or pollution control equipment) in different plant areas.

V. Procedure

- A. The organization's top management is responsible for establishing environmental objectives on an annual basis. To initiate the process, the Plant Manager holds a meeting of all staff members to discuss the development of environmental objectives.
- B. Objectives are action- and prevention-oriented and are intended to result in meaningful improvements in the organization 's environmental performance.
- C. Each plant area or functional manager is responsible for providing input from his / her own function (Finance, Engineering, etc.) or shop area (Fabrication, Assembly, Shipping / Receiving, etc.). The organization's environmental manager is responsible for providing input on applicable laws and regulations, significant site environmental impacts, and the views of interested parties. (These inputs are obtained from the separate analyses required by Procedure #'s).
- D. As a starting point, the organization's management evaluates its performance against environmental objectives for the current year. As part of this effort, management examines the results of its environmental performance evaluations.
- E. Preliminary environmental objectives are developed for further discussion and evaluation. Each manager is responsible for evaluating the potential impacts within his / her functional or shop area (if any) of the proposed environmental objectives. The organization's environmental manager reviews proposed objectives to ensure consistency with the overall environmental policy.
- F. Environmental objectives are finalized, based on review comments from site managers and employees. Each manager identifies the impacts of the objectives in his / her function or shop area, establishes targets to achieve the objectives, and develops appropriate measures to track progress towards meeting the objectives and targets.
- G. Each manager is responsible for communicating objectives and targets (and the means for achieving them) to others in his / her part of the organization.
- H. Progress towards the objectives and targets is reviewed on a regular basis at management meetings. The progress is also communicated to plant employees via bulletin boards and other similar means.
- I. At the end of each calendar year, the organization's management reviews its performance with regard to achieving the objectives and targets. This information is used as input to setting objectives and targets for the succeeding year.

Sample Tool: Environmental Management Program

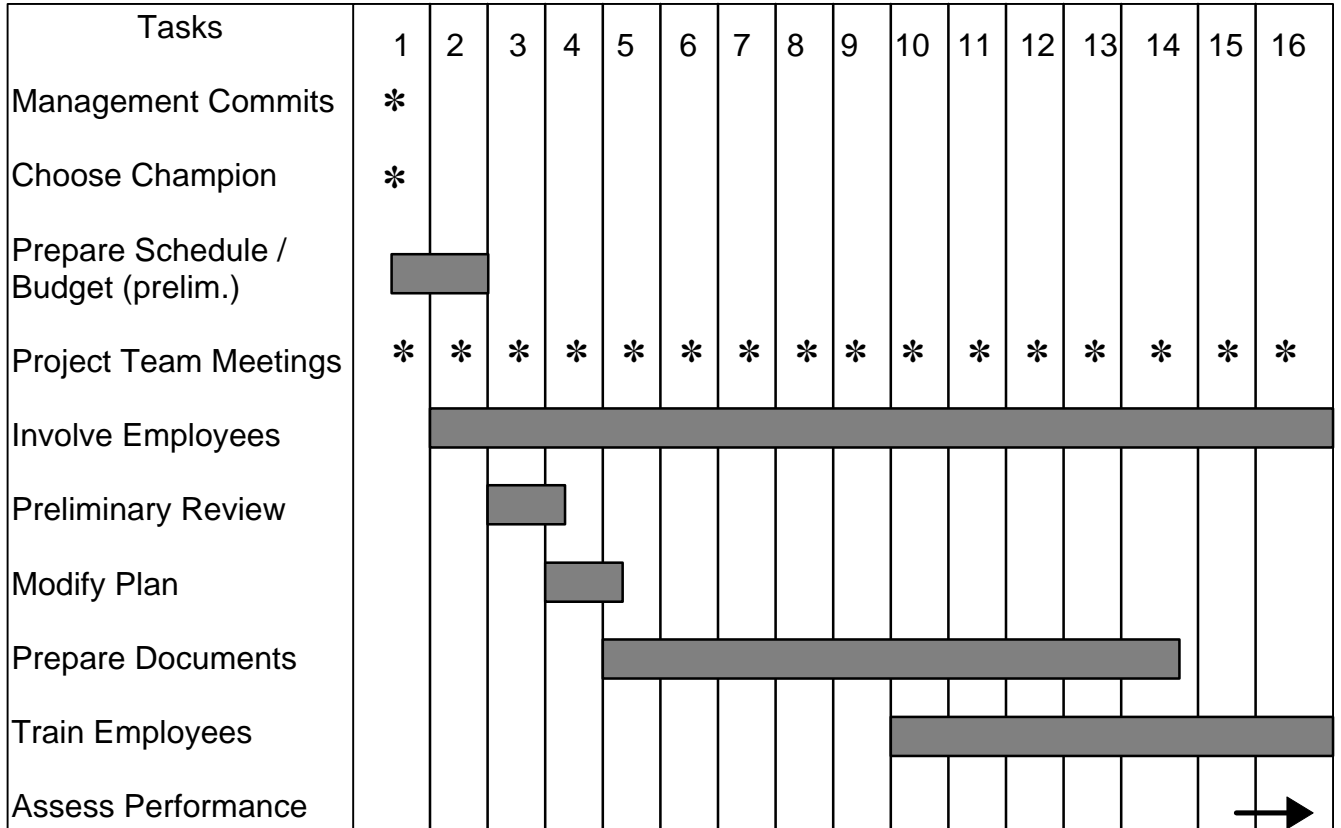
Environmental Management Program — Sample Tool

