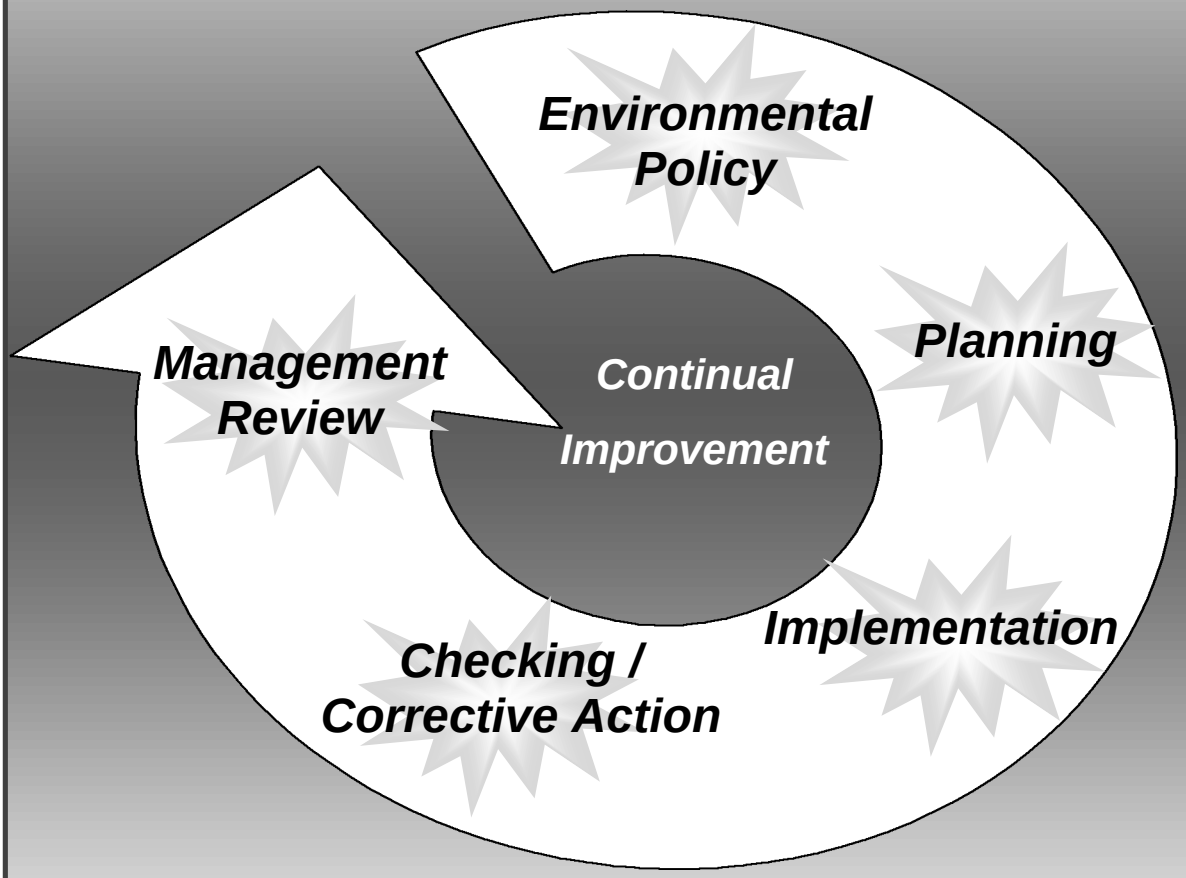
Second Edition

Environmental Management Systems:

An Implementation Guide for Small and Medium-Sized Organizations



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Acknowledgments

When the first edition of this Guide was published in November 1996, the use of environmental management systems (EMS) was a relatively new, but rapidly expanding phenomenon. Considerable experience in EMS design and implementation has been gained since the first edition of this Guide was published. The authors' primary goal in preparing this second edition of the Guide was to take advantage of the many new developments in the EMS field as well as the insights and experiences of many organizations that have implemented EMS over the past few years.

The second edition was prepared by NSF International with funding through a cooperative agreement with the U.S. Environmental Protection Agency's Office of Wastewater Management; Office of Enforcement and Compliance Assistance; Office of Pesticides, Prevention and Toxic Substances; and Office of Policy Economics – Innovation.

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Introduction to Second Edition

The first edition of this Guide was published in November 1996. Like its predecessor, this second edition is designed to explain environmental management system (EMS) concepts and to support and facilitate the development of EMS among small and medium-sized organizations. Implementation of an EMS is a **voluntary** approach to improving environmental performance. Over the past several years, many public and private sector organizations have implemented EMS and their numbers grow daily. These organizations report a number of important EMS benefits, as described in this Guide.

Many changes were made in this edition of the Guide to improve its usefulness and to reflect EMS experience gained over the last four years The changes were based on feedback solicited from selected users of the first edition of the Guide, lessons learned and implementation examples from the NSF/EPA projects, the Multi-State Working Group, *Guide* users, and Technical Committee 207-Small and Medium-Sized Enterprise efforts. In particular, the authors have provided additional information on certain EMS elements that many organizations have found to be particularly challenging – including environmental aspects, communications and operational controls, among others. Sections 3 through 5 have been reconfigured into a new "Ready-Set-Go" format. The new Section 5 (GO!) has been added to provide a "roadmap" or logical sequence for implementing the key elements of an EMS. In addition, pollution prevention success stories and examples of EMS implementation practices from public sector and service based-organizations have been added to help demonstrate the value of EMS.

This Guide is designed primarily for use by EMS **implementers —** the people in a small or medium-sized organization that lead the EMS development effort. The heart of the Guide is found in **Section 4**, "Key Elements of an EMS." For each of the key EMS elements, this section describes the importance of the element, how to get started on implementation, and other key suggestions. In this edition, worksheets have been added to help users "capture their learning" as they progress from one EMS element to the next. Readers of the Guide can use these worksheets to summarize and evaluate their existing management processes, to initiate needed improvements and to help maintain implementation momentum.

The Guide continues to use the ISO 14001 standard as one important EMS model. ISO 14001, published in November 1996, is the most widely accepted international standard for EMS. EPA, as part of its effort to promote the use of EMS's that can help organizations improve environmental performance (including compliance) and make greater use of pollution prevention approaches, is implementing several EMS initiatives that might be useful to some organizations. These include the National Environmental Performance Track, the EMS Initiative for Local Governments and the Design for Environment EMS Guide. Information on the National Environmental Performance Track program and other Federal and state-level EMS initiatives can be found in ***Appendix B*** and other relevant sections of this Guide.

While this Guide is intended primarily for organizations outside the Federal government, some Federal agencies are developing EMS's at their facilities. These agencies may wish to use this Guide to support their EMS efforts.

This Guide is **not** intended for use by registrars (or others) for registration purposes, nor is it intended to provide specific interpretations of the ISO 14001 Standard.

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How this Guide is Organized

Section 1: **Why Your Organization Should Have an EMS**	Describes the many benefits of an EMS and how such a system can help your organization to compete and prosper in today's global marketplace.
Section 2: **Key EMS Concepts**	Summarizes overall management systems concepts. This section explains what a management system is and what must be in place for a successful EMS.
Section 3: **Initial EMS Planning**	Describes the initial process for planning an EMS and recommends some steps in the overall EMS planning effort.
Section 4: **Key Elements of an EMS**	Provides detailed guidance on how each element of your EMS could be designed and implemented. Discusses each of the key elements of an EMS and suggests how to put them in place.
Section 5: **Roadmap for EMS Development**	Describes a sequence of events or "roadmap" for implementing the key elements of an EMS and explains why the implementation of certain elements might precede others.
Appendices	Describe sources of EMS information and related EPA and state programs. Also describe the process for registering an EMS and selecting and working with a registrar. The **Tool Kit** (Appendix A) provides sample EMS policies, 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 organizations that have implemented EMS.

Use of Icons

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

The light bulb is used to highlight **EMS examples and experiences** from various organizations.

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

The key is used to indicate **keys to successful EMS implementation**, as identified by various organizations.

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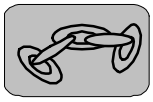
The speech balloon is used to indicate **quotes** from representatives of organizations that have implemented an EMS, as well as **definitions** from various sources (such as ISO 14001).

The Tool Box icon is used to highlight **references to useful examples and other tools** that are found in Appendix A (the Tool Kit).



The Links icon is used to summarize **critical linkages among EMS elements**.

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Section 1: Why Your Organization Should Have an EMS

A systematic approach to achieve your environmental and other organizational 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
- ☑ more favorable credit terms
- ☑ meet customer requirements

"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

Does your organization need an EMS? Well, ask yourself the following questions:

- Is your organization required to comply with **environmental laws and regulations**?
- Are you looking for ways to improve your **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 managing its environmental obligations effectively?
- Is the relationship between your organization's **environmental goals** and other goals unclear?

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

As one of your organization's leaders, you probably know that interest in environmental protection and sustainable development is growing each year. You might hear about these issues from customers, the public or others. Like many, your organization may be increasingly challenged to demonstrate its commitment to the environment. Implementing an EMS can help you **meet this challenge** in several important ways.

First, an effective EMS makes good sense, whether your organization is in the public or private sector. By helping to 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 (or provide a service) right the first time** or to fix it later?
- ❖ Is it cheaper to **prevent a spill in the first place** or to clean it up afterwards?
- ❖ Is it more cost-effective to **prevent pollution** or to manage it after it has been generated?

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"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

Second, an EMS can be an **investment in long-term viability** of your organization. An EMS can 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**.

Here's some good news: Much of what you need for an EMS may **already be in place!** The management system framework described in this Guide includes many elements that are common to **managing many organizational processes**, such as quality, health & safety, finance, or human resources. As you review this Guide, you will probably find that your organization has many EMS processes in place, even though they may have been designed for other purposes. Integrating environmental management with other key organizational processes can improve financial, quality **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 performance. Potentially significant environmental improvements (and cost savings) can be achieved by assessing and improving your organization's **management processes**. Many environmental "problems" can be solved without installing expensive pollution control equipment.

Some reasons that municipalities have implemented an EMS:

- ☑ Improved compliance performance
- ☑ Enhanced management confidence
- ☑ Increased efficiency
- ☑ Public image concerns
- ☑ Growth management
- ☑ Desire to be seen as leaders and innovators

Of course, there is some work involved in planning, implementing and maintaining an EMS. But many organizations have found that the development of an EMS can be a **vehicle for positive change**. Many organizations have seen that the benefits of an EMS far outweigh the potential costs. And while these EMS concepts certainly apply to the private sector, a number of **public sector** organizations (including municipalities) have found that they can benefit from an EMS.

In the Total Quality Management (TQM) world, they say that "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? *Then read on …*

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Frequently Asked Questions about EMS

EPA encourages the use of EMS that improve compliance, pollution prevention and other forms of environmental performance. The Agency is assessing how EMS can be used to strengthen environmental programs and policies.

1. ***We already have a compliance program – why do we need an EMS?***

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

2. ***How big does an organization need to be to successfully implement an EMS?***

EMS have been implemented by organizations ranging in size from a couple of dozen employees to many thousands of employees. The elements of an EMS (as described in this Guide) are flexible by design to accommodate a wide range of organizational types and sizes.

"We needed a system to manage things that came up in a consistent way. Our area is growing and an EMS will help us handle development issues such as controlling soil erosion and preserving the natural features of the area. An EMS is a way to control environmental problems in a rapidly growing community."

Steve Daut, Council Trustee
Village of Chelsea, Michigan

3. ***Will an EMS help us to prevent pollution?***

A commitment to preventing pollution is a cornerstone of an effective EMS and should be reflected in an organization's policy, objectives and other EMS elements. Examples throughout this Guide show how organizations have used an EMS to prevent pollution.

4. ***To implement an EMS, do we have to start from scratch?***

Much of what you have in place now for environmental management probably can be incorporated into the EMS. There is no need to "start over".

5. ***How will an EMS affect my existing compliance obligations?***

An EMS will not result in more or less stringent legal compliance obligations. But an EMS should improve your efforts to comply with legal obligations, and, in some cases, may lead to more flexible compliance requirements. (See discussion of Performance Track in **Appendix B**.)

6. ***Do we need to be in 100% compliance in order to have an EMS?***

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

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EMS Costs and Benefits

POTENTIAL COSTS	POTENTIAL BENEFITS
Internal • Staff (manager) time • Other employee time (**Note**: Internal labor costs represent the bulk of the EMS resources expended by most organizations) **External** • Potential consulting assistance • Outside training of personnel	• Improved environmental performance • Enhanced compliance • Prevention of pollution/resource conservation • New customers / markets • Increased efficiency / reduced costs • Enhanced employee morale • Enhanced image with public, regulators, lenders, investors • Employee awareness of environmental issues and responsibilities

If your organization already has or is considering a quality management system (based on ISO 9001, for example), you will find significant synergy between what you need for **quality** management and for **environmental** management (see below).

Some Common Aspects of Quality and Environmental Management Systems

QMS	EMS
• Quality Policy	• Environmental Policy
• Adequate Resources	• Adequate Resources
• Responsibilities and Authorities	• Responsibilities and Authorities
• Training	• Training
• System Documentation	• System Documentation
• Process Controls	• Operational Controls
• Document Control	• Document Control
• System Audits	• System Audits
• Management Review	• Management Review

One final note: Small and medium-sized organizations often have certain **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, processes are generally well understood, and access to management is simpler. 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.

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Section 2: Key EMS Concepts

The focus on quality principles

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

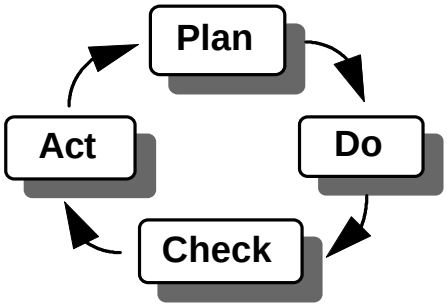
An EMS is:
A continual cycle of **planning**, **implementing**, **reviewing and improving** the processes and actions that an organization undertakes to meet its environmental obligations.

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, the systematic identification and correction of system deficiencies leads to better environmental (and overall organizational) performance.

Most EMS models (including the ISO 14001 standard, which is described later) are built on the "Plan, Do, Check, Act" model introduced by Shewart and Deming. This model endorses the concept of **continual improvement**.

Continual Improvement:
Enhancing your EMS to better your overall environmental performance

Figure 1



In the EMS model described in this Guide, the "Plan, Do, Check, Act" steps have been expanded into seventeen elements that are **linked together**. These EMS elements and their linkages are discussed in **Section 4**.

Some of the **keys** to a successful EMS include:

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

Top management" is the person or group with executive responsibility for the organization"

Top Management Commitment

Applying TQM principles to the environmental area and providing adequate resources are the job of **top management**. To initiate and sustain the EMS effort, top 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)
- ***integrating environmental management throughout the organization*** (thinking about the environment as part of product/service and process development and delivery, among other activities)

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- ***looking at problems as opportunities*** (identifying problems, determining root causes and preventing problem recurrence)

Focus on Continual Improvement

No organization is perfect. The concept of continual improvement recognizes that problems will occur. A committed organization **learns from its mistakes** and **prevents** similar problems from recurring.

Flexible & Simple = Adaptable & Understandable

Flexibility

An effective EMS must be **dynamic** to allow your organization to adapt to a quickly changing 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 — your organization's managers and other employees.

Some organizations have found that an effective EMS allows them to design pollution and other environmental impacts out of their products, services and operations. This can save money and reduce liability.

Compatibility with Organizational Culture

The EMS approach and an organization's culture should be compatible. For some organizations, this involves a choice: (1) tailoring the EMS to the culture, or (2) changing the culture to be compatible with the EMS approach. Bear in mind that changing an organization's culture can be a long-term process. Keeping this compatibility issue in mind will help you ensure that the EMS meets your organization's needs.

Employee involvement is crucial. An effective implementation team is pivotal to the success of many organizations.

Employee Awareness and Involvement

As you design and implement an EMS, roadblocks may be encountered. Some people may view an EMS as bureaucracy or extra expense. There also may be resistance to change or fear of new responsibilities. To overcome potential roadblocks, make sure that everyone understands **why** the organization needs an effective EMS, **what** their role is and **how** an EMS will help to control environmental impacts in a cost-effective manner. Employee involvement helps to demonstrate the organization's commitment to the environment **and** helps to ensure that the EMS is realistic, practical and adds value.

An EMS should integrate environmental management into day-to-day operations as well as strategic decisions. It can make the environment the responsibiity of <u>every</u> employee.

Building or improving an EMS (with the help of this Guide) provides an 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 — the focus is on *continual improvement!*

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Section 3: READY! (Initial EMS Planning)

Putting the theory of EMS into practice

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

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

Figure 2 illustrates the initial steps in the EMS planning 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 **who** must be involved will pay big dividends down the road.

Experience shows that using a **team approach** to planning and building an EMS is an excellent way to promote commitment and ensure that your objectives, procedures and other system elements are realistic, achievable, and cost-effective. Ideas for using a team and involving employees are discussed in this section.