Objective / Target #1: _____

Action Items	Priority	Responsibilities	Schedule	Resources Needed	Comments

Sample Schedule for EMS Action Plan

Sample Schedule for EMS Action Plan



Responsibility Matrix

Responsibility Matrix

Legend:

L = Lead Role

S = Supporting Role

	Plant M'gr	EHS M'gr	HR M'gr	Maintenance	Purchasing / Materials	Engineering	Production Supervisor(s)	Finance	EMS Mg't Rep.	Employees
Communicate importance of environmental management	L	S					S			
Coordinate auditing efforts		L		S			S			
Track / analyze new regulations (and maintain library)		L								
Obtain permits and develop compliance plans		L				S				
Prepare reports required by regulations		L								
Coordinate communications with interested parties			L							
Train employees		S					L			
Integrate environmental into recruiting practices			L							
Integrate environmental into performance appraisal process			L							
Communicate with contractors on environmental expectations					L					
Comply with applicable regulatory requirements	L	L	S	S	S	S	S	S	S	S
Conform with organization's EMS requirements	L	L	S	S	S	S	S	S	S	S
Maintain equipment / tools to control environmental impact				L						
Monitor key processes		S					L			
Coordinate emergency response efforts	L	S								
Identify environmental aspects of products, activities, or services	S	L	S	S	S	S	S	S	S	
Establish environmental objectives and targets	L	S					S			
Develop budget for environmental management		S						L		
Maintain EMS records (training, etc.)		L								
Coordinate EMS document control efforts					S				L	

Responsibility Matrix

Legend:

L = Lead Role

S = Supporting Role

	Plant M'gr	EHS M'gr	HR M'gr	Maintenance	Purchasing / Materials	Engineering	Production Supervisor(s)	Finance	EMS Mg't Rep.	Employees
Communicate importance of environmental management										
Coordinate auditing efforts										
Track / analyze new regulations (and maintain library)										
Obtain permits and develop compliance plans										
Prepare reports required by regulations										
Coordinate communications with interested parties										
Train employees										
Integrate environmental into recruiting practices										
Integrate environmental into performance appraisal process										
Communicate with contractors on environmental expectations										
Comply with applicable regulatory requirements										
Conform with organization's EMS requirements										
Maintain equipment / tools to control environmental impact										
Monitor key processes										
Coordinate emergency response efforts										
Identify environmental aspects of products, activities, or services										
Establish environmental objectives and targets										
Develop budget for environmental management										
Maintain EMS records (training, etc.)										
Coordinate EMS document control efforts										

Environmental Training Log

EMS Training Log (Sample)