Appendix F has information on EMS resources

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

- Help is available — don't hesitate to use it. (See **Appendix F** for information on resources.)
- Pace yourself. Move quickly enough that employees stay interested and engaged, but not so fast that those involved are overloaded or that the effort becomes superficial.
- Don't re-invent the wheel -- existing management practices should help you to meet EMS requirements.
- Consultants can help you evaluate your EMS and suggest approaches used successfully elsewhere. Explore ways to hold consulting costs down. You may be able to join forces with other organizations to hire a consultant or sponsor a training course.

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

Preliminary Review Tools: See the "NSF ISO 14001 Self Assessment Tool" (at www.nsf-isr.org) or "Incorporating Design for Environment into your Gap Analysis" (at www.epa.gov/dfe)

Some Thoughts on Using Consultants

- Assess your own in-house resources first.
- Ensure both parties understand the scope of work.
- Get references and check them. Look for consultants with experience in small organizations and your specific industry.
- Use consultants to gain insights on approaches used by other organizations.
- An EMS developed by consultants "in isolation" will not work. Your own people need to be involved in the EMS development process.

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FIGURE 2: INITIAL EMS PLANNING STEPS

READY!

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Laying the Groundwork for an EMS: Key Steps

Define Organization's Goals for EMS

A first step in EMS planning is to **decide why you are pursuing the development of an EMS**. Are you trying to improve your environmental performance (for example, compliance with regulations or prevent pollution)? Are you trying to promote involvement throughout the organization? Write your goals down and refer back to them frequently as you move forward. As you design and implement the EMS, ask: How is this task going to help us achieve our goals? This also is a good time to define the **project scope** or **"fenceline**" (i.e., what is the "organization" that the EMS will cover? One location? Multiple locations? Should we "pilot" the EMS at one location then implement the system at other locations later?).

Secure Top Management Commitment

One of the most critical steps in the planning process is **gaining top management's commitment** to support EMS development and implementation. Management must first understand the benefits of an EMS and what it will take to put an EMS in place. Explain the strengths and limitations of your current approach and how those limitations can affect the organization's financial and other performance. Management also has a role in ensuring that the **goals** for the EMS (see above) are clear and consistent with other organizational goals. Management's commitment should be communicated across the organization.

Select EMS Champion

Not all small- or medium-sized 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" (ISO 9000 experience can be a plus, but is not necessary), should have the time to commit to the EMS-building process and must have top management support.

Build Implementation Team

A **team** with representatives from key management functions (such as engineering, finance, human resources, production and/or service) can identify and assess issues, opportunities, and existing processes. Consider including contractors, suppliers or other external parties as part of the project team, where appropriate. The team will need to meet regularly, especially in the early stages of the project. A cross-functional team can help to ensure that procedures are practical and effective and can build commitment to and "ownership" of the EMS.

Hold Kick-Off Meeting

Once the team has been selected, **hold a kick-off meeting** to discuss the organization's objectives in implementing an EMS, the steps that need to be taken initially, and the roles of team members, among other topics. If possible, get top management to describe its mitment to the EMS at this meeting. The kick-off

more…

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Creating Your Own EMS (cont'd.)

meeting also is a good opportunity to provide some EMS training for team members. Follow-up this meeting with a communication to all employees.

Conduct Preliminary Review

The next step is for the team to conduct a **preliminary review** of your current compliance and other environmental programs/systems and to compare these against the criteria for your EMS (such as ISO 14001). Evaluate your organization's structure, procedures, policies, environmental impacts, training programs and other factors. Determine which parts of your current EMS are in good shape and which need additional work. See the "NSF ISO 14001 Self-Assessment Tool" (www.nsf-isr.org) or "Incorporating Design for the Environment into Your Gap Analysis" (www.epa.gov/dfe) for gap analysis tools.

Prepare Budget and Schedule

Based on the results of the preliminary review, prepare a **project plan and budget**. The plan should describe in detail <u>what</u> key actions are needed, <u>who</u> will be responsible, <u>what</u> resources are needed, and <u>when</u> the work will be completed. Keep the plan flexible, but set some stretch goals. Think about how you will maintain project focus and momentum over time. Look for potential "early successes" that can help to build momentum and reinforce the benefits of the EMS.

Secure Resources, Assistance

The plan and budget should be reviewed and **approved by top management**. In some cases, there may be **outside funding or other types of assistance** that you can use (from a trade association, a state technical assistance office, etc.). See Appendix F for more ideas on possible sources of help.

Involve Employees

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

Monitor and Communicate Progress

As you build the EMS, be sure to regularly **monitor your progress** against the project plan and **communicate** this progress within the organization. Be sure to communicate the **accomplishments** that have been made and describe what happens next. Build on small successes. Be sure to keep top management informed and engaged, especially if additional resources might be required.

Advertise your successes to keep management and employees aware of your EMS efforts. Document benefits, no matter how small they may seem at the time. As this list grows, so will EMS support.

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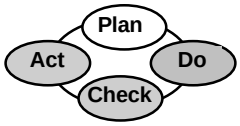


Section 4: SET! (Key Elements of an EMS)

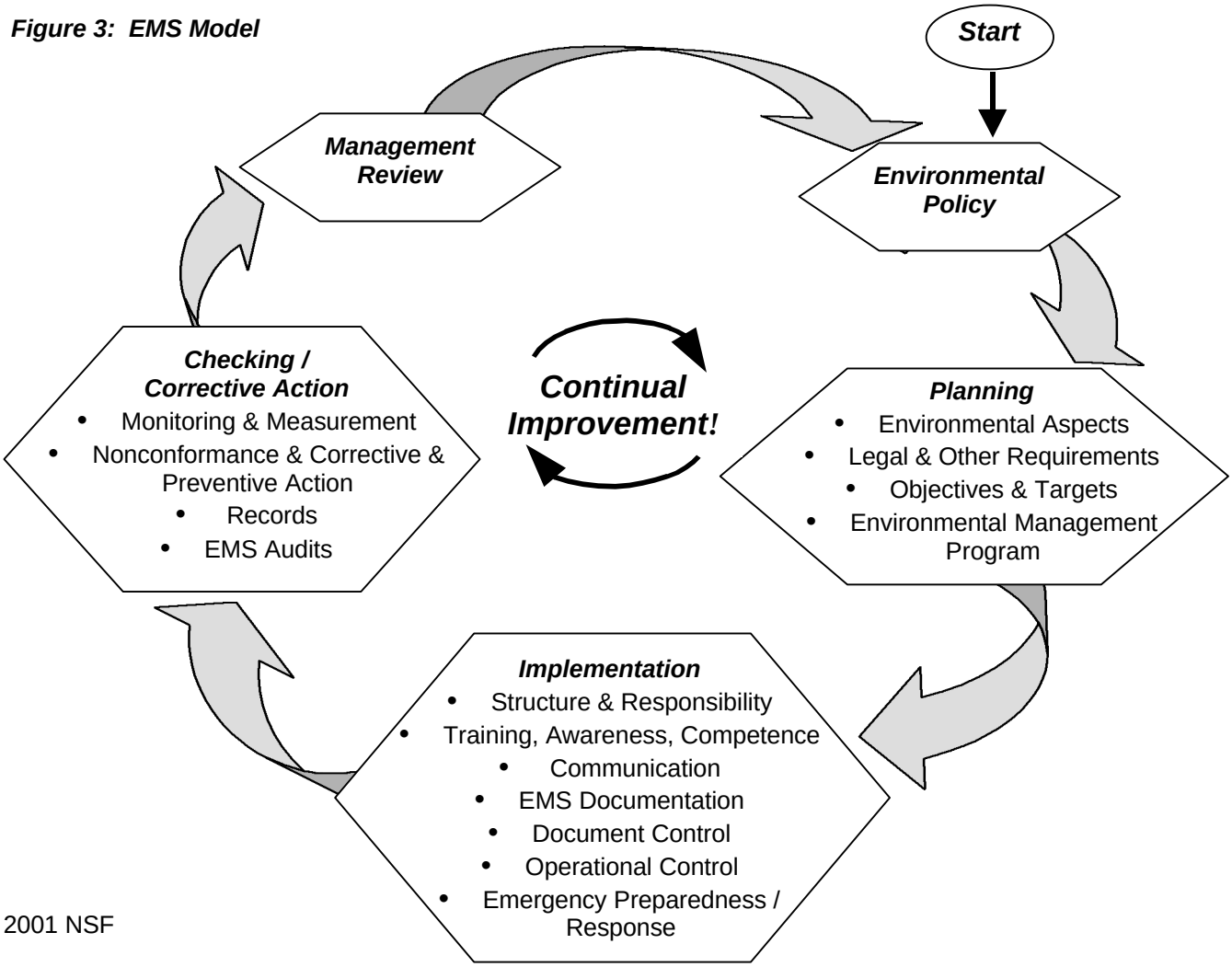
What does an EMS consist of? How are the elements linked together?

As mentioned earlier, your EMS should be built on the "Plan, Do, Check, Act" model to ensure that environmental matters are systematically **identified, controlled, and monitored**. Using this approach will help to ensure that performance of your EMS **improves** over time and that you meet your goals for implementing an EMS in the first place.

This section describes seventeen EMS elements that are common to most EMS models. This section also notes the **key linkages** among these elements. While there are several good EMS models available, this Guide generally uses the ISO 14001 Standard as a starting point for describing EMS elements. This has been done for several reasons:

- ISO 14001 is a widely accepted international standard for EMS that focuses on continual improvement;
- 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 many EMS models, including the European Union's Eco-Management and Audit Scheme, EPA's Performance Track and the Code of Environmental Management Principles for Federal Agencies, among others.

Figure 3: EMS Model



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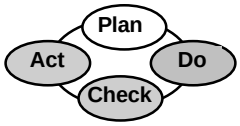

Key Elements of an EMS: A Snapshot

- **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, as well as other requirements to which your organization adheres.
- **Objectives and targets** — Establish environmental goals for your organization, in line with your policy, environmental impacts, the views of interested parties and other factors.
- **Environmental management program** — Plan actions necessary to achieve your objectives and targets.
- **Structure and responsibility** — Establish roles and responsibilities for environmental management and provide appropriate 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. Conduct periodic assessments of compliance with legal requirements.
- **Nonconformance and corrective and preventive action —** Identify and correct problems and prevent their recurrence.
- **Records** — Maintain and manage 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.

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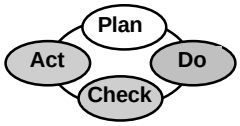

Environmental Policy

Communicating your environmental vision

Key Policy Commitments:

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

An environmental policy is top management's declaration of its commitment to the environment. This policy should serve as the **foundation** for your EMS and provide a **unifying vision** of environmental concern by the entire organization. Given its importance, 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 policy and what is expected of them in order to achieve the organization's objectives and targets.

Your policy should reflect three key commitments *(see box),* including a commitment to **continual improvement**. While this does **not** mean that you must improve in all areas at once, the policy should drive your organization's efforts to continually improve environmental management (and the improved performance that results from these efforts).

Sample environmental policies are provided in the ***Tool Kit*** *(see Appendix A).*

Hints:

- Your organization probably has some type of environmental policy now, **even if it's not written down**. For example, your organization probably is committed to complying with the law and avoiding major environmental problems, at a minimum. Document existing commitments and goals as a starting point.

- The policy should relate to your products and services, as well as supporting activities. Consider the results of your **preliminary review** (see Section 3) and your analysis of the **environmental aspects** of your products, services and activities before finalizing the policy. These two steps can provide insight as to how your organization interacts with the environment and how well it is meeting its challenges. For example, information obtained during the preliminary review might help you define specific policy commitments.

- Keep your policy **simple and understandable**. Ask yourself: What are we trying to achieve? How can we best communicate this to the rest of the organization? One test to use: Could our employees describe the intent of our policy in twenty words or less?

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

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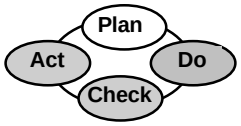


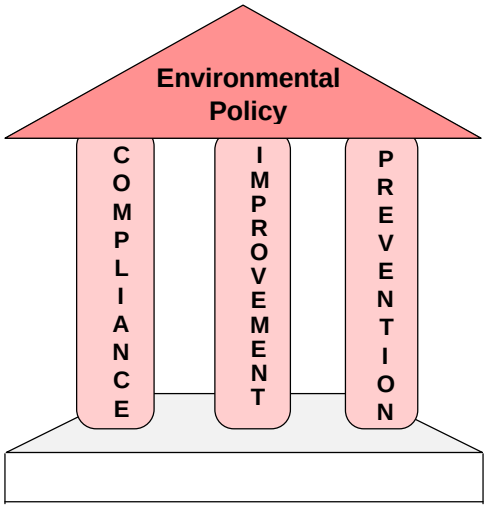


Figure 4: Three Pillars of an Environmental Policy

- The environmental policy should be **explicit enough to be audited**. If you choose to use phrases such as "We are committed to excellence and leadership in protecting the environment", consider how you would demonstrate that such a commitment is being met.

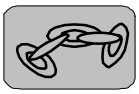
- The environmental policy can be a stand-alone document or it can be **integrated** with your health & safety, quality, or other organizational policies.

- Consider who should be involved in **developing the policy** and the best process for writing it. Input from a range of people within 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 work sites (e.g., in lunchrooms), using paycheck stuffers, incorporating the policy into training classes and materials, and referring to the policy at staff or all-hands meetings. **Test awareness** and understanding from time to time by asking employees what the policy means to them and how it affects their work.

- The policy also should be communicated **externally**. Some options for external communications include placing the policy on business cards, in newspaper advertisements and in annual reports, among other options. You might choose to communicate the policy proactively or in response to external requests (or both). This decision should be factored into your overall strategy for external communication (see later discussion under "Communications").

- Consider how you would **demonstrate** that you are living by the commitments laid out in the policy. This is a good test of whether or not the policy is a "living document".



- ***Environmental Aspects***
- ***Objectives & Targets***
- ***Training & Awareness***
- ***Communication***
- ***Management Review***

For EPA's Performance Track program, an organization's policy must include:

- **compliance with legal requirements and voluntary commitments;**
- **pollution prevention (see Figure 5);**
- **continuous improvement in environmental performance, including areas not subject to regulation, and**
- **sharing information on environmental performance and their operation of the EMS with the community.**

For more information see Appendix B.

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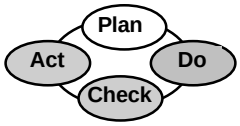


Commitments to Compliance with Legal Requirements and Pollution Prevention

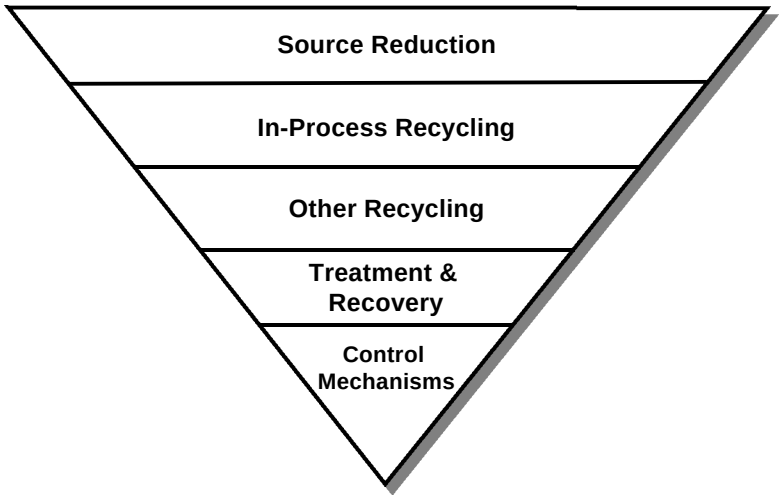
Compliance with legal requirements is a critical consideration in EMS development and implementation. EMS implementation requires an organization, among other things, to:

- develop and communicate an environmental **policy** that includes a commitment to compliance*;*
- develop and implement a procedure to identify, analyze and have **access to environmental laws and regulations**;
- set **objectives and targets** in line with its environmental policy, which includes a commitment to compliance;
- establish **management programs** to achieve its objectives;
- **train employees** and **communicate** relevant EMS requirements to them;
- establish and implement **operational control** procedures;
- establish and implement a procedure for **periodically evaluating compliance**; and
- establish and implement a procedure to carry out **corrective and preventive actions**.

While the requirements noted above relate directly to an organization's management of legal requirements, each of the seventeen EMS elements described in this Guide can contribute to enhanced compliance (including communication, documentation and document control, records management, EMS audits, and management review). An EMS that includes the elements described in this Guide will help your organization improve or maintain its compliance performance and facilitate the establishment of objectives and targets that go "beyond compliance."

Figure 5

Prevention of Pollution Hierarchy



EMS design and implementation also should take into account the **Pollution Prevention** (P2) **hierarchy**. In evaluating P2 opportunities, organizations should start at the top of the pyramid (i.e., source reduction) and work their way down as needed to define the most appropriate methods for preventing pollution. Examples and best practices of P2 in operation are provided throughout this Guide.