Training Topic	Attendees*	Frequency	Course Length	Course Method	Comments	Date Completed
EMS Awareness						
Supervisor EHS Training						
Hazardous Waste Management						
Hazardous Waste Operations						
Spill Prevention & Response						
Chemical Management						
Emergency Response						
Accident Investigation						
Hazardous Materials Transport						
Hazard Communication						
Personal Protective Equipment						
Fire Safety						
Electrical Safety						
Hearing Conservation						
Confined Space Entry						
Lock-out/Tag-out						
Bloodborne Pathogens						
Job-Specific Training (list)						

Attendees Code

- 1: All Employees**
- 2: Supervisors / Managers**
- 3: Operators**
- 4: Maintenance**
- 5: Material Handlers**
- 6: Engineering**

Sample Procedure: Internal Communications

EMS PROCEDURE: INTERNAL COMMUNICATIONS

I. Purpose

The purpose of this procedure is to ensure effective and timely communication of environmentally-related information within the organization.

II. Scope

This procedure describes processes for internal communications on various elements of the organization 's environmental management system, including the environmental policy and objectives. This procedure also can be used for employee reporting of health & safety hazards, or for other related purposes.

III. General

A variety of processes are used for internal communication on environmentally-related matters. The effectiveness of these communication processes are evaluated on an on-going basis, through employee surveys, environmental training programs, organization audits and inspections, and informal discussions.

Major topics of internal communication include:

- environmental policy, objectives, and targets;
- environmental management roles and responsibilities;
- organization performance compared to environmental objectives and targets;
- environmental policies and procedures; and,
- hazards and emergency situations.

IV. Procedure

General

A. The Plant Manager is responsible for communicating the organization 's environmental policies and procedures to all employees. The Plant Manager is also responsible for communicating roles and responsibilities for environmental management.

B. Area and functional managers are responsible for communicating environmental targets (and performance vs. objectives and targets) to employees in their areas or functions, as well as to the management team.

IV. Procedure (cont'd.)

- C. Area and functional leaders are responsible for communicating environmental procedures (and any changes to the procedures), results of accident and "near miss" investigations in their areas, and other significant environmentally-related information (such as upcoming training classes).
- D. The selection of the most appropriate mechanism(s) used for internal communication is left to the discretion of the responsible manager. Mechanisms that are used for various types of communications include, but are not limited to:
- "all employee" meetings,
 - area environmental meetings,
 - workstation procedures,
 - bulletin boards and posters,
 - memoranda and employee letters, and
 - newsletters.

Hazard and Emergency Reporting

- A. All employees are responsible for reporting environmental or health & safety hazards or emergencies (including spills and fires) immediately upon discovery. Such hazards are reported to the Area Manager. If necessary, such hazards should also be reported to the appropriate emergency contacts (as identified in the emergency response procedures {Procedure #}). The Area Manager in turn notifies the organization's environmental manager.
- B. If the Area Manager is not available, employees report environmental or health & safety hazards directly to the environmental manager.
- C. The organization's environmental manager maintains a log of all reported environmental or health & safety hazards. The environmental manager tracks the investigation and correction (as needed) for all reported hazards.
- D. Communication of the results of investigating / correcting reported hazards is the responsibility of the appropriate Area Manager.
- E. Emergency response procedures are described in Procedure #.

Sample Procedure: Communications with External Parties

EMS PROCEDURE: COMMUNICATIONS WITH EXTERNAL PARTIES

I. Purpose

This procedure is intended to establish a process for outreach and communication with external parties regarding the organization's environmental management system (*Note: the organization should also consider external communication regarding its significant environmental aspects*).

II. Scope

This procedure describes how the organization receives, documents, and responds to communications from external parties. In addition, it discusses proactive steps that the organization takes to maintain a meaningful dialogue with external parties on environmental matters.

III. Definitions

Interested Parties- Individuals or groups with an interest in the environmental impacts of the organization's products, activities or services. These parties include regulators, local residents, employees, stockholders, insurers, customers, environmental groups and the general public (*adapted from ISO 14001*).

IV. General

The organization uses a number of mechanisms to ensure effective communication with interested parties. These mechanisms include regulatory filings (such as permit applications and reports), open houses, the media, and informal discussions with regulators, community representatives, and local business leaders.

To solicit the views of interested parties, the organization may use additional techniques, including (but not limited to) surveys, community advisory panels, newsletters, or informal meetings with representatives of external groups.

General rules for external communications require that the information provided by the organization:

- be understandable and adequately explained to the recipient(s); and
- present an accurate and verifiable picture of the organization and its environmental management system, its environmental performance, or other related matters.

V. Procedure

A. Management of Communications from External Parties

1. Inquiries and other communications (received by mail, fax, telephone, or in person) from external parties concerning the organization's EMS or environmental performance may be received by a number of the organization's representatives, including the Plant Manager, the environmental manager, and the human resources manager, among others. All such communications are reviewed by the Plant Manager or his / her designee to determine the appropriate response.
2. Communication with representatives of regulatory agencies is delegated to the organization's environmental manager, who maintains records of all such communications (both incoming and outgoing). In the absence of the environmental manager, communications with regulatory officials are delegated to the human resources manager.
3. Copies of all other written communications on environmental matters are maintained by the human resources manager. All non-written communications from external parties are documented using telephone logs or similar means. All records of external communications are maintained as discussed in Procedure # (Records Management).
4. A record of the responses to all communications from external parties is maintained by the human resources manager in files designated for that purpose.

B. Outreach to Interested Parties

1. On an as-needed basis, the organization solicits the views of interested parties on its environmental management system, its environmental performance, and other related matters. In particular, such outreach is conducted when significant changes at the facility are being considered, such as facility expansion or other actions that might affect the actual or potential environmental impacts of the organization's products, activities, or services.
2. As part of the Management Review process, the team designated to conduct the Review evaluates proactive efforts to communicate with external parties. Based on this evaluation and other factors, the organization's management determines the need for outreach with external parties in the coming year and how such communications can be carried out most effectively.

External Hazard and Emergency Communication

Note: All external communication regarding emergency response are addressed in Procedure #.

Sample Document Index

Sample Document Index

(sample indicates individual that revised document, his/her position/department, and date(s) of revision)

Document	1	2	3	4	5	6
Environmental Policy	John Smith Plant Manager 1/1/95	John Smith Plant Manager 1/1/96				
Environmental Manual						
Procedure 1: Environmental Aspects Identification						
Procedure 2: Access to Laws and Regulations						
Procedure 3: Setting Objectives & Targets						
Procedure 4: Environmental Training						
Procedure 5: External Communications						
Procedure 6: Internal Communications						
Procedure 7: Document Control						
Procedure 8: Emergency Preparedness						
Procedure 9: Corrective Action						
Procedure 10: Records Management						
Procedure 11: EMS Audits						
Procedure 12: Management Reviews						
Procedures 13-X (list individually)						
EMS Audit Checklist						
Other plans & documents related to above procedures (list separately , e.g. SPCC Plan, Emergency Response Plan, etc.).						
Other forms and checklists (list)						

Outline of Sample EMS Manual, Other Documents

Outline of Sample EMS Manual, Other Documents

Basic EMS Manual

- **Index / Revision History / Distribution List**
- **Environmental Policy**
- **Description of How Our EMS Addresses Each of the EMS Elements**
 - How We Identify Significant Environmental Aspects
 - How We Access Legal and Other Requirements
 - How We Establish Objectives and Targets
 - How the Organization Supports EMS (organization charts, key responsibilities)
 - How We Train our Employees
 - How We Communicate (internally and externally)
 - How We Control EMS Documents
 - How We Identify and Control Key Processes
 - How We Prepare for and Respond to Emergencies
 - How We Monitor Key Characteristics of Operations and Activities
 - How We Handle and Investigate Nonconformance
 - etc.

Environmental Management Program Manual

- **Annual Objectives and Targets**
- **Action Plan (to achieve objectives and targets)**
- **Tracking and Measuring Progress**

EMS Procedures Manual

- **Index / Revision History / Distribution List**
- **Organization-wide Procedures (in some cases, could be several procedures)**
 - Environmental Aspects Identification
 - Access to Legal and Other Requirements
 - Training, Awareness and Competence
 - Internal Communication
 - External Communication
 - Document Control
 - Change Management Process(es)
 - Management of Suppliers / Vendors
 - Emergency Preparedness and Response
 - Monitoring and Measurement
 - Calibration and Maintenance of Monitoring Equipment
 - Compliance Evaluation
 - Corrective and Preventive Action
 - Records Management
 - EMS Auditing
 - Management Review
- **Procedures / Work Instructions for Specific Operations or Activities**
 - Waste Management
 - Wastewater Treatment *(These are examples only)*
 - Operation of the Paint Line
 - Operation of Plating Line
- **Forms, Drawings, and Checklists (that support the EMS procedures)**