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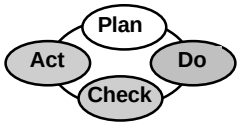

Capture the Learning: Environmental Policy Worksheet

Do we have an **existing policy?** If yes, how was the policy **developed**? When was the policy last **reviewed**?	
Does the policy reflect the **three key commitments** (commitments to compliance, prevention of pollution and continual improvement?) What **other commitments** does or should our policy contain?	
How does our policy take into account the environmental attributes of our **products, activities and services**?	
How would we **demonstrate conformance** to our policy?	
How is the policy **communicated** to our employees? Do our employees **understand** the critical elements of our policy? How do we know?	
What **feedback** have we received on the policy (from employees, contractors or other interested parties)? What happens when we receive feedback on the policy?	
How do we make our policy **available to external parties**? Is this process effective?	
Our next step on environmental policy is to …	

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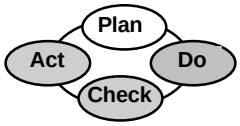


Identifying Environmental Aspects

How an organization interfaces 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."

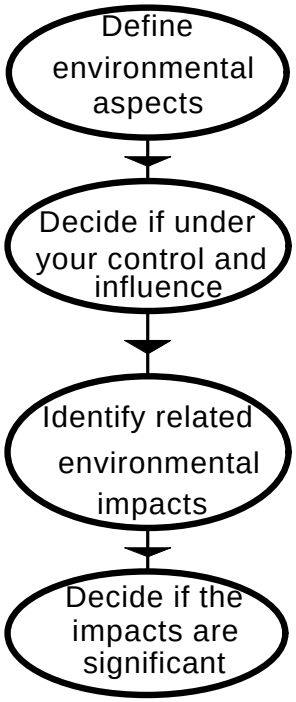
To plan for and control its environmental impacts, an organization must know what these impacts are. But knowing **what** the impacts are is only part of the challenge — you also should know **where these impacts come from**. Stated another way, *how does your organization (i.e., your products, services and activities) interact with the environment?*

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

So, an EMS should include a procedure to identify and assess environmental **aspects** that the organization:

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

Your organization **is not expected** to manage issues outside its sphere of influence or control. For example, while your organization probably has control over how much electricity it buys from a supplier, it likely does **not** control or influence the way in which that electricity is generated. Similarly, if your organization manufactures a product that is subsequently incorporated into another product (for example, a bumper that becomes part of an automobile), your organization does not control the environmental aspects of that "finished" product (the automobile). Thus, your focus should be on the environmental aspects of **your** products or services.



The relationship between aspects and impacts is often one of **cause and effect**. The term "aspects" *(see definition above)* is neutral, so keep in mind that your environmental aspects can be either **positive** (such as making a product out of recycled materials) or **negative** (such as discharging toxic materials to a stream). Aspects may result from **past activities**, such as spills.

Once you have identified the environmental aspects of your products, activities, and services, you should determine which aspects could have significant i**mpacts** on the environment. Aspects that have one or more significant impact should be considered **significant environmental aspects**. These significant aspects should be considered when you establish environmental **objectives**, define **operational controls** and consider other actions, as discussed later.

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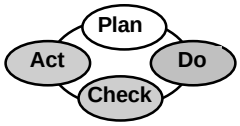

A multi-step process can be used to make this evaluation. Keep the resulting information **up-to-date**, so that potential aspects of new products, services, and activities are factored into your objectives and controls.

US Postal Service Assesses Its Environmental Aspects

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.

"Products" are tangible results of a process that transforms inputs into outputs (for example, cars or computers). "Services" also result from processes, but are intangible in that you cannot "hold" them (such as dry cleaning or equipment maintenance at a customer site). "Activities" may relate directly or indirectly to the provision of products or services to customers (such as purchasing or product design).

Milan Screw Products set up an internal task group to identify environmental aspects. As part of this process, external stakeholders were identified and interviewed to understand their environmental concerns. These stakeholder concerns were added to the list of environmental aspects.

Hints:

- In identifying aspects and impacts, look **beyond activities covered by 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 monitoring records can be useful inputs. Beyond regulated aspects, consider land, energy, and natural resource use, for example.

- 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 or scientific uncertainty) for addressing some impacts now while deferring action on others. Keep in mind that managing environmental aspects can have **positive impacts** on the organization.

- Remember to look at **services** as well as products. While the need to examine on-site operations might be obvious, you also should consider the potential impacts of what you might 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 steps in EMS implementation. It can be one of the most **challenging** – as well as one of the most **rewarding**. Decisions you make in this step can affect many other system elements (such as, setting objectives and targets, establishing operational controls and defining monitoring needs). Careful planning 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. **Flow charting** your major processes can help you understand the process inputs and outputs as well as how materials are used. A sample flow chart is provided in the **Tool Kit** (see Appendix C). You might also want to consider the **views of interested parties** (e.g., neighbors, civic groups, regulators, etc.) in this process. Some organizations have found external parties to be a good resource in identifying environmental aspects.

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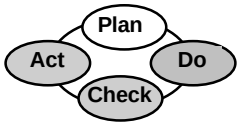


In evaluating your environmental aspects and impacts, consider both normal and abnormal (such as start-up and shutdown) operating conditions.

- You can use many sources of information to help you identify and assess your environmental aspects. For starters, look at your permits, the regulations that apply to your operations, EPCRA reports, Material Safety Data Sheets and monitoring records. Trade associations, regulatory agencies, customers and suppliers also might provide useful information to support the assessment

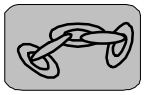
- Your team should define the **criteria** that will be used to determine significance. Such criteria often include the types of impact; the magnitude, frequency and duration of the impact; regulatory status, and other factors. Consider the **questions on the following page** for identifying and characterizing aspects and impacts.

Use visual tools. As a starting point, some organizations prepare maps of their site and building(s), along with surrounding land uses. The implementation team uses these maps to "audit" the site and identify potential environmental aspects.

- Various approaches exist for evaluating environmental aspects and impacts. Select one that can be readily adapted for your use and that makes sense for your organization. Examples of approaches for evaluating environmental aspects and impacts can be found in the **Tool Kit** (see Appendix A).

- Once you've found a process that works for your organization, describe the process in the form of a written **procedure**. A sample procedure for performing the assessment is provided in the **Tool Kit**.

- You can **start out with a simple process** for identifying aspects and impacts, then refine the process in the future as needed. You also can identify and consider more obvious environmental impacts or "low hanging fruit" first, then enhance the assessment process to consider more complex environmental impacts later. As with any element of the EMS, there is virtue in considering how your process for identifying aspects and impacts might be improved over time. Ask yourself: *Is there additional information we should consider in this process? Do we have the right people involved? Are we using the results in a meaningful way?*



- ***Objectives & Targets***
- ***Training & Awareness***
- ***Communications***
- ***Operational Controls***
- ***Monitoring & Measurement***

- Use the **worksheet** at the end of this section to capture some of your ideas. Using this worksheet will give you a "jump start" on implementing this EMS element.

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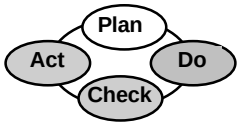

Identifying Aspects and Impacts: Some Questions to Consider:

Identifying Aspects	Evaluating Impacts
❑ Which operations and activities interface with the environment in a way that could result (or has resulted) in environmental impacts? ❑ What materials, energy sources and other resources do we use in our work? ❑ Do we have emissions to the air, water or land? ❑ Do we generate wastes, scrap or off-spec materials? If so, does the treatment of disposal of these materials have potential environmental impacts? ❑ Which characteristics or attributes of our products or services could result in impact the environment (through their intended use, end-of-life management, etc.)? ❑ Does our land or infrastructure (e.g., buildings) interact with the environment? ❑ Which activities (for example, chemical storage) might lead to accidental releases?	❑ Are the impacts actual or potential? ❑ Are the impacts beneficial or damaging to the environment? ❑ What is the magnitude or degree of these impacts? ❑ What is the frequency or likelihood of these impacts? ❑ What is the duration and geographic area of these impacts? ❑ Which parts of the environment might be affected (e.g., air, water, land, flora, fauna)? ❑ Is the impact regulated in some manner? ❑ Have our interested parties expressed concerns about these impacts?

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

Some Potential Environmental Aspect Categories:

- Air Emissions
- Solid and Hazardous Wastes
- Contamination of Land
- Local Issues (e.g. noise, odor, dust, traffic, etc.)
- Water Discharges
- Energy Use
- Raw Material and Resource Use (water, energy, etc.)
- Hazardous Material Storage and Handling

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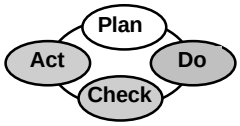

Capture the Learning: Environmental Aspects Worksheet

Do we have an **existing process** for identifying aspects and/or impacts? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization? Should any **outside parties** be involved?	
When is the **best time** for us to implement this process? Can it be **linked** to an existing organizational process (such as our budget, annual planning or auditing cycles?)	
What are some **obvious environmental aspects** of our: ☞ Operations and activities? ☞ Products? ☞ Services?	
What **sources of information** can we use to identify environmental **aspects**?	
What **sources of information** can be used to determine the environmental **impacts** of these aspects?	
What **significance criteria** might make sense for our organization?	
How will we keep this information **up-to-date**?	
Our next step on environmental aspects is to …	

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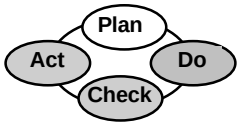

Legal and Other Requirements

Setting the legal framework for your EMS

Legal requirements include:

- Federal requirements
- State and local requirements
- Standards in locations where you sell products/services
- Permit conditions

Other requirements might include (for example):

- Company-specific codes
- International Chamber of Commerce (ICC) Charter for Sustainable Development
- American Chemistry Council's (ACC) 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

In order to comply with 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. The potential costs of non-compliance (possible damage to the environment, revenue loss and impact on public image, for example) can be very high.

Thus, an effective EMS should includes processes to:

- **identify** and **communicate** applicable legal and other requirements, and;
- **ensure** that these requirements are factored into the organization's management efforts.

New or revised legal requirements might require modification of your environmental objectives or other EMS elements. By **anticipating new requirements** and making changes to your operations, you might avoid some future compliance obligations and their costs.

Getting Started

Your EMS should include a procedure for **identifying, having access to and analyzing** applicable legal and other requirements. "Other requirements" might include industry codes of practice or similar requirements to which your organization might subscribe.

Identifying applicable regulations, interpreting them, and determining their impacts on your operations can be a time-consuming task. Fortunately, there are many methods for obtaining information about applicable laws or regulations. These methods include:

- commercial services (with updates offered on-line, on CD-ROM or in paper form);
- regulatory agencies (federal, state and local);
- trade groups / associations;
- the Internet (see USEPA web site at *www.epa.gov*);
- public libraries;
- seminars and courses;
- newsletters / magazines;
- consultants and attorneys; 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 has established

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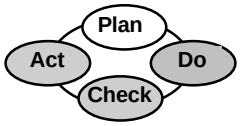
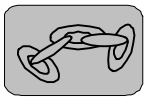


For more information on EMS and compliance, see "Improving Environmental Performance and Compliance: Ten Elements of Effective Environmental Management Systems" (see Appendix F for details)



- ***Environmental Policy***
- ***Objectives & Targets***
- ***Training & Awareness***
- ***Communication***
- ***Operational Controls***

See Appendix A for information on resources for tracking environmental laws and regulations.

technical and compliance assistance programs to help companies comply with air quality rules. In some cases, these programs have expanded into other environmental "media", such as water and waste management. In addition, National Compliance Assistance Centers can provide compliance assistance for certain industry sectors (see Appendix F for more information).

Once applicable requirements have been identified and analyzed for potential impacts, **communicate** these requirements (and plans for complying with them) to employees, on-site contractors and others, as needed. Communicating "other applicable requirements" (as well as their impacts on the organization) is an important but often overlooked step. Keep in mind that different people may have different information needs.

As with many EMS elements, this is **not a "one time" activity**. Since legal and other requirements change over time, your process should ensure that you are working with up-to-date information.

Resources to identify and track environmental laws and regulations are described in the **Tool Kit** (Appendix A).

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 sources that discharge directly to a waterbody or to a public sewer system.
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) [40 CFR Parts 150-189]	Establishes a program for Federal 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 that hold 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) are subject to specific management standards.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as "Superfund") [40 CFR Parts 300-311]	Establishes a program for cleaning up contaminated waste 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 (also known as the "Toxic Release Inventory") to inform the public about releases of hazardous and toxic chemicals. Reporting requirements apply to companies that use, process or store specific chemicals over specified quantities.
Hazardous Materials Transportation Act (HMTA) [49 CFR Parts 100-180]	Establishes standards for the safe transportation of hazardous materials.

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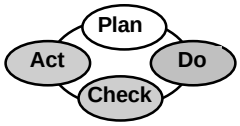

Capture the Learning: Legal & Other Requirements Worksheet

Do we have an **existing process** for identifying applicable legal and other requirements? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization? What should their responsibilities be?	
What **sources of information** do we use to identify applicable legal and other requirements? Are these sources adequate and effective? How **often do we review** these sources for possible changes?	
How do we ensure that we have **access** to legal and other requirements? (List any methods used, such as on-site library, use of web sites, commercial services, etc.)	
How do we **communicate information** on legal and other requirements to people within the organization who need such information?	
Who is **responsible** for analyzing new or modified legal requirements to determine how we might be affected?	
How will we keep information on legal and other requirements **up-to-date**?	
Our next step on legal and other requirements is to …	

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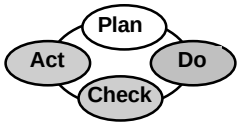


Objectives and Targets

Establishing goals for environmental management

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:

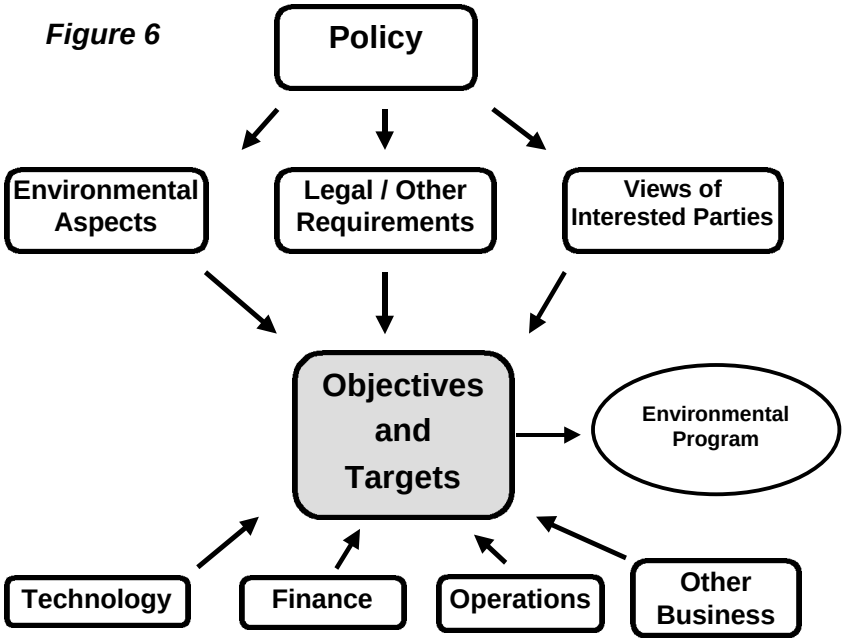
"Detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives?

Objectives and targets help an organization **translate purpose into action.** These environmental goals should be factored into your strategic plans. This can facilitate the integration of environmental management with your organization's other management processes.

You determine what objectives and targets are appropriate for your organization. These goals can be applied organization-wide or to individual units, departments or functions -- depending on where the implementing actions will be needed.

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 organizational considerations**.

Figure 6



There are no "standard" environmental objectives that make sense for all organizations. Your objectives and targets should reflect what your organization does, how well it is performing and what it wants to achieve.

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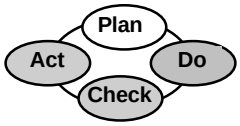
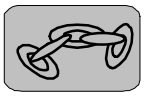


Factors to consider in setting objectives and targets

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

A sample process tool and procedure for setting objectives and targets are included in the Tool Kit (Appendix A).



- ***Environmental Policy***
- ***Environmental Aspects***
- ***Legal & Other Requirements***
- ***Structure & Responsibility***
- ***Operational Control***
- ***Monitoring & Measurement***
- ***Management Review***

Hints:

- Setting objectives and targets should involve **people in the relevant functional area(s)**. These people should be well positioned to establish, plan for, and achieve these goals. **Involving people** helps to **build commitment.**

- Get **top management buy-in** for your objectives. This should help to ensure that adequate resources are applied and that the objectives are integrated with other organizational goals.

- In **communicating objectives to employees,** try to link the objectives to the **actual environmental improvements** being sought. This should give people something tangible to work towards.

- Objectives should be **consistent** with your overall mission and plan and the key commitments established in your **policy** (pollution prevention, continual improvement, and compliance). Targets should be sufficiently clear to answer the question: “Did we achieve our objectives?”

- Be **flexible** in your objectives. Define a desired result, then let the people responsible determine **how** to achieve the result.

- Objectives can be established to **maintain** current levels of performance as well as to **improve** performance. For some environmental aspects you might have both maintenance and improvement objectives.

- Communicate your **progress** in achieving objectives and targets across the organization. Consider a regular report on this 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.

- How many objectives and targets should an organization have? Various EMS implementation projects for small and medium-sized organizations indicate that it is best to start with a limited number of objectives (say, three to five) and then expand the list over time. **Keep your objectives simple** initially, gain some early successes, and then build on them.

- Make sure your objectives and targets are **realistic.** Determine how you will **measure progress** towards achieving them.

- Keep in mind that your **suppliers** (of service or materials) can help you in meeting your objectives and targets (e.g., by providing more “environmentally friendly” products).

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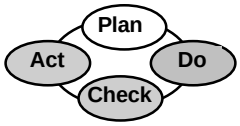

Comparing Objectives and Targets - Some Examples

Objectives	Targets
Reduce energy usage	• Reduce electricity use by 10% in 2001 • Reduce natural gas use by 15% in 2001
Reduce usage of hazardous chemicals	• Eliminate use of CFCs by 2002 • Reduce use of high-VOC paints by 25%
Improve employee awareness of environmental issues	• Hold monthly awareness training courses • Train 100% of employees by end of year
Improve compliance with wastewater discharge permit limits	• Zero permit limit violations by the end of 2001

☆☆ *POLLUTION PREVENTION* ☆☆

Pfizer Global Research & Development (formerly Warner-Lambert Parke-Davis) has a pollution prevention program that shows that improving the environment and the bottom line can go hand-in-hand. For example:

- By replacing chillers and redesigning chilling systems to be more efficient, the company has realized $250,000 in energy savings. Also, because the company is more energy efficient, it has reduced emissions from its local power supplier.
- By redesigning and modifying its dust collection system, the company replaced its 100-hp motors with 40 hp motors, without compromising the effectiveness of the dust collection system. This project lowered the company's operating costs and reduced emissions at the local power plant.

☆☆ *POLLUTION PREVENTION* ☆☆

Some Motorola manufacturing sites have reduced their water consumption and wastewater discharges by greater than 95% by installing ion exchange technology and employing better operating techniques. These changes have lowered usage of water treatment chemicals and have resulted in considerable cost savings.

EPA's Performance Track program requires organizations to consider the following factors in setting *measurable* objectives and targets:

- **Prevention of noncompliance,**
- **Prevention of pollution at the source**
- **Minimization of cross-media pollutant transfers, and**
- **Environmental performance improvement.**

Participating organizations also must show *continued improvement* in specific environmental categories, such as energy use, water discharges, or waste generation, among others.

See Appendix B for more information.

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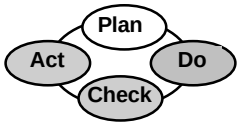

Capture the Learning: Objectives and Targets Worksheet

Do we have an **existing process** for setting and reviewing environmental objectives and targets? If so, does that process need to be revised? In what way(s)?	
Who needs to be involved in this process within our organization? Should any outside parties be involved?	
When is the **best time** for us to implement this process? Can it be **linked** to another existing organizational process (like our annual or strategic planning process?)	
What are our **existing environmental goals**? How were these developed? Who was involved? What **factors** were considered in setting these goals?	
Who are our **interested parties**? How do we **obtain their views**? **How effective** has our process been?	
How can we effectively and efficiently **track our progress** and **communicate the results**? **Who** is in the best position to do this?	
Our next step on environmental objectives and targets is to …	

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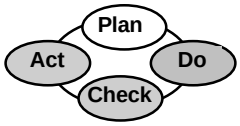
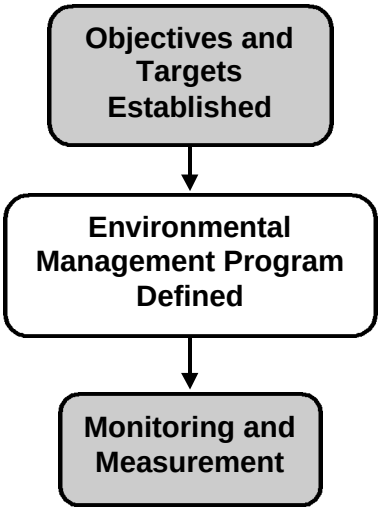


Environmental Management Program(s)

A road map for achieving environmental goals



So far, this Guide has focused on the **foundations** of an EMS -- the planning elements. An important part of this planning effort is defining what your organization intends to achieve in the environmental area. To achieve your objectives and targets, you need an **action plan --** also known as an environmental management program.

Your 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 and policy commitments into concrete actions** so that environmental objectives and targets are achieved.

To ensure its effectiveness, your environmental management program should define:

- the **responsibilities** for achieving goals *(who will do it?)*
- the **means** for achieving goals *(how will they do it?)*
- the **time frame** for achieving those goals *(when?)*

Keep in mind that your program should be a **dynamic** one. For example, consider modifying your program when:

- objectives and targets are modified or added;
- relevant legal requirements are introduced or changed;
- substantial progress in achieving your objectives and targets has been made (or has not been made); or
- your products, services, processes, or facilities change or other issues arise.

At St. Joseph's Mercy Hospital (in Michigan), mercury was in widespread use. The Hospital had a contract with a professional environmental response company to clean up and dispose of any discarded equipment and waste that resulted from mercury spills. Mercury was identified as an environmental aspect during EMS implementation, leading to the development of a Mercury Reduction Initiative. This Initiative is expected to save the Hospital as much as $20,000 per year.

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

This program should **not** be developed in a vacuum — it should be **coordinated or integrated with other organizational plans, strategies, and budgets**. For example, if you are planning for a major expansion in one of your service operations, then it makes sense to look at the possible environmental issues associated with this operational expansion at the same time.

Hints:

- **Build** on the plans and programs you have now for compliance, health & safety or quality management.
- **Involve your employees** early in establishing and carrying out the program.
- Clearly **communicate** the expectations and

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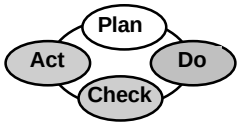
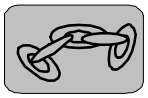


"Before, we focused on compliance issues without the benefit of an EMS. Now, we have a strategic plan in place to look beyond legal requirements and save money. It makes my job easier when I can prove my department does not have to be a cost center."

Charlie Saunders, EMS Manager, Pfizer Global Research & Development

responsibilities defined in the program to those who need to know.

- In some cases, your environmental management program may encompass a number of existing **operating procedures or work instructions** for particular operations or activities. In other cases, new operating procedures or work instructions might be required to implement the program.
- Re-evaluate your action plan when you are considering 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.
- There may be real **opportunities** here! Coordinating your environmental program with your overall plans and strategies may position your organization to exploit some significant cost-saving opportunities.



- ***Objectives & Targets***
- ***Structure & Responsibility***
- ***Communication***
- ***Operational Control***
- ***Monitoring & Measurement***

.

Figure 7: Environmental Management Program (Sample Form)

*A full-size copy of this form and another sample form are provided in the **Tool Kit** (see Appendix A).*

Objective / Target #1: _____					
Action Items	Priority	Responsibilities	Schedule	Resources Needed	Comments

☆☆ *POLLUTION PREVENTION* ☆☆

March Coatings operated a de-ionization unit to purify water for its coating process. While effective, the unit required 39,000 pounds of hydrochloric acid to operate. Concerns about potential spills and worker health & safety impacts led the company to replace the de-ionizer with a reverse osmosis unit, which completely eliminated the use of hydrochloric acid.

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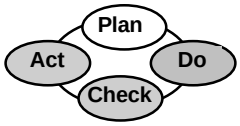

Capture the Learning: Environmental Management Programs Worksheet

Do we have an **existing process** for establishing environmental management programs? If yes, does that process need to be revised? In what way?	
What environmental management programs do we have **in place now**?	
What is the **basis** for our environmental management programs (for example, do they consider our environmental objectives, our environmental policy commitments and other organizational priorities)?	
Who needs to be involved in the design and implementation of these programs within our organization?	
When is the **best time** for us to establish and review such programs? Can this effort be **linked** to an existing organization process (such as our budget, planning or auditing cycles?)	
How do we ensure that **changes to products, processes, equipment and infrastructure** are considered in our programs?	
How will we otherwise keep our programs **up-to-date**?	
Our next step on environmental management programs is to …	

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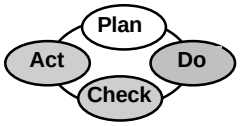

Structure and Responsibility

Aligning your resources to succeed

"Resources include human resources and specialized skills, technology, and financial resources."

- ISO 14001

For an EMS to be effective, roles and responsibilities must be clearly defined and communicated. The commitment of all employees is needed for an EMS to live up to its full potential.

Top management plays a key role by **providing resources** needed to implement the EMS. This is one of the most important jobs of top management (see "Finding Resources" on next page). In some organizations, "top management" might be a single individual, while in others it might be a group of people (such as a board of directors).

Characteristics of a good management representative:

- **Knowledgeable**
- **Assertive**
- **Independent**

An effective management system needs an advocate. Thus, 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 as needed. The management representative can be the same person who serves as the project champion (as discussed in Section 3), but this is not mandatory. A business owner, plant or shop manager, or any number of other people might serve as an effective EMS management representative.

More organizational advantages of small business:

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

Small and medium-sized organizations may have **advantages** over larger ones in structuring their resources for environmental management. Because personnel and other resources are generally more limited in smaller organizations, people often "wear more than one hat" and have experience in performing multiple functions. An individual responsible for environmental management in a smaller organization also might be responsible for quality, health & safety, facilities, or other functions. In such cases, integrating environmental responsibilities with other functions can be greatly simplified.

Getting Started

Look at:

- ☑ Program Scope
- ☑ Environmental Aspects
- ☑ Objectives
- ☑ Previous audits
- ☑ Other systems

Getting Started:

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

- ***What is the scope of our environmental management program?*** What capabilities do we need? Who will help to make the EMS effective? What training or other resources do we need?

- ***What are our significant environmental aspects and compliance needs?*** What operations / activities need to be controlled? Who needs to be involved to ensure that controls are implemented?

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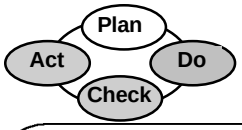

Consider integrating EMS with your existing:

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

What are the results of previous audits or other assessments? What does this information tell us about the effectiveness of our organizational structure and how it might be improved?

- ***What are the current responsibilities for environmental management?*** How can we enhance ownership of environmental management across the organization? How can other functions support the EMS? (See next page.)

- ***What are our objectives and targets, including those related to compliance and pollution prevention?*** How will the organizational structure help up achieve these goals?

- ***What quality management and / or other existing management systems exist?*** What roles and responsibilities exist in these management systems? Do opportunities for system integration exist?

*See **Appendix C** for information on process mapping*

Consider **flow charting** your existing environmental management activities. This can help you understand how these processes work and the final product can be a great communication and training tool. Flow charts also can be useful to look at processes such as chemical purchasing and distribution, employee training, and preventive maintenance, among others. **Appendix C** provides information on process mapping.

Hints:

- Build **flexibility** into your organizational structure. Recognize that environmental (and other) management needs will change over time.

- **Communicate** to people what their roles are (as well as the roles of others). One tool for communicating these responsibilities is a **responsibility matrix.** (See the **Tool Kit** in Appendix A for an example of such a matrix.)

Appendix A provides a sample responsibility matrix

More information on resources is found in Appendix F of this Guide

- ***Objectives & Targets***
- ***Training & Awareness***
- ***Communication***
- ***Management Review***

Finding Resources

In most cases, developing and maintaining an EMS will not require large capital outlays. What an EMS will require is **time**. Many smaller organizations find they can make effective use of interns or temporary employees to perform potentially time-consuming EMS development tasks (such as collecting data, drafting procedures, etc.). This allows in-house personnel to focus on more complex EMS development tasks. Also, look for areas where environmental management can support other organizational functions (and vice-versa — see next page).

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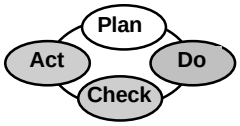

How Various Functions Can Support Your EMS

Functions	How They Can Help (Possible Roles)
Purchasing	• Develop and implement controls for chemical / other material purchases
Human Resources	• Define competency requirements and job descriptions for various EMS roles • Train temporary workers and contractors; maintain training records • Integrate environmental management into reward, discipline and appraisal systems
Maintenance	• Implement preventive maintenance program for key equipment • Support identification of environmental aspects
Finance	• Track data on environmental-related costs (such as resource, material and energy costs, waste disposal costs, etc.) • Prepare budgets for environmental management program • Evaluate economic feasibility of environmental projects
Engineering	• Consider environmental impacts of new or modified products and processes • Identify pollution prevention opportunities
Top Management	• Communicate importance of EMS throughout organization • Provide necessary resources • Track and review EMS performance
Quality	• Support document control, records management and employee training efforts • Support integration of environmental and quality management systems
Line Workers	• Provide first-hand knowledge of environmental aspects of their operations • Support training for new employees

For EPA's Performance Track program, organizations must provide appropriate incentives for personnel to meet EMS requirements. See Appendix B for more information.

See the EPA/NSF project report, *Implementing an EMS in Community-Based Organizations* for more ideas on how organizations with limited resources can implement an EMS. Download the report free of charge at www.nsf-isr.org or www.epa.gov.

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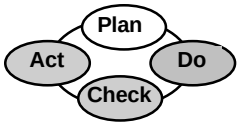

Capture the Learning: Structure & Responsibility Worksheet

How do we **define roles, responsibilities and authorities** for environmental management now? Is this process **effective?**	
Who is / should be our EMS **Management Representative**? Does this individual have the necessary authority to carry out the responsibilities of this job?	
Are our key roles and responsibilities for environmental management **documented** in some manner? If so, how (e.g., job descriptions, organizational charts, responsibility matrix, etc.)?	
How are EMS roles and responsibilities **communicated** within our organization?	
How do we ensure that **adequate resources** have been allocated for environmental management? How is this process **integrated** with our overall budgeting process? How are environmental expenditures **tracked**?	
How will we keep this information **up-to-date**?	
Our next step on structure and responsibility is to …	

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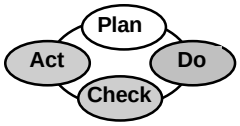


Training, Awareness and Competency

Building internal capabilities

Implementing and maintaining an EMS involves <u>everyone</u>

Reasons for <u>Training</u>:

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

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

- Every employee can have potential **impacts** on the environment, and
- Any employee can have **good ideas** about how to improve environmental management efforts.

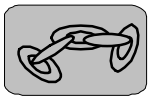
Each person and function within your organization can play a role in environmental management. For this reason, your training program should cast a wide net. Every employee and manager should be aware of the environmental policy, the significant environmental impacts of their work activities, key EMS roles and responsibilities, procedures that apply to their work and the importance of conformance with EMS requirements. Employees also should understand the **potential consequences** of <u>not</u> following EMS requirements (such as spill, releases, fines or other penalties).

All personnel should receive <u>appropriate</u> training. Such training should be **tailored** to the different needs of various levels or functions in the organization. However, training is just one element of establishing **competence,** which is typically based on a combination of education, training, and experience. For certain jobs (particularly tasks that can cause significant environmental impacts), you should establish criteria to measure the competence of individuals performing those tasks.

An example of a trainin log is provided in the Tool Kit (see Appendix A)

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** needs (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?")



- ***Environmental Aspects***
- ***Legal/Other Requirements***
- ***Structure & Responsibility***
- ***Operational Control***
- ***Records***

- 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. Competence might be established on the basis of regulatory-required training, in some instances.

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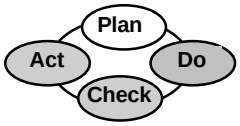

Milan Screw Products found that it could provide a great deal of its training during "brown bag" lunches, during which employees bring their lunches, participate in a training session, and remain "on the clock" for the lunch period.

Key Steps in Developing a Training Program

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

Hints:

- Because of the level of effort involved in training, this is one EMS element where you don't want to start from scratch. Many employees may be qualified on the basis of their experience and previous training. (Keep in mind that all training should be documented.) Since some employees might require training on how to operate equipment safely, **on-the-job training** certainly can play an important role. **Computer-based training** also may be an option, especially for employees who spend much of their time in the field.

- **Plan and schedule** training opportunities carefully. While finding enough time for training can be a challenge, you might find creative ways to make "more time" (see "tip", above left). Use 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 to 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.

- If the organization uses **temporary or contract workers**, assess their training needs as well.

- Factor EMS skills requirements into your **recruiting**, **selection**, and new employee **orientation** processes.