Sample Procedure: Document Control

EMS PROCEDURE: CONTROL OF EMS DOCUMENTS

I. Purpose

This procedure establishes a process for the review, distribution, and implementation of documents that describe and control the EMS.

II. Scope

This procedure applies to the following documents (and any changes to them) which must be controlled:

- the environmental manual;
- facility-wide environmental procedures;
- process - or activity-specific procedures and work instructions; and
- forms, checklists, and drawings used for EMS purposes.

III. General

- A. Distribution lists are maintained by the ISO Management Representative (or designee). Document distribution may be either controlled or uncontrolled.
- B. Depending on the type of document, controlled copies are identified by stamp, signature, or other similar means.
- C. Uncontrolled copies of documents may exist for illustrative, instructional, knowledge preservation, or external distribution purposes only.
- D. All controlled documents are approved prior to issue. All controlled documents are marked with the revision number and the revision date.
- E. Initial distribution of documents may be determined by the originator of the document or the ISO Management Representative.
- F. Unless otherwise specified, the originator of a document is responsible for review and approval of any subsequent changes to the document.
- G. The ISO Management Representative (or designee) is responsible for removal of obsolete controlled documents from all points of issue and use.

- H. The ISO Management Representative (or designee) is responsible for ensuring that changes to controlled documents are understood, distributed, and communicated to the affected functions within the organization.
- I. All controlled documents are listed on the EMS Document Index. The Index shows the date(s) of any revisions and the person(s) initiating the revisions.

IV. Procedure

A. Environmental Manual

- 1. Copies of the environmental manual are numbered sequentially. Distribution of controlled copies is the responsibility of the ISO Management Representative (or designee).
 - a. Controlled copies are stamped "Controlled" with the distribution date.
 - b. Uncontrolled copies can be issued by the ISO Management Representative (or designee). All uncontrolled copies are stamped "Uncontrolled - For Reference Only".
- 2. A Distribution List of controlled documents is maintained by the ISO Management Representative (or designee). Each recipient initials the Distribution List to indicate his/her receipt of the Manual.
- 3. Each individual issued a controlled copy of the Environmental Manual is responsible for its safekeeping.
- 4. Uncontrolled copies of the Environmental Manual may be distributed outside the organization (for example, to customers). All uncontrolled copies are stamped "Uncontrolled - For Reference Only".
- 5. The process for revising the Environmental Manual is described in Procedure #.

B. Facility-wide Procedures

- 1. Revision of facility-wide procedures is controlled as per Procedure # and is the responsibility of the ISO Management Representative (or designee).
- 2. Distribution of facility-wide environmental procedures is specified on the Distribution List.
- 3. The ISO Management Representative (or designee) is responsible for distributing new and revised procedures. A copy of the Distribution List is signed and dated by the ISO Management Representative, and initialed by each recipient. This copy of this list is maintained for at least one year.
- 4. When a new individual must be added to the controlled distribution for a procedure, the requester notifies the ISO Management Representative. The ISO Management Representative is then responsible for updating the Distribution List.

5. The ISO Management Representative is responsible for coordinating and executing the implementation of facility-wide procedures, as well as for documenting any resulting training. Evidence of such training is maintained in the employee training records.
6. Control of forms, checklists, and drawing used for EMS purposes follows the same process as described in steps B.1 through B.5 (above).

C. Process- or Activity-Specific Procedures and Work Instructions

1. Revision of process- or activity-specific procedures and work instructions is controlled as per Procedure # and is the responsibility of the ISO Management Representative (or designee).
2. Distribution of process- or activity-specific procedures and work instructions is specified on the Distribution List. Controlled copies are stamped "Controlled" with the distribution date.
3. The ISO Management Representative (or designee) is responsible for distribution of new and revised procedures and work instructions. A copy of the Distribution List is signed and dated by the ISO Management Representative, and initialed by each recipient. This copy of the list is maintained for at least one year.
4. Area or functional managers are responsible for coordinating and executing the implementation of activity- or process-specific procedures and work instructions in their areas, as well as for documenting any resulting training. Evidence of such training is maintained in the employee training records.