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

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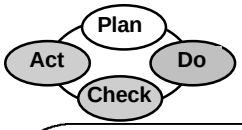

When Training Might Be Needed:

- ☑ New employee is hired
- ☑ Employee is transferred to a new job
- ☑ Individual doesn't follow procedure / instruction
- ☑ Procedures are changed
- ☑ New process, material or equipment is introduces
- ☑ Company changes objectives and/or targets
- ☑ New regulation affects organization's activities
- ☑ Job performance must be improved

- 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.

  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 perform the job safely. This can help you gauge whether additional training might be needed.

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

- Finally, some organizations have been successful in **blending environmental awareness training into existing safety training** programs. This can be particularly effective where safety training is mandated (i.e., by regulation or other organizational requirements) and has strong management support.

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 "Adults Learning: What Do We Know For Sure" (Training Magazine, June 1995)

For EPA's Performance Track, organizations must provide specific training for employees whose responsibilities relate directly to achieving objectives and targets and legal compliance.
See Appendix B for more information.

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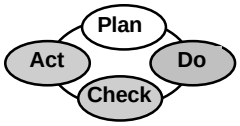

Capture the Learning: Training, Awareness & Competence Worksheet

Do we have an **existing process** for environmental training? If so, does that process need to be revised? In what way(s)?	
What types of training do we provide now (e.g., new employee orientation, contractor training, safety training)? How would EMS-related training fit with our existing training program?	
Who is responsible for training now? Who else might need to be involved within our organization?	
How do we determine **training needs** now? (List methods used) Are these processes effective?	
Who is **responsible** for ensuring that employees receive appropriate training? How do we **track training** to ensure we are on target?	
How do we **evaluate training effectiveness?** (List methods used, such as course evaluation, post-training testing, behavior observation)	
How do we **establish competency**, where needed? (List methods used, such as professional certifications) What are the **key job functions and activities** where we need to ensure environmental competency?	
Our next step on training, awareness & competence is to …	

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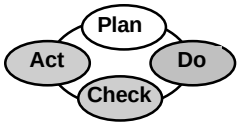

Communications

Maintaining the flow of information

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. In addition, there may be parties with an interest in your environmental performance and management efforts outside the organization. Effective environmental management requires effective communications, both internally **and** externally.

Effective communications will help you:

- motivate your workforce;
- gain acceptance for your plans and efforts;
- explain your environmental policy and EMS and how they relate to the overall organizational vision;
- ensure understanding of roles and expectations;
- demonstrate management commitment;
- monitor and evaluate performance; and,
- identify potential system improvements.

Effective **internal** communication requires mechanisms for information to flow top-down, bottom-up and across functional lines. Since employees are on the "front lines," they can be an excellent source of information, issues, concerns and ideas.

Pfizer Global Research & Development (formerly Warner-Lambert Parke-Davis) *has hosted local community leaders, state agencies, and federal agencies, to share its environmental activities and programs and to obtain feedback.*

Proactive, two way communication with external parties is also important for an effective environmental management system. Taking steps to obtain the views of these stakeholders, which can include neighbors, customers, community groups, and regulators, will help you better understand how your organization is perceived by others. These stakeholders can also bring important environmental issues to your attention that should be addressed in your EMS. Your should also condiser ways to get specific advice from these stakeholders when developing critical elements of your EMS such as setting objectives and targets. Involving these parties, however, does not mean you should cede control of your EMS to them, but rather use their input to make your EMS stronger and more responsive to community concerns. Doing so will usually provide long-term benefits to your organization.

Thus, an effective EMS should include procedures for:

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

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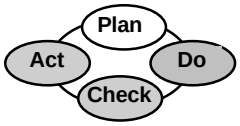

Getting Started:

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

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

Once you have identified the audiences, determine **what** you need to communicate to them. (What do they need to know about your products, operations or management efforts? What are their concerns?)

A sample procedure for external communication is provided in the Tool Kit (see Appendix A)

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:

Internal Methods	External Methods
• newsletters	• open houses
• intranet	• focus or advisory groups
• staff meetings	• web site or e-mail list
• employee meetings	• press releases
• bulletin boards	• annual reports
• brown bag lunches	• advertising
• training	• informal discussions

Hints:

- Determine how **proactive** your external communications strategy should be. Select an approach that fits your organization's culture and strategy. Consider, for example, whether reporting on environmental performance and progress might give you a competitive edge.

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

- In communicating with employees, it is helpful to explain not only **what** they need to do but also **why** they need to do it. For example, when describing a requirement based on a regulation, 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,** clear, concise, and accurate.

- Managing responses to external inquiries does not have to be burdensome. 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 process for gathering and responding to external inquiries.

- ***Environmental Policy***
- ***Environmental Aspects***
- ***Objectives & Targets***
- ***Structure & Responsibility***
- ***Monitoring & Measurement***
- ***Management Review***

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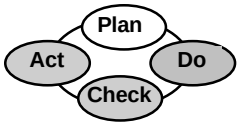

☆☆ *POLLUTION PREVENTION* ☆☆
and Public Involvement

Motorola has conducted Household Waste Electronics Recycling Days for local residents. Working in collaboration with local solid waste authorities, the Company has collected for recycle a variety of home electronic and entertainment equipment, small appliances and other products. At one of these events, over 21 tons of materials were collected and over 95% of these materials were recycled.

For EPA's Performance Track, organizations must commit to public outreach and performance reporting. Specifically, participating organizations must prepare an annual report on their EMS, a summary of progress on performance commitments, and of their public outreach activities.
See Appendix B for more information.

The community as part of the solution….

In an effort to involve stakeholders in the EMS process the Town of Londonderry, NH and the City of Lowell, MA engaged residents to collect information pertaining to environmental issues that affect their communities. For example, the Town of Londonderry, NH in conjunction with its household hazardous waste collection day, asked residents to complete a survey to prioritize community related environmental issues. The residents identified the fast pace at which the small community is growing as their top-priority issue. The City of Lowell, MA's wastewater treatment plant asked local residents to assist with efforts to address the plant's odor issues. A number of residents throughout the surrounding area recorded weather information on days the odor was prevalent. This information identified odor patterns which would aid the City's efforts to identify a solution to this problem.

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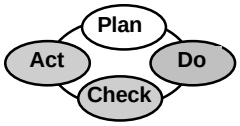

Capture the Learning: Communications Worksheet

Who are **our key external stakeholders**? How were these stakeholders **identified**?	
With regard to our organization, what are the **key concerns of these stakeholders**? **How do we know** this?	
What **community outreach efforts** are we making now (or have we made in the recent past)? How **successful** have these efforts been?	
What **methods** do we use for external communications? Which appear to be the most **effective**? Who has primary **responsibility** for external communications?	
How do we **gather and analyze information** to be communicated? Who has **responsibility** for this?	
How do we **communicate internally** (as well as with our suppliers and contractors)? What processes do we have to **respond to internal inquiries**, concerns and suggestions? **How effective** are these methods?	
Our next step on communication is to …	

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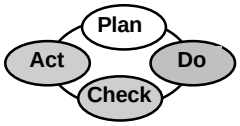


EMS Documentation

Describing the EMS and how the pieces fit together

Rule of thumb:
Try to keep the EMS description document (or manual) to no more than one page per EMS element

Easy to read and understand
equals
easy to implement

To ensure that your EMS is well understood and operating as designed, you must provide adequate information to the people doing the work. There also may be external parties that want to understand how your EMS is designed and implemented, such as customers, regulators, lending institutions, registrars and the public. For these reasons, the various processes that make up your EMS should be documented.

The EMS Manual (or description document)

A "road map" or description that summarizes how the pieces of the EMS fit together can be a very useful tool. This roadmap generally takes the form of an EMS manual.

An EMS manual is a series of explanations of the processes your organization implements to conform to the EMS criteria (such as the elements discussed in the Guide). While you don't need to maintain a single "manual" that contains all of your EMS documentation, you should maintain a summary of the EMS that:

- describes the system's **core elements** (and how the elements relate to each other), and
- provides **direction** to related documentation.

Other EMS Documentation

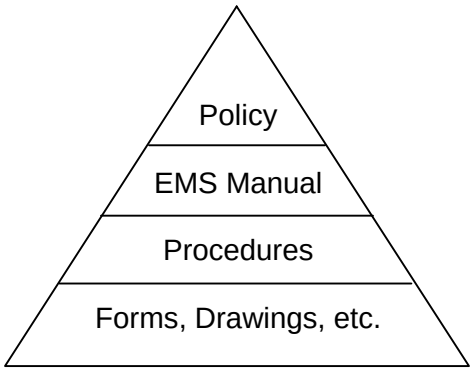
In addition to the EMS manual, your organization should maintain other documentation of its EMS.

First, you should document the processes used to meet the EMS criteria. (For example, "How do we identify environmental aspects?" "How do we implement corrective actions?") This documentation generally takes the form of system **procedures**. In addition, you might maintain area-or activity-specific documentation (such as work instructions) that instructs employees on how to carry out certain operations or activities.

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 and how you do it), while EMS **records demonstrate** that you are doing what the documentation said you would do. Document control and records management are discussed later in this Guide.

One way to think about your EMS documentation is to use the figure shown at left, which also can be applied to quality or other management system documents.

Figure 8: Hierarchy of EMS Documentation



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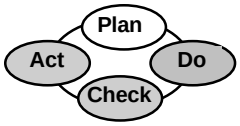


You can maintain EMS documentation either on paper or electronically. There may be some advantages to maintaining documents electronically, such as ease of updating, controlling access, and ensuring that all readers are using the most up-to-date versions of documents.

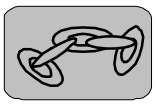
Hints:

- Keep EMS documentation **simple**. Choose a format that works best for your organization. Your manual does **not** need to describe every detail of your EMS. Instead, the manual can **provide references** to other documents or procedures.

Use flow charts or other graphics where they help explain the linkages from one system element to another

- Use the **results of your preliminary assessment** to prepare your EMS documentation. In the course of conducting this assessment, you should have collected or prepared useful material on how your organization satisfies the selected EMS criteria. The box below illustrates what constitutes EMS documentation.

- The usefulness of your EMS manual can be improved by including the organization's mission statement, vision or guiding principles (if these exist). These will improve understanding of the organization and **how the EMS supports** its overall goals.



- ***Environmental Policy***
- ***Environmental Management Programs***
- ***Document Control***
- ***Operational Control***

- An EMS manual can be a useful tool for explaining your EMS to new employees, customers and others. A sample outline for an EMS manual is provided in the **Tool Kit** (see Appendix A).

- 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 might need to update the manual frequently (see first hint, above).

<u>What Constitutes EMS Documentation?</u> ***Consider the following:***

- your environmental policy
- your organizational structure and key responsibilities
- a description or summary of **how** your organization satisfies EMS requirements (e.g., "How do we identify environmental aspects?". "How do we control documents?" How do we comply with legal requirements?")
- system-level procedures (e.g., procedure for corrective action)
- activity- or process-specific procedures / work instructions
- other EMS-related documents (such as emergency response plans, training plans, etc.)

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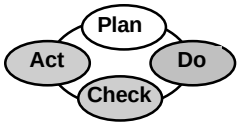

Capture the Learning: EMS Documentation Worksheet

Do we have **existing documentation of our EMS**? If yes, how is this EMS documentation **maintained** (electronically? In paper form?)	
Who is responsible for maintaining EMS documentation within our organization?	
Do we have an **EMS manual** or other summary document that describes the key elements of the EMS? If so, does this document describe the **linkages** among system elements?	
What does our EMS documentation consist of? (List components such as environmental policy, EMS manual, activity-level procedures or work instructions, emergency plans, etc.)	
Is our EMS documentation **integrated with other organizational documentation** (such as human resource plans or quality procedures)? If so, how do we ensure proper **coordination** between environmental and these other functions?	
How will we keep our EMS documentation **up-to-date**?	
Our next step on EMS documentation is to …	

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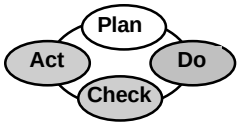

Document Control

Ensuring that everyone works with the right tools

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

People in your organization probably use various documents (procedures, work instructions, forms, drawings and the like) as they perform their duties. To ensure that personnel are **consistently** performing their jobs in the right way, the organization must provide them with the proper tools. In the context of an EMS, the "tools" needed are correct and up-to-date procedures, instructions and other documents. Without a mechanism to manage these EMS documents, the organization cannot be sure 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 such documents are controlled. Implementation of this procedure should ensure that:

- EMS documents can be **located** *(we know where to find them),*
- they are periodically **reviewed** *(we check to make sure they are still valid),*
- current versions are **available** where needed *(we make sure the right people have access to them*), and
- obsolete documents are **removed** *(people don't use the wrong documents by mistake).*

Document control should address:

- *Preparation*
- *Issuance / distribution*
- *Revision*
- *Periodic review*
- *Disposition of obsolete documents*

Your 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 generate and change documents and **the process for doing so**.

Key Questions:

Is everyone working with the same set of documents?

Do people who need access have access?

Getting Started:

- EMS document control requirements are almost a mirror image of the ISO 9001 requirements. Organizations that have or are developing an ISO 9001 management system can enjoy some advantages here.
- Even if your organization doesn't have an ISO 9001 system, you might be better off than you think. Your organization probably has document controls in place for **other purposes** (such as finance, human resources or purchasing). Assess how well these controls work and if they can be adapted for your EMS.

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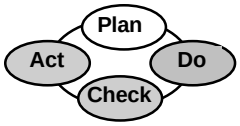

Hints:

- Don't make your procedure more complicated than it needs to be. While larger organizations often have complex processes for document control, smaller organizations can use simpler processes.

- **Limiting distribution** can make the job easier. Could everyone have access to one or a few copies? Determine **how many copies you really need** and where they should be maintained for **ease of access**.

- If the people that need access to documents are connected to a **local area network** or have access to the organization's **internal web site**, consider using a paperless system. Such systems can facilitate control and revision of documents considerably. There also are a number of **commercial software packages** that can simplify the document control effort.

- Prepare a **document control index** that shows all of your EMS documents and the history of their revision. Include this index in your manual. Also, if multiple paper 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 readers to find the changes.

- ***EMS Documentation***
- ***Operational Control***
- ***Records***

*The **Tool Kit** contains a sample index of EMS-controlled documents (see Appendix A).*

What EMS documents should be controlled? Consider the following:

- ☑ Environmental policy
- ☑ Objectives and targets
- ☑ Roles, responsibilities and authorities
- ☑ EMS description document ("manual")
- ☑ System-level procedures
- ☑ Process- or activity-level procedures / work instructions
- ☑ Related plans (such as emergency response plans)

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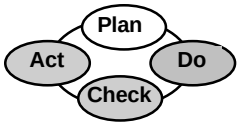

Capture the Learning: Document Control Worksheet

Do we have an **existing process** for controlling EMS documents? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization?	
Who needs **access** to controlled copies of EMS documents? How do we ensure that they have access?	
How do we ensure that EMS documents are **periodically reviewed and updated** as necessary?	
Who has authority to **generate** new documents or **modify** existing ones? How is this process managed?	
How are **users alerted** to the existence of new EMS documents or revisions to existing ones?	
How do we ensure that **obsolete** documents are not used?	
Is our EMS document control process **integrated with other organizational functions** (such as quality)? If so, how do we ensure proper **coordination** between environmental and other functions?	
Our next step on document control is to …	

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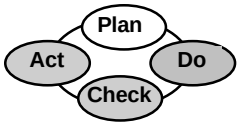
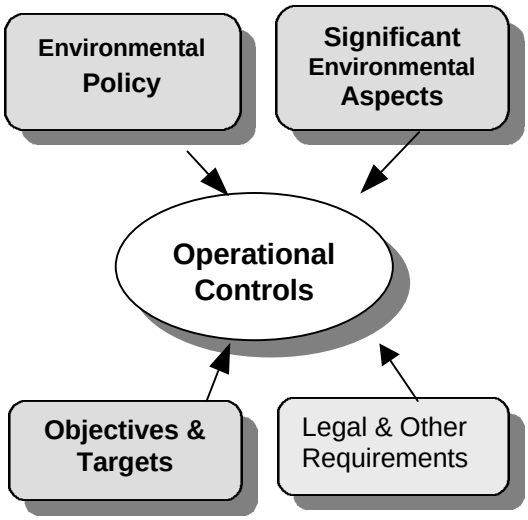


Operational Control

Building environmental performance into operations and activities

Figure 9



To ensure that you satisfy the commitments in your environmental policy, certain operations and activities must be controlled. Where operations or activities are complex and/or the potential environmental impacts are significant, controls should include documented procedures. Procedures can help your organization to manage its **significant environmental aspects**, ensure regulatory **compliance** and achieve **environmental objectives**. Procedures can also play a prominent role in employee **training**.

Documented procedures should be established where the absence of procedures could lead to **deviations from the environmental policy** (including the commitments to compliance and pollution prevention) or from your **objectives and targets**. Determining **which operations** should be covered by documented procedures and **how** those operations should be controlled is a critical step in designing an effective EMS. Keep in mind that you might need operational controls in order to manage significant aspects or legal requirements, regardless of whether you established objectives and targets for each of them.