**Sample Procedure:
Corrective Action
(includes tracking log)**

EMS PROCEDURE: PREVENTIVE AND CORRECTIVE ACTION

I. Purpose

The purpose of this procedure is to establish and outline the process for identifying, documenting, analyzing, and implementing preventive and corrective actions.

II. Scope

Preventive or corrective actions may be initiated using this procedure for any environmental problem affecting the organization.

III. General

- A. Corrective action is generally a reactive process used to address problems after they have occurred. Corrective action is initiated using the Corrective Action Notice (CAN) document as the primary vehicle for communication. Corrective action may be triggered by a variety of events, including internal audits and management reviews. Other items which might result in a CAN include neighbor complaints or results of monitoring and measurement.
- B. Preventive action is generally a proactive process intended to prevent potential problems before they occur or become more severe. Preventive action is initiated using the Preventive Action Notice (PAN). Preventive action focuses on identifying negative trends and addressing them before they become significant. Events that might trigger a PAN include monitoring and measurement, trends analysis, tracking of progress on achieving objectives and targets, response to emergencies and near misses, and customer or neighbor complaints, among other events.
- C. Preventive and corrective action notices are prepared, managed and tracked using the preventive and corrective action database.
- D. The ISO Management Representative (or designee) is responsible for reviewing issues affecting the EMS, the application and maintenance of this procedure, and any updates to EMS documents affected by the preventive and corrective actions.
- E. The ISO Management Representative is responsible for logging the PAN or CAN into the data base, and tracking and recording submission of solutions in the database. The requester and recipient of the CAN or PAN are responsible for verifying the effectiveness of the solution. The ISO Management Representative is responsible for overall tracking and reporting on preventive and corrective actions.
- F. Personnel receiving PAN's and CAN's are responsible for instituting the required corrective or preventive action, reporting completion of the required action to the ISO Management Representative, and assuring sustained effectiveness.

III. General (cont'd.)

G. Completed records of PAN's and CAN's are maintained in the database for at least two years after completion of the corrective or preventive action.

IV. Procedure

A. Issuing a CAN or PAN

1. A CAN or PAN may be requested by any employee. The employee requesting the CAN or PAN is responsible for bringing the problem to the attention of the ISO Management Representative. The ISO Management Representative is responsible for determining whether a CAN or PAN is appropriate and enters the appropriate information into the corrective and preventive action database. Responsibility for resolving the problem is assigned to a specific individual ("the recipient").
2. The ISO Management Representative, working with the recipient, determines an appropriate due date for resolving the CAN or PAN.

B. Determining and Implementing Corrective and Preventive Actions

1. The CAN or PAN is issued to the recipient, who is responsible for investigation and resolution of the problem. The recipient is also responsible for communicating the corrective or preventive action taken.
2. If the recipient cannot resolve the problem by the specified due date, he / she is responsible for determining an acceptable alternate due date with the ISO Management Representative.

C. Tracking CAN's and PAN's

1. CAN's or PAN's whose resolution dates are overdue appear on the Overdue Solutions report. The ISO Management Representative is responsible for issuing this report on a weekly basis to the Plant Manager and the recipients of any overdue CANs or PANs.
2. Records of PANs and CANs are maintained in the database for at least two years after completion of the corrective or preventive action.

D. Tracking Effectiveness of Solutions

1. The recipient of a CAN or PAN, in conjunction with the requester, are responsible for verifying the effectiveness of the solution. If the solution is deemed not effective, the CAN or PAN will be reissued to the original recipient.