In determining which operations and activities need to be controlled, look beyond routine production or service. Activities such as **equipment maintenance**, management of on-site **contractors**, and services provided by **suppliers or vendors** could affect your organization's environmental performance significantly.

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
- ☑ equipment servicing
- ☑ wastewater treatment
- ☑ operation of paint line
- ☑ operation of plating system
- ☑ management of contractors

Getting Started:

- Start by looking at the **environmental aspects** and **legal requirements** that you identified earlier. Identify the **operations** and other activities that are related to these significant impacts and legal requirements, then consider what types of controls might be needed to manage these aspects and compliance requirements. If you have **flow charts** of these processes (or can develop them), this may simplify the identification of the process steps where some type of control might 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 appropriate, realistic and practical. Don't be surprised if reviewers come up with a simpler way to achieve the same results!

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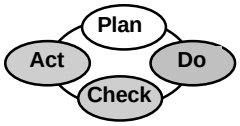

Hints:

- Review 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 controls are needed, such as:

Operation or Activity	Procedure is needed (none exists)	Procedure exists, but is not documented	Procedure exists and is documented	No procedure is needed
1	**X**			
2		**X**		
3		**X**		
4			**X**	

- **Rules of Thumb**: In general, the more highly skilled and trained your employees are, the less critical documented work instructions become. As work becomes more complex or as the potential impact on the environment increases, the more important these documented work instruction will be.

- Once you have identified operations that require control, consider what kinds of maintenance and calibration may be appropriate. **Maintenance** of equipment that could have significant environmental impacts or result in non-compliance should be considered, and the need for a plan to manage such maintenance should not be overlooked. An elaborate preventive or predictive maintenance program is **not** needed in all cases. Assess your existing maintenance program and its effectiveness before making significant changes.

Factors that could affect the need for documented procedures

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

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 does not provide better control and can confuse the user.

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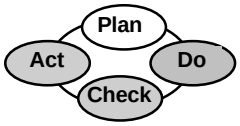
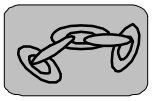


- Some of your identified environmental aspects may relate to the chemicals, raw materials, or other goods and services you obtain from **vendors/suppliers**. Likewise, the activities of your **contractors** can affect your environmental performance. **Communicate your expectations** (including any relevant procedures) to these business partners.



- ***Policy***
- ***Environmental Aspects***
- ***Legal/Other Requirements***
- ***Objectives & Targets***
- ***Training***
- ***Monitoring & Measurement***

- While the development of procedures can be time-consuming, organizations have come up with creative ways to reduce the burden. For example, consider using a college intern or temporary employee to interview employees "on the line", collecting 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 work areas (or to modify existing procedures for EMS purposes).

☆☆ *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.

For EPA's Performance Track program, organizations must have operation and maintenance programs for equipment and operations that relate to legal compliance and significant environmental aspects.
See Appendix B for more information.

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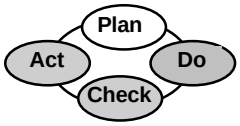

Capture the Learning: Operational Controls Worksheet

Have we **identified operations and activities** associated with significant environmental aspects, legal requirements and environmental objectives? If not **how will this be accomplished**? Who should be **involved**?	
What operations and activities are associated with **significant environmental aspects**?	
What operations and activities are associated with **legal requirements**?	
What operations and activities are associated with environmental **objectives and targets**?	
How are the above operations and activities **controlled**? (list methods)	
How do we know whether these **controls are adequate** (i.e., to manage significant aspects, to ensure compliance, to achieve objectives?	
How do we **train** employees and contractors on relevant operating controls?	
If **new controls** are needed (or **existing ones need to be revised**), what is our **process** for doing so? Who needs to be **involved** in this process?	
Our next step on operational control is to …	

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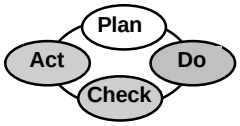

Emergency Preparedness and Response

Minimizing the impacts of uncontrolled events

Despite an organization's best efforts, the possibility of accidents and other emergency situations still exists. Effective **preparation and response** can reduce injuries, prevent or minimize environmental impacts, protect employees and neighbors, reduce asset losses and minimize downtime.

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

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.

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

Consistent with the focus on continual improvement, it is important to **review** your emergency response performance **after an incident** has occurred. Use this review to determine if more training is needed or if emergency plans / procedures should be revised.

USEFUL INFORMATION SOURCES:

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

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 now and assess how well it satisfies the items discussed above.
- Two planning components that many organizations overlook are how they **identify the potential for accidents** and emergencies and how they **mitigate the impacts** of such incidents. A cross-functional team (with representatives 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.

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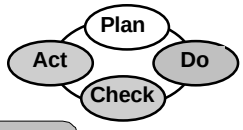

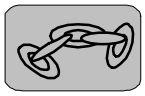

- ***Environmental Aspects***
- ***Legal/Other Requirements***
- ***Training & Awareness***
- ***Communication***
- ***Document Control***

- 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.
- **Revise and improve your plan** as you learn from mock drills, training or actual emergencies.

Checklist for Emergency Preparedness and Response Plans

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?

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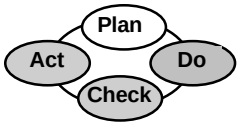

Capture the Learning: Emergency Preparedness & Response Worksheet

Have we **reviewed our operations and activities** for potential emergency situations? If not **how will this be accomplished**? Who should be **involved**?	
Do our existing emergency plans describe how we will **prevent** incidents and associated environmental impacts? If not **how will this be accomplished**? Who should be **involved**?	
Have we **trained personnel** on their roles and responsibilities during emergencies?	
What **emergency equipment** do we maintain? How do we know that this equipment is adequate for our needs?	
How do **contractors and other visitors** know what to do in an emergency situation?	
When was our last emergency **drill**? Is there a plan / schedule for conducting future drills?	
Have we established a **feedback loop** so we can learn from our experiences?	
Our next step on emergency preparedness & response is to …	

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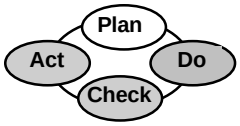

Monitoring and Measurement

Assessing how well the system is performing

"If you can't measure it, you can't manage it."

- **Peter Drucker**
Management Expert

An EMS without effective monitoring and measurement processes 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 an organization to:

- **evaluate** environmental **performance**;
- **analyze root causes** of problems;
- **assess compliance** with legal requirements;
- **identify** areas requiring **corrective action**, and,
- **improve performance** and **increase efficiency**.

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

Which operations and activities can have significant environmental impacts?

What are the key characteristics of these operations and activities?

How do we measure these characteristics?

Your organization should **develop procedures** to:

- **monitor key characteristics** of operations and activities that can have significant environmental impacts and/or compliance consequences;
- **track performance** (including your progress in achieving 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 a resource-intensive effort. One of the most important steps you can take is to clearly **define your needs**. While collecting meaningful 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 process, then build on it as you gain experience with your EMS.

Attributes of effective measurement programs

- ☑ simple
- ☑ flexible
- ☑ consistent
- ☑ ongoing
- ☑ produce reliable data
- ☑ communicate results

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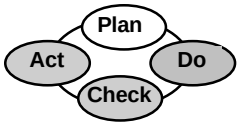

Hints:

- **Monitoring key process characteristics**: Many management theorists endorse the concept of the "**vital few**" — that is, that a limited number of factors can have a substantial impact on the outcome of a process. The key is to figure out what those factors are and how to measure them. Process mapping can help you determine what those factors might be.

EPA policies provide incentives for effective compliance management programs. See "Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations" (http://es.epa.gov/oeca/finalpolstate.pdf) and "Small Business Compliance Policy" (http://es.epa.gov/oeca/sbcp2000.pdf)

- 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 look at "upstream" factors, such as the amount of paint used per unit of product or the number of employees trained on a topic. Select a combination of process and outcome measures that are right for your organization.

- **Equipment calibration**: Identify process equipment and activities that truly affect your environmental performance. As a starting point, look at those **key process characteristics** you identified earlier. Some organizations place critical monitoring equipment under a special calibration and preventive maintenance program. This can help to ensure accurate monitoring and make employees aware of which instruments are most critical for environmental monitoring purposes. Some organizations find it is more cost-effective to subcontract calibration and maintenance of monitoring equipment than to perform these functions internally.

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

- **Regulatory compliance**: Determining your compliance status on a regular basis is very important. You should have a procedure to systematically **identify, correct, and prevent** violations. Effectiveness of the compliance assessment process should be considered during EMS **management review**. EPA encourages "systematic discovery" of regulatory violations, which means detecting potential violations through environmental audits or compliance management systems that show due diligence in preventing, detecting and correcting violations.

- **Operational performance**: Consider what information you will need to determine if the company is implementing operational controls as intended. The example on Page 62 illustrates the relationship among monitoring and measurement, operational controls and significant environmental aspects.

Focus on things that you can do something about

- **Progress on meeting objectives**: You should measure progress on achieving objectives and targets on a regular basis and communicate the results of such measurement to top management. To measure progress in meeting objectives, select appropriate performance indicators (see below).

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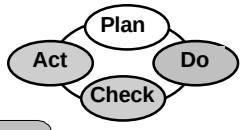

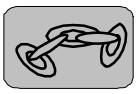

- ***Environmental Aspects***
- ***Legal/Other Requirements***
- ***Objectives & Targets***
- ***Operational Control***
- ***Corrective Action***
- ***Management Review***

- **Selecting performance indicators:** Performance indicators can help you to understand how well your EMS is working. Start by identifying a few performance indicators that are:
  - **simple** and understandable;
  - **objective**;
  - **measurable**; and
  - **relevant** to what your organization is trying to achieve (i.e., its objectives and targets)

  Data collected on performance indicators can be quite helpful during **management reviews**. So, select indicators that will provide top management with the information it needs to make decisions about the EMS.

  Make sure you can commit the necessary **resources** to track performance information over time. It is OK to **start small** and build over time as you gain experience in evaluating your performance. Keep in mind that **no single measurement** will tell your organization how it is doing in the environmental area.

The value of periodic monitoring:

St. Joseph's Mercy Hospital noticed an increase in its discharge of silver to the local wastewater treatment plant. They investigated what had changed at the Hospital and found that a new x-ray processor had been installed without a silver recovery system. Once the recovery system was installed, silver discharge levels returned to permitted levels.

- **Communicating performance**: 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).

- **Compliance auditing guidance**: The USEPA has prepared guidance documents and protocols for conducting environmental compliance audits under a number of its regulatory programs. For more information, check the EPA web site at www.epa.gov/oeca/index.html.

☆☆ *POLLUTION PREVENTION* ☆☆

A Pitney Bowes Inc. facility formed a Zero Discharge Task Team to design projects to reduce emissions over a five-year period. Wastes were ranked ordered in terms of their potential risks to the environment and employee safety. Those with high rankings were evaluated on a priority basis. Through the implementation of many projects, the facility has reduced hazardous waste generation by 69%, EPCRA 313 air emissions by 98% and treated wastewater by 93%. Projects included finding substitutes for parts cleaning and degreasing, replacement of all cyanide processes, and installation of fume scrubbers on plating lines, among others.

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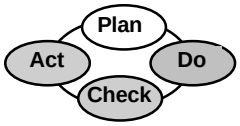

Figure 10:
Linking Monitoring Processes to Operational Controls: One Example

Operation with Significant Environmental Aspect	Operational Controls	Key Characteristics of Operation or Activity	Monitoring or Measurement Methods	Equipment Calibration Needs
Surface Coating Operation	• Approved list of coatings	• Type of coating	• Compare to approved list	• None
(significant aspect is VOC emissions)	• Coating work instruction	• Rate of application	• Measure quantity applied	• Flow meter
		• Frequency of application	• Use coating log book	• None
	• Permit report procedure	• Emissions of VOCs	• Calculate based on use	• Flow meter
Liquid Waste Storage	• Generator • procedure	• Use of proper containers	• Inspections of storage area	• None
(significant aspect is potential for spills)		• Segregation of incompatibles	• Inspections of storage area	• None
	• Storage area procedure	• Availability of spill equipment	• Inspections of storage area	• None

Examples of 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

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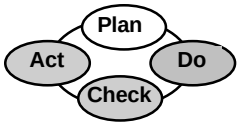

Capture the Learning: Monitoring and Measurement Worksheet

Have we **identified operations and activities** associated with significant environmental aspects, legal requirements and environmental objectives? If, not how will this be accomplished?	
What type(s) of monitoring and measurement do we need to ensure that **operational controls** are being implemented correctly?	
What type(s) of monitoring and measurement do we need to ensure that we are **complying** with **applicable legal requirements?**	
What type(s) of monitoring and measurement do we need to ensure that we are **achieving** our environmental **objectives & targets?**	
How do we identify the **equipment** used for any of the monitoring or measurement listed above? If not how will this be accomplished?	
How will we ensure that monitoring and measurement equipment is properly **calibrated and maintained**?	
What process do we have to periodically **evaluate compliance with legal requirements**? How effective is this process?	
Our next step on monitoring and measurement is to …	

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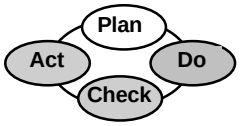

Nonconformance and Corrective / Preventive Action

Fixing EMS problems – and avoiding them in the future

Key Steps

- ☑ identify the problem
- ☑ investigate to identify the root cause
- ☑ come up with solution
- ☑ implement solution
- ☑ document solution
- ☑ communicate solution
- ☑ evaluate effectiveness of solution

No EMS is perfect. You will probably identify problems with your system (especially in the early phases) through audits, measurement, or other activities. In addition, your EMS will need to change as your organization changes and grows. To deal with system deficiencies, your organization needs a process to ensure that:

- **problems** (including nonconformities) are **identified** and **investigated**;
- root **causes** are **identified**;
- corrective and preventive **actions** are **identified** and **implemented**; and,
- **actions** are **tracked** and their **effectiveness is verified**.

EMS nonconformities and other system deficiencies (such as legal noncompliance) should be analyzed to detect patterns or **trends**. Identifying trends allows you to anticipate and **prevent** future problems.

"Nonconformance" means…

- system does not meet the EMS criteria

-- or --

- implementation is not consistent with the EMS description

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

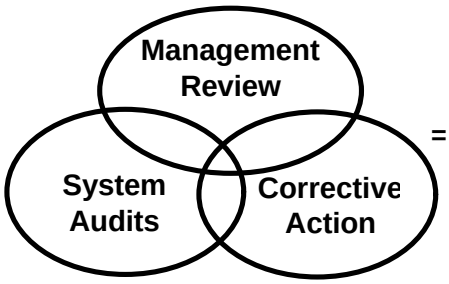

Figure 11:

= System Improvement

Hints:

- If your organization has an ISO 9001 management system, you should already have a corrective and preventive action process for **quality** purposes. Use this as a model (or integrate with it) for EMS purposes.

- Some organizations find that they can **combine** some elements of their management review and corrective action processes. These organizations use a portion of their management review meetings to review noncomformities, discuss causes and trends, identify corrective actions and assign responsibilities.

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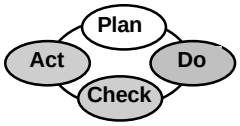
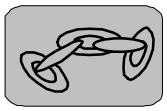


Why do EMS problems occur?
Typical causes include:

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



- ***Legal & Other Requirements***
- ***Operational Control***
- ***Monitoring & Measurement***
- ***EMS Audits***
- ***Management Review***

- The amount of planning and documentation needed for corrective & preventive actions will vary with the **severity** of the problem and its potential environmental **impacts**. Don't go overboard with bureaucracy — simple methods often work quite effectively.

- Once you document a problem, the organization must be committed to **resolving it in a timely manner**. Be sure that your corrective & preventive action process specifies **responsibilities** and **schedules** for completion. Review your **progress** regularly and follow up to ensure that actions taken are effective.

- Make sure your actions are based on good information and analysis of causes. While many corrective actions may be "common sense," you need to **look beneath the surface** to determine **why** problems occur. Many organizations use the term "**root cause**" in their corrective and preventive action processes. While this term can be used to describe a very formal analysis process, it can also mean something simpler – looking past the obvious or immediate reason for a nonconformance to determine why the nonconformance occurred.

- **Rule of thumb**: Corrective actions should (1) resolve the immediate problem (2) consider whether the same or similar problems exist elsewhere in the organization, and (3) prevent the problem from recurring. The corrective action process also should define the responsibilities and schedules associated with these three steps.

- Initially, most EMS problems may be identified by your internal auditors. However, over the long run, many problems and good ideas may be identified by the people doing the work. **This should be encouraged**. Find ways to get employees involved in the system improvement process (for example, via suggestion boxes, contests or incentive programs).

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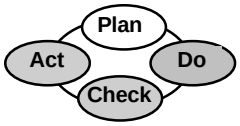

People doing the work are often in the best position to see problems and suggest solutions

The Tool Kit contains a sample corrective action procedure and tracking log (see Appendix A)

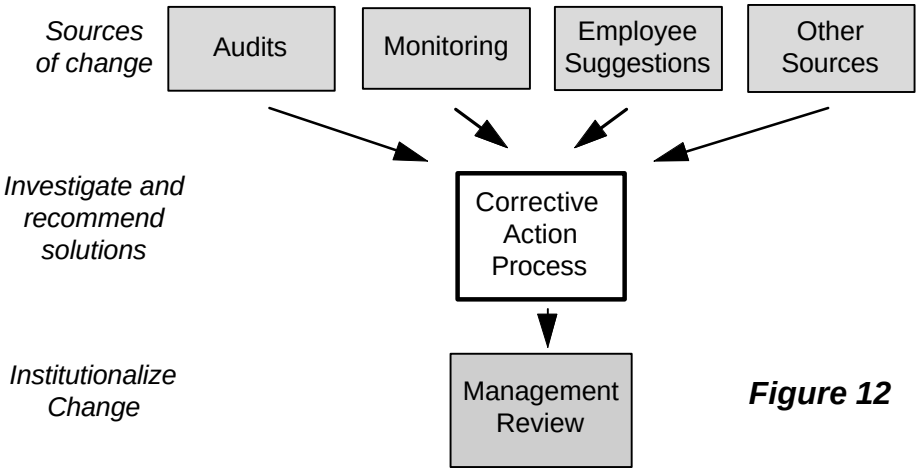

Figure 12

☆☆ *POLLUTION PREVENTION* ☆☆

By switching from a solvent-based paint that contained lead to a no lead, low-solvent, water-based paint, March Coatings dramatically decreased its volatile organic compound (VOC) air emissions from over 19 tons in 1995 to less than 6 tons in 1999 while simultaneously increasing production. The company went from being a large quantity generator of hazardous waste to small quantity generator status under RCRA. March Coatings accomplished this by working closely with its paint supplier to find a formula that met their needs.

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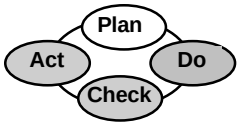

Capture the Learning: Corrective & Preventive Action Worksheet

Do we have an **existing process** for corrective and preventive action? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization?	
How are **nonconformities** and other potential system deficiencies **identified**? (List methods such as audits, employee suggestions, ongoing monitoring, etc.)	
How do we **determine the causes** of nonconformities and other system deficiencies? How is this information used?	
How do we **track the status** of our corrective and preventive actions?	
How is / can **information** on nonconformities and corrective actions **be used within the EMS** (for example, in management review meetings, in employee training sessions, in review of procedures, etc.)	
How do we **ensure the effectiveness** of our corrective and preventive actions?	
Our next step on corrective and preventive action is to …	

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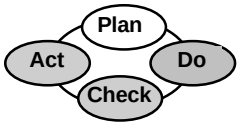

Records

Evidence that the EMS is working as intended

The value of records management is fairly simple — you should be able to **demonstrate** 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 sometimes seen as bureaucratic, but it is difficult to imagine a system **operating consistently** without accurate records.

What are "records"?

Records provide evidence that the processes that make up your EMS are being implemented as described.

The basics of records management are 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 9001 (or other) management system, you should have a process in place for managing records. This process could be adapted for EMS purposes.

Hints:

- Start by **identifying** what **EMS records are required**. Look at your other procedures and work instructions to determine **what evidence is needed to demonstrate implementation**. Also consider records that are required by various **legal requirements**.

- **Focus on records that add value —** avoid bureaucracy. If records have no value or are not specifically required, don't collect them. The records you choose to keep should be **accurate and complete**.

- You may need to generate certain **forms** in order to implement your EMS. When these forms are filled out, they become records. Forms should be **simple and understandable** for the users.

- 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 process, be sure to consider:
  - who needs access?
  - to what records?
  - in what circumstances?

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

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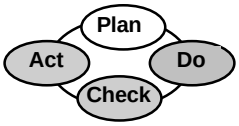
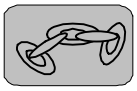


Key Questions

- ☑ 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?

- 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 maintained at another location?



Virtually every element of an EMS can result in the generation of records

The Tool Kit contains a tool for organizing your filing system (see Appendix A). You can copy the pages, cut out the tabs, and use them to set up your filing system.

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
- job descriptions and performance evaluations
- 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

Capture the Learning: Records Management Worksheet

Have we **identified what records** need to be maintained? Where is this defined?	
Have we determined records **retention times**? Where is this defined?	
Have we established an effective **storage and retrieval** system?	
Our next step on records is to …	

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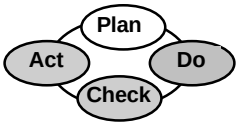

EMS Auditing

Objective evidence of conformance with EMS requirements

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 smaller organization, periodic audits can be particularly valuable. Managers are often so close to the work performed that they may not see problems or bad habits that have developed. Periodic EMS audits will help determine whether **all** of the requirements of the EMS are being carried out **in the specified manner**.

Audits are vital to continual improvement

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

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

Results of your EMS audits should be linked to the **corrective** and **preventive action** process, 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 its performance, and
- ensure the system's **cost-effectiveness**.

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

Getting Started:

- ***How frequently do we need to audit?*** To determine an appropriate frequency of your EMS audits, consider the following factors:

  - the nature of your **operations** and **activities**,
  - your significant environmental **aspects / impacts** (which you identified earlier),
  - the results of your **monitoring** processes, 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 conducting frequent audits, but the decision is up to you).

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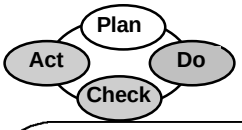

Audit procedures should describe:

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

Traits of a good auditor:

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

- ***Who will perform the audits?*** You should select and train 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 or other organizations in your area (perhaps through a trade association) to sponsor an auditor training course. Some local community colleges also offer EMS auditor training courses.

  Auditors should be trained in **auditing techniques** and **management system** concepts. Familiarity with environmental regulations, facility operations, and environmental science can be 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 auditor training, but make sure that an **experienced auditor** leads or takes part in those "training" audits.

  Auditors should be **independent of the activities being audited**. This can be a challenge for small organizations. See the box on next page for ideas.

  If your company is registered under **ISO 9001**, consider using your internal quality auditors as EMS auditors. While some additional training might be needed for EMS auditing, many of the required skills are the same.

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

Hints:

- Your EMS audits should focus on **objective evidence of conformance**. During an audit, auditors should resist the temptation to evaluate, for example, **why** a procedure was not followed — that step comes later.

- During an audit, auditors should **review identified deficiencies** with people who work in the relevant area(s). This will help the auditors verify that their audit findings are correct. This also can reinforce employee awareness of EMS requirements.

- If possible, train at least **two** people as internal auditors. This will allow your auditors to work as a **team**. It also allows audits to take place when one auditor has a schedule conflict, which is often unavoidable in a smaller organization!

Sources of Evidence

- ☑ interviews
- ☑ document review
- ☑ observation of work practices

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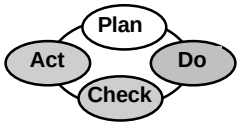


Results of regulatory compliance audits are often good indicators of EMS deficiencies. Use compliance audit findings to guide your EMS efforts

Options for Auditor Independence

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

- **Before you start** an audit, be sure to **communicate** the audit scope, criteria, schedule, and other pertinent information to the people in the affected area(s). This helps to avoid confusion and facilitate the audit process.

*The **Tool Kit** includes a sample EMS audit procedure, sample EMS audit questions, and a number of sample audit forms (see Appendix A)*

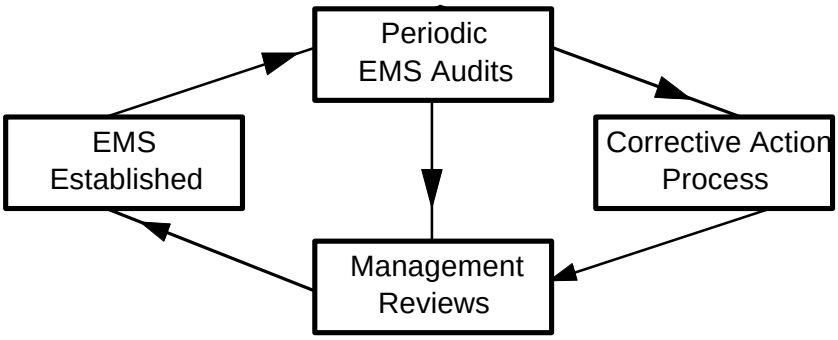
- Consider **integrating** your EMS and regulatory compliance audit processes, **but** keep in mind that these audit processes have different purposes. While you might want to **communicate the results** of EMS audits widely within your organization, the results of compliance audits might need to be communicated in a more limited fashion.

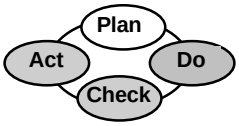
- Final thought: An EMS audit **is** a check on how well your system meets your own established EMS requirements. An EMS audit is **not** an assessment of how well employees do their jobs. Auditors should avoid the "gotcha" mentality. Audits should be judged on the **quality** of findings, rather than on the number of findings.

- ***Structure & Responsibility***
- ***Training & Awareness***
- ***Corrective Action***
- ***Management Review***

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

Figure 13:
Linkages among EMS audits, corrective action and management reviews





Capture the Learning: EMS Auditing Worksheet

Have we developed an **EMS audit program**? If not, how will this be accomplished? **Who need to be involved** in the audit process?	
Is there **another audit program** with which our EMS audits could be **linked** (for example, our quality or health & safety management system audits)?	
Have we determined an appropriate **audit frequency**? What is the **basis** for the existing frequency? Should the frequency of audits be modified?	
Have we **selected** EMS auditors? What are the **qualifications** of our auditors?	
What **training** has been conducted or is planned for our EMS auditors?	
Have we **conducted EMS audits** as described in the audit program? Where are the results of such audits described?	
How are the results of EMS audits **communicated** to top management?	
How are the **records** of these audits maintained?	
Our next step on EMS auditing is to …	

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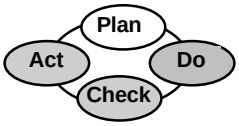

Management Review

Closing the continual improvement loop

An effective EMS is one that:

- ☑ ***meets the organization's needs***
- ☑ ***produces results***
- ☑ ***conforms to EMS criteria***
- ☑ ***has staying power***

Just as a person should have periodic physical exams, your EMS must be reviewed periodically by top management to stay "healthy". Management reviews are one **key to continual improvement** and for 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 to 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 the system **working**?" (i.e., is it suitable, adequate and effective, given our needs?)

Hints:

- Two kinds of people should be involved in the management review process:
  - people who have the right **information** / knowledge,
  - people who can **make decisions** about the organization and its resources (top management).
- Determine management review **frequency** that will work best for your organization. Some organizations combine these reviews with other meetings (such as director meetings). Other organizations hold "stand-alone" reviews. At a minimum, consider conducting management reviews at least once per year.
- During management review meetings, make sure that someone records what **issues** were discussed, what **decisions** were arrived at, and what **action** items were selected. Results of management reviews should be **documented**.
- Management reviews should assess how **changing circumstances** might influence the suitability, effectiveness or adequacy of your EMS. Changing circumstances might be **internal** to your organization (such as new facilities, new raw materials, changes in products or services, new customers, etc.) or might be **external** factors (such as new laws, new scientific information or changes in adjacent land use).

"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

*The **Tool Kit** contains a sample Management Review procedure.*
(See Appendix A)

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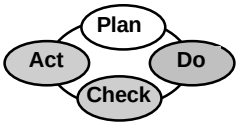
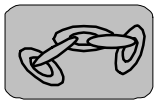


Information sources to consider:

- ☑ 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

Consider holding management review meetings "after hours" to minimize disruption of work.



All elements of the EMS should be considered as part of Management Review

- After documenting the action items arising from your management review, be sure that someone **follows-up**. Progress on action items should be tracked to completion.
- As you assess potential changes to your EMS, consider **other organizational plans and goals**. In this way, environmental decision-making can be integrated into your overall management and strategy.

Management Review: Questions to Ponder

- 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, do they make sense and are they communicated effectively?
- Are we applying **resources** appropriately?
- Are our **procedures** clear and adequate? Do we need other controls? Should we eliminate some of them?
- Are we **fixing problems** when we find them?
- 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 other changes are coming in the near term? What impacts (if any) will these have on our EMS?
- What **stakeholder concerns** have been raised since our last review? How are concerns being addressed?
- Is there a **better way**? What can we do to **improve**?

Smaller organizations often favor employee experience over written procedures and documented systems. However, personnel turnover without documented systems can stall progress. When the manager of the Washtenaw County Home Toxics Reduction Program took over his position, there had been a six-month gap since his predecessor had left and very little in place to tell him what to do, whom to contact, or what the history of the program was. Having an EMS can facilitate a smooth transfer of responsibilities for environmental management.

YOU SHOULD NOW UNDERSTAND ALL OF THE ELEMENTS OF AN EFFECTIVE EMS !!

NOW YOU'RE READY TO "GO"! (See next section)

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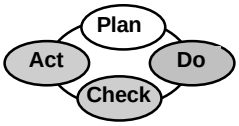

Capture the Learning: Management Review Worksheet

Do we have an **existing process** for conducting management reviews? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization?	
When is the **best time** for us to implement this process? Can this effort be **linked** to an existing organization process (such as our budget, annual planning or auditing cycles?)	
How **frequently** are management reviews? What is the **basis** for this frequency? Should we conduct reviews more or less frequently?	
Who is responsible for **gathering the information** needed to conduct management reviews? Who is responsible for **presenting** this information?	
How do we ensure that **changing circumstances** (both internal and external to the organization) are considered I this process?	
How do we ensure that the **recommendations** of management reviews are **tracked and acted upon**?	
Our next step on management review is to …	

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Section 5 : GO! (Roadmap for EMS Development)

A sequence of activities for building an EMS from the ground up

Once you gain an understanding the individual elements of an EMS, you can begin the process of **putting these elements in place**. Each of the individual EMS elements is described in detail in Section 4. Also, several "up front" EMS planning tasks (such as gaining top management commitment) were described in Section 3.

Ford Motor Company conducted ISO 14001 implementation workshops for its suppliers. Part of these workshops was devoted to a discussion of how to "launch" the EMS effort through a set of implementation steps.

Experience of many organizations shows that the **order** in which EMS implementation activities should take place is not always obvious or intuitive. Further, the optimal **sequence of implementation activities** does not necessarily follow the order in which elements are described in various EMS models, such as ISO 14001. Using a logical sequence can save time and money and minimize the "false starts" an organization might make.

This section provides a **step by step action plan** for developing and implementing the elements of an EMS. It describes a logical sequence or "roadmap" for planning and implementing EMS elements and explains how this sequence can be important in building an effective EMS.

The Washtenaw County Home Toxics Reduction Program (HTRP) successfully linked its management review process with its new Business Improvement Process (BIP). HTRP used its environmental objectives as input to the BIP and reviewed progress annually to determine what worked and to make adjustments, where needed. The output of BIP will feed into the County's budgeting process.

Keep in mind that this is just one way to do the job– you might find other approaches that work just as well.

Figure 14 illustrates the suggested implementation process flow. Each of the steps (and a rationale for their sequence) is discussed below.

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

- **You may already have some EMS elements in place**, as indicated by the preliminary review that you performed earlier (see Section 3 for more details).
- Make sure to build in the **links between elements**. Refer back to Section 4 for information on the key links. The effectiveness of your EMS depends as much on the strength of its links as it does on the strength of the individual elements themselves.
- For many EMS elements, you will need to **design and implement a process**. In these cases, you also should consider **documenting** the process in the form of a **procedure**.