SAMPLE CORRECTIVE ACTION NOTICE

CAN Number:

Issue Date:

Solution Due Date:

Name

Location

Phone:

Requested By:
Issued To:

Problem Statement (completed by ISO Management Representative):

Most Likely Causes (completed by ISO Management Representative):

Implemented Solutions (completed by recipient - include dates as applicable):

Results (confirming effectiveness):

Closed by:

Closing Date:

Environmental Records Organizer

Environmental Records Organizer (SAMPLE)

Permits & Applications*

Air Emissions Permit

Air Permit Application

Previous Air Permit

Wastewater Permit

Solid Waste Permit

Hazardous Waste Permit

Stormwater Permit

Annual Licenses & Fees*

Air Emissions Fees

Wastewater Fees

Hazardous Waste Fees

Solid Waste Fees

P2 Fees

Compliance Reporting*

Air Emissions**

VOC/HAPs Reporting

Ink Usage Reports

VOC Annual Analysis

Air Emissions Inventories

Historical Data

Wastewater**

Semi-Annual Wastewater Testing Reports

Pollution Prevention**

Annual P2 Report

Biannual Hazardous Waste Report

Hazardous Waste**

Open Manifests

Closed Manifests

Special Wastes**

Fluorescent Lamps

Ink Recycling

SARA 313*

Environmental Census Reports*

Compliance Plans*

Community Right-to-Know

Employee Right-to-Know

OSHA Lock Out

Minnesota AWAIR

Loss Prevention

Indoor Air Quality*

OSHA*

OSHA Posters

1996 OSHA Inspection

1994 OSHA Inspection

Safety Shoes

First Aid*

Spills Clean-Up*

Sample Procedure: EMS Audits

EMS Procedure: Environmental Management System Audits

I. Purpose

To define the process for conducting periodic audits of the environmental management system (EMS). The procedure defines the process for scheduling, conducting, and reporting of EMS audits.

II. Scope

This procedure applies to all internal EMS audits conducted at the site.

The scope of EMS audits may cover all activities and processes comprising the EMS or selected elements thereof.

III. General

Internal EMS audits help to ensure the proper implementation and maintenance of the EMS by verifying that activities conform with documented procedures and that corrective actions are undertaken and are effective.

All audits are conducted by trained auditors. Auditor training is defined by Procedure #. Records of auditor training are maintained in accordance with Procedure #.

When a candidate for EMS auditor is assigned to an audit team, the Lead Auditor will prepare an evaluation of the candidate auditor's performance following the audit.

The ISO Management Representative is responsible for maintaining EMS audit records, including a list of trained auditors, auditor training records, audit schedules and protocols, and audit reports.

EMS audits are scheduled to ensure that all EMS elements and plant functions are audited at least once each year.

The ISO Management Representative is responsible for notifying EMS auditors of any upcoming audits a reasonable time prior to the scheduled audit date. Plant areas and functions subject to the EMS audit will also be notified a reasonable time prior to the audit.

The Lead Auditor is responsible for ensuring that the audit, audit report and any feedback to the plant areas or functions covered by the audit is completed per the audit schedule.

The ISO Management Representative, in conjunction with the Lead Auditor, is responsible for ensuring that Corrective Action Notices are prepared for audit findings, as appropriate.

IV. Procedure

- A. Audit Team Selection - One or more auditors comprise an audit team. When the team consists of more than one auditor, a Lead Auditor will be designated. The Lead Auditor is responsible for audit team orientation, coordinating the audit process, and coordinating the preparation of the audit report.
- B. Audit Team Orientation - The Lead Auditor will assure that the team is adequately prepared to initiate the audit. Pertinent policies, procedures, standards, regulatory requirements and prior audit reports are made available for review by the audit team. Each auditor will have appropriate audit training, as defined by Procedure #.
- C. Written Audit Plan - The Lead Auditor is responsible for ensuring the preparation of a written plan for the audit. The Internal EMS Audit Checklist may be used as a guide for this plan.
- D. Prior Notification - The plant areas and / or functions to be audited are to be notified a reasonable time prior to the audit.
- E. Conducting the Audit
1. A pre-audit conference is held with appropriate personnel to review the scope, plan and schedule for the audit.
 2. Auditors are at liberty to modify the audit scope and plan if conditions warrant.
 3. Objective evidence is examined to verify conformance to EMS requirements, including operating procedures. All audit findings must be documented.
 4. Specific attention is given to corrective actions for audit findings from previous audits.
 5. A post-audit conference is held to present audit findings, clarify any misunderstandings, and summarize the audit results.
- F. Reporting Audit Results
1. The Team Leader prepares the audit report, which summarizes the audit scope, identifies the audit team, describes sources of evidence used, and summarizes the audit results.
 2. Findings requiring corrective action are entered into the corrective action database.

IV. Procedure (cont'd.)

G. Audit Report Distribution

1. The ISO Management Representative is responsible for communicating the audit results to responsible area and / or functional management. Copies of the audit report are made available by the ISO Management Representative.
2. The ISO Management Representative is responsible for ensuring availability of audit reports for purposes of the annual Management review (see Procedure #).

H. Audit Follow-up

1. Management in the affected areas and / or functions are responsible for any follow-up actions needed as a result of the audit.
2. The ISO Management Representative is responsible for tracking the completion and effectiveness of corrective actions.

I. Record keeping

1. Audit reports are retained for at least two years from the date of audit completion. The ISO Management Representative is responsible for maintaining such records.

Audit Plan

Area or Function to be Audited	Lead Auditor	Audit Team Members	Target Date	Special Instructions
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Sample Communications to Audit Team

ENVIRONMENTAL MANAGEMENT SYSTEM AUDIT

Lead Auditor:

Audit Team Members:

Audit Area:

Target Due Date:

Listed above is the area to be audited. The due date given is the target to have the entire audit completed, including the report and follow-up meeting with the responsible area management. Listed below are the areas of environmental management systems criteria that you are to assess. If you have any questions, please call me. Special instructions, if any, are listed below. Thank you for your help. Effective audits help make an effective environmental management system.

- | | |
|--|---|
| <input type="checkbox"/> Policy | <input type="checkbox"/> Legal and Other Requirements |
| <input type="checkbox"/> Environmental Aspect identification | <input type="checkbox"/> Objectives and Targets |
| <input type="checkbox"/> Environmental Management Program | <input type="checkbox"/> Structure and Responsibility |
| <input type="checkbox"/> Training, Awareness, Competence | <input type="checkbox"/> Communication |
| <input type="checkbox"/> EMS Documentation | <input type="checkbox"/> Document Control |
| <input type="checkbox"/> Operational Controls | <input type="checkbox"/> Emergency Preparedness |
| <input type="checkbox"/> Monitoring and Measurement | <input type="checkbox"/> Nonconformance / Corrective Action |
| <input type="checkbox"/> Records | <input type="checkbox"/> Management System Audits |
| <input type="checkbox"/> Management Review | |

Special Instructions:

ISO Representative (signature)

Sample Procedure: Management Reviews

EMS PROCEDURE: MANAGEMENT REVIEW

I. Purpose

The purpose of this procedure is to document the process and primary agenda of issues to be included in the Management Review meetings for evaluating the status of the organization's environmental management system (EMS).

II. Scope

This procedure applies to all Management Review meetings conducted by the organization.

III. General

The Management Review process is intended to provide a forum for discussion and improvement of the EMS and to provide management with a vehicle for making any changes to the EMS necessary to achieve the organization's goals.

IV. Procedure

- A. The ISO Management Representative is responsible for scheduling and conducting a minimum of two Management Review meetings during each 12-month period. The ISO Management Representative is also responsible for ensuring that the necessary data and other information is collected prior to the meeting.
- B. At a minimum, each Management Review meeting will consider the following:
- the suitability, adequacy and effectiveness of the environmental policy;
 - the suitability, adequacy and effectiveness of the environmental objectives (as well as the organization's current status against these objectives);
 - the overall suitability, adequacy and effectiveness of the EMS;
 - the status of corrective and preventive actions;
 - the results of any EMS audits conducted since the last Management Review meeting;
 - the suitability, adequacy and effectiveness of training efforts; and,
 - the results of any action items from the previous Management Review meeting.
- C. Minutes of the Management Review meeting will be documented. These meeting minutes will include, at a minimum:
- a list of attendees;
 - a summary of key issues discussed; and,

- any actions items arising from the meeting.

D. A copy of the meeting minutes will be distributed to attendees and any individuals assigned action items. A copy of the meeting minutes will also be retained on file.