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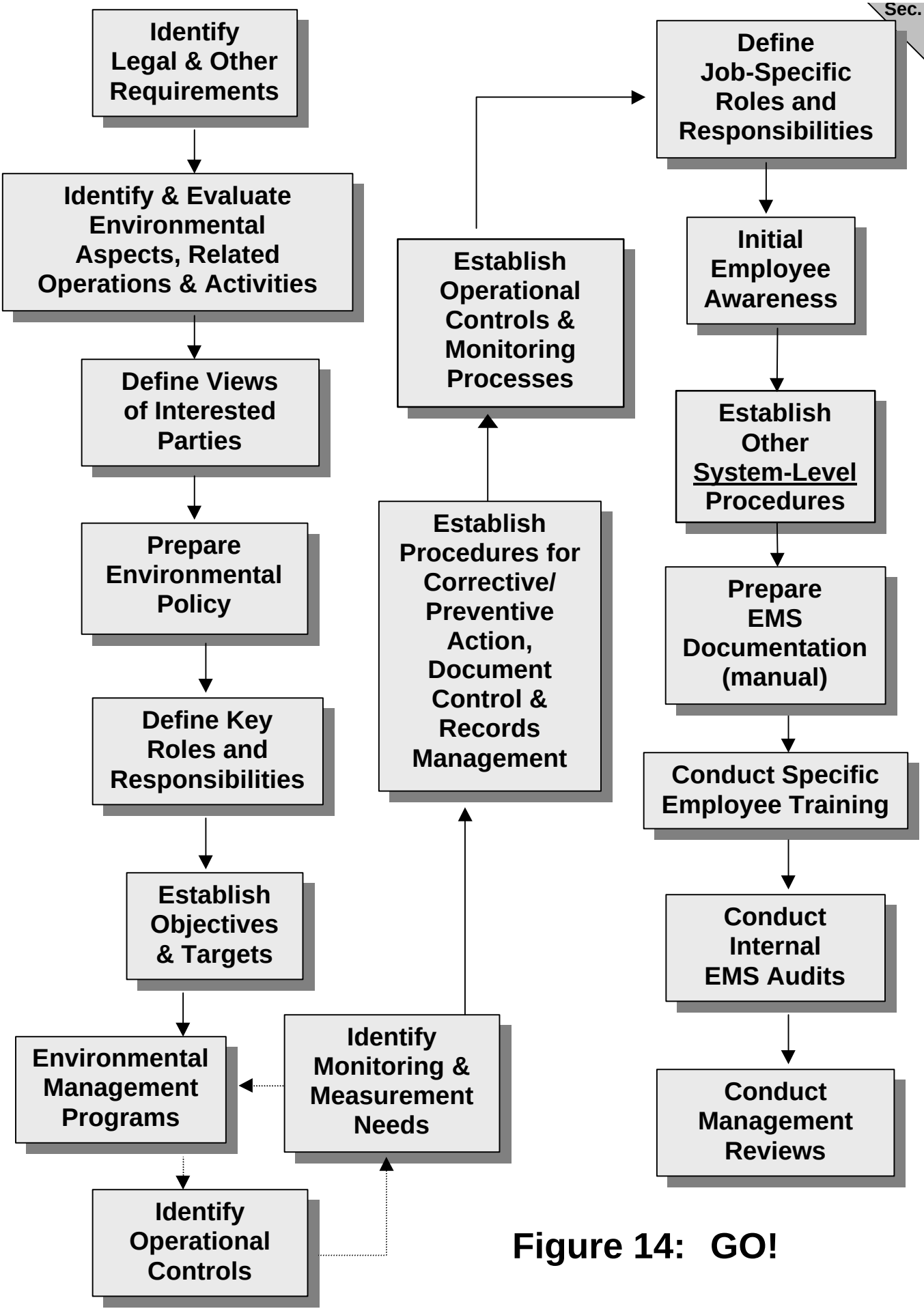

Figure 14: GO!

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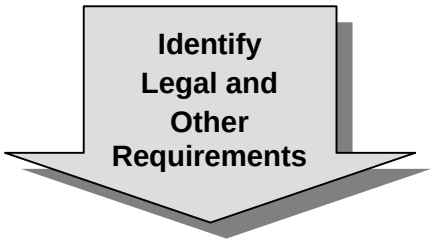
Creating Your EMS: Step by Step



A first step in the EMS-building process is **understanding the legal and other requirements** that apply to what you do (i.e., that apply to your products, activities and services). This step is important for understanding compliance obligations and how these obligations affect the overall EMS design. For example, you might have an operation that is covered by an air quality permit or might provide a service that results in the generation of regulated wastes. Your EMS should include processes to ensure that such legal requirements are addressed when you conduct these operations (or when they are modified).

Your EMS should be designed to help you accomplish more that just compliance with applicable laws and regulations, but these compliance requirements should be a major consideration. Performing this step first allows you to understand how legal requirements might relate to the environmental aspects and impacts of your products, activities and services, as discussed next.

Once you understand what "rules" apply, you should **assess how your organization interacts with the environment.** This is accomplished by identifying your environmental **aspects and impacts** and determining which of them are significant. Some of your environmental aspects may be regulated, while others may not be.

As you identify and assess your aspects, you also should **identify specific products, operations and activities** from which these aspects / impacts arise. Likewise, you can identify any **monitoring** that is performed of these operations or activities for environmental purposes. For example, if you identify the generation of a particular air emission as a significant environmental aspect, it would help to know which operation(s) generate such air emissions. It might also help to know whether these air emissions are monitored or otherwise measured in some manner.

Collecting this information at an early stage will help you implement subsequent EMS elements. You can use a form (such as **Figure 15**) to capture this information. One caveat -- just because you identify an existing control and/or monitoring activity related to a particular operation or activity, **don't automatically assume that these controls are adequate** for EMS purposes. The adequacy of these controls will depend on several factors, including your objectives and targets.

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Figure 15: **Linking Operations, Aspects, Controls and Monitoring (example)**

Source	Significant Aspect(s)	Regulated?	Associated Controls	Associated Monitoring or Measurement
Operations *Parts painting*	• *Air emissions (VOCs)* • *Solvent waste generation*	• *Yes* • *Yes*	• *Limits on VOC content in paints and operating hours* • *SOP for HW generation*	• *Paint use records, log of operating hours* • *Waste tracking sheet*
Parts plating	• *Waste generation* • *Water discharges*	• *Yes* • *Yes*	• *SOP for HW generation* • *Notification to site effluent treatment plant*	• *Waste tracking sheet* • *Pre-discharge sampling*
Other Activities *Raw material storage*	• *Potential spills*	• *Yes*	• *Stormwater Pollution Prevention Plan*	• *Weekly inspections of storage area*
Fleet maintenance	• Waste oil generation • *Potential spills*	• *Yes* • *Yes*	• *SOP for HW generation* • *Stormwater Pollution Prevention Plan*	• *Waste tracking sheet* • *Weekly inspections of storage area*
Products *Pumps*	• *Energy Use* • *Chromium content*	• *No* • *No*	• *None* • *None*	• *None* • *None*
Services *Equipment servicing at customer sites*	• *Waste generation* • *Fuel use*	• *No* • *No*	• *SOP for equipment service* • *None*	• *Waste tracking sheet* • *Fuel dispensing records*

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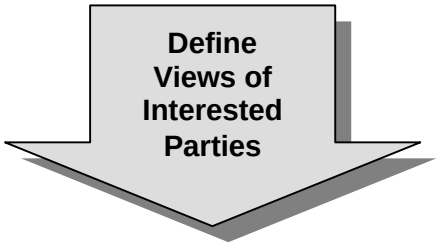

Armed with information on applicable legal and other requirements as well as the environmental attributes of your products, activities and services, you should **gather information of the views of your "stakeholders"** (or interested parties). Stakeholders might include, for example, your neighbors, interest groups, regulators and others. Their views might address how your organization affects the environment, how well you are meeting your environmental obligations, and whether your organization is a "good neighbor", among other topics. There are many ways to collect information on stakeholder views, as discussed in Section 4 (See "Communication").

Gathering this information now allows you to consider stakeholder input in the development of your environmental policy. Since you have already assessed your legal and other requirements and your environmental aspects, you should be in a good position to have meaningful dialogues with these stakeholders.

At this point, you should have a sound basis for **developing** (or possibly amending) **your environmental policy**. Using the information developed in the previous three steps allows your organization to prepare a policy that is relevant to the organization and the key issues that it faces. For example, you will have information on the views of your stakeholders that might be valuable in developing an environmental policy.

Keep in mind that you evaluated your current environmental programs when you performed the preliminary review (see Section 3), so you should understand how (and how well) you are currently managing these key issues.

Once the environmental policy has been written, you can begin to **define key roles and responsibilities** within the EMS. At this stage of implementation, focus on "higher-level" responsibilities, such as the roles and responsibilities of senior management, key functional leaders and environmental staff (if one exists). EMS responsibilities for other specific jobs or functions will be identified in a later step. Once the key roles and responsibilities have been defined, obtain the input of these individuals in the next step of the process – establishing objectives and targets.

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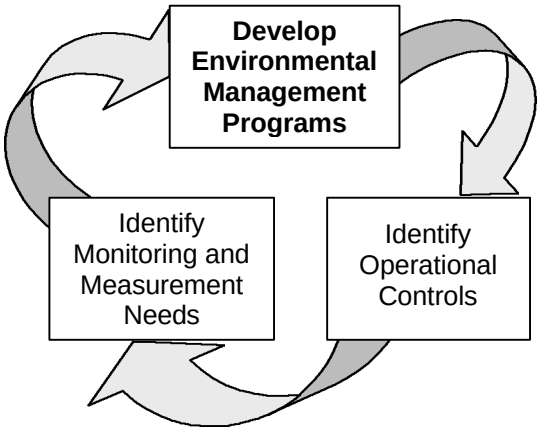
At this point you are ready to **establish environmental objectives and targets** for your organization. These objectives should be consistent with your environmental policy. Each of your objectives also should reflect the analyses you carried out on legal and other requirements, environmental aspects and impacts, and the views of interested parties (as well as the other factors discussed in Section 4).

You identified the operations and activities related to your significant aspects and impacts in an earlier step. Also, you defined certain key roles and responsibilities. This information will help you to determine the **relevant levels and functions** within the organization for achieving objectives and targets. For example, if you set an objective to reduce hazardous waste generation by 10% this year, you also should know which parts of the organization must be involved in order to meet this objective.

Figure 16



This brings us to one of the most challenging (and potentially most valuable) steps in the overall process. Armed with an understanding of legal requirements, your significant environmental aspects and impacts, and your objectives and targets, your are ready to **tackle several EMS elements simultaneously**. These elements include the design of environmental **management programs**, the initial identification of necessary **operational controls**, and the initial identification of **monitoring and measurement** needs. One reason combining these steps is that they can often overlap significantly. For example, your environmental management program for achieving a certain objective (such as maintaining compliance with regulations) might consist of a number of existing operational controls (procedures) and monitoring activities. Similarly, achieving an objective might require a feasibility study or the implementation of certain “new” operational controls. Likewise, determining progress on achieving objectives often requires some form of monitoring or measurement.

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One important caveat: Keep in mind that operational controls and monitoring / measurement processes might be needed **even if** no objective (or corresponding management program) exists for a particular operation or activity. For example, controls might be needed for certain operations to ensure compliance with legal requirements or to control a significant environmental aspect, even where no specific objective has been set. The initial identification of operational control needs at this point in the process should be supplemented by a more detailed design of operational controls and monitoring processes, as described in a subsequent process step.

An example of a form for describing environmental management programs that shows the links between programs and operational controls is provided in the Tool Kit (Appendix A)

Also keep in mind that this **process is usually iterative.** That is, you might need to "re-visit" your management programs, operational controls and monitoring processes over time to ensure they are consistent and up-to-date.

You should already have a **head start** on this step, since you identified operations and activities related to your significant environmental aspects (as well as existing control and monitoring processes) several steps ago. *Remember how we said this was a good idea?*

Your don't need to fully develop these operational controls and monitoring activities yet – that step comes later (see "Design Operational Controls & Monitoring Processes"). What you need to do now is **compile a list of your operational control and monitoring <u>needs</u>**. As you develop your environmental management programs, ask yourself the following questions:

- How do we control this operation or activity <u>now</u>?
- Are these controls <u>adequate</u> to meet our objectives and to ensure compliance?
- If <u>additional controls</u> are needed, <u>what types</u> of controls make sense?
- What type of <u>monitoring / measurement</u> is needed to <u>track our progress</u> in achieving objectives and to <u>ensure that operational controls are implemented</u> as designed?

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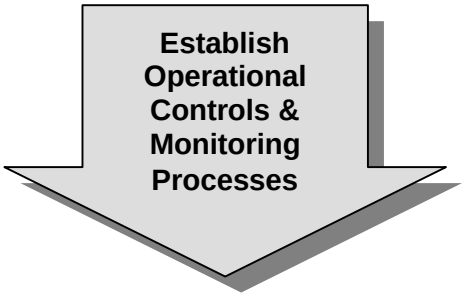
At this stage of implementation, your EMS will begin to generate some documents (such as procedures and forms) and records (that demonstrate that various processes are being carried out). For this reason, it is a good time to **establish procedures for corrective/preventive action, document control, and records management**. These three processes are essentially "system maintenance" functions. As you develop and implement other system-level procedures, work instructions for various activities, and other EMS documents, you need a process for controlling the generation and modification of these documents. Likewise, you will need a process to ensure that you can fix (or correct) problems when they occur. In addition, many of these processes (such as monitoring activities) will generate records, so you need an effective way to manage the records that your EMS generates.



Once the system maintenance functions are in place, you can start in earnest the **establishment of activity- or area-specific operational controls and monitoring processes**. As a starting point, refer back to the list of operational control and monitoring needs that you generated in preparing your environmental management programs (see earlier step). Also, you should have a template for the development of these work instructions (or standard operating procedures), since your document control process was established in the prior step. Remember that you might need operational controls and monitoring processes to meet your **policy commitments** and **control significant environmental aspects**, even where no specific objectives or environmental management programs have been established.

Employees that work in relevant operations or activities can provide a lot of support here. Also, note that these operational controls and monitoring processes can play an important role in employee training, as discussed later.

Also keep in mind that you also need a procedure for conducting **periodic compliance evaluations**.

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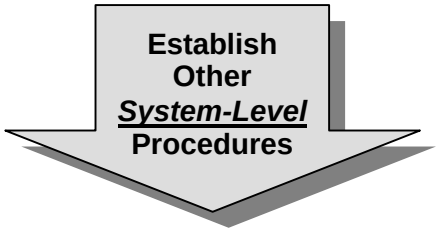
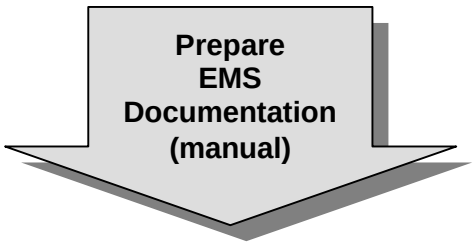
As part of the process described above, you should **define job-specific roles and responsibilities**. Such roles and responsibilities should address the specific operational controls and monitoring processes discussed above. You might want to document these responsibilities in a **responsibility matrix** or in some other form that is easily communicated to employees.

Initial employee awareness training should be conducted to promote understanding of the organization's EMS efforts and the progress made to-date. As a first step, train employees on the environmental policy and other elements of the EMS. Discuss the environmental impacts of their activities, any new / modified procedures, the organization's objectives and targets, as well as their EMS responsibilities. If you have contractors or others at your site who are not employees of your organization, consider whether these other individuals should be included in these EMS awareness sessions.



Some system-level procedures (such as the procedures for identification of environmental aspects and access to legal and other requirements) were developed at earlier stages of the process. At this point, you **can establish any other procedures required for the EMS**. These other system-level procedures might include, for example:

- employee training and awareness,
- internal and external communication,
- emergency preparedness and response,
- EMS auditing, and
- management review.



Once you have established roles and responsibilities and defined all of your system-level procedures, **preparing the EMS manual** should be a relatively simple matter. The manual should summarize the results of your efforts so far (that is, it should describe the processes you have developed, the roles and responsibilities you have defined as well as other EMS elements). Also, it is important to describe the **links** among system elements and provide direction to other system documents. Keep the manual simple – there is no need to provide great detail on any particular system process. Readers can be referred to the detailed procedures if more information is needed.

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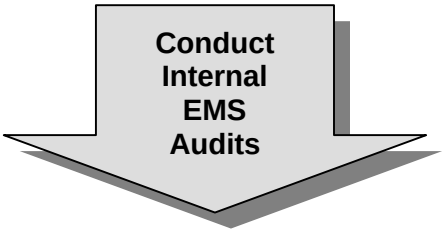
Once the procedures and other system documentation have been prepared, you are ready to **conduct specific employee EMS training**. As a first step, identify specific **training needs**. Employee training should be designed to ensure understanding of:

- key system processes,
- operational controls related to their specific jobs, and
- any monitoring or measurement for which they are responsible.

Job-specific training should also cover topics such as EMS auditing for those employees that will conduct internal EMS audits.



Once internal auditors have been selected and trained, you should **design and initiate the internal auditing process**. At this point, you should have sufficient EMS processes in place to conduct meaningful audits. Many organizations find that it is easier to start with smaller, more frequent audits that to audit the entire EMS at once. These early audits can serve as a learning tool for the auditors.

Once the audit results are known, use **the corrective and preventive action process** you developed earlier to address any identified problems. Audit records should be managed in accordance with the records management process.

Use the results of your internal audits (along with other information on the EMS) to **conduct management reviews**. Management should consider the need for any changes to the EMS and make assignments for any changes needed. Such assignments should be consistent with the roles and responsibilities established previously.

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Appendix A: TOOL KIT

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Note: The examples in the Tool Kit are drawn from many different sources. They are not designed to be used together in EMS development.

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Sample Environmental Policies

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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

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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.

September 1995

(Actual policy is printed on recycled paper)

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.

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CAMPBELL & CO. ENVIRONMENTAL POLICY

Campbell & Co's commitment to improve the environment is an expression of our Guiding Principles, and a demonstration of "think globally and act locally" sensibilities.

We strengthen this commitment by employing Quality Operating System methodology as the framework to identify objectives and targets for addressing areas of environmental significance.

Campbell & Co. is improving the condition of our environment by preventing pollution, specifically through the reduction of natural resource usage. We are also helping to preserve the environment by promoting recycling as well as continuing to make responsible environmental choices when purchasing products.

Campbell & Co. will comply with all federal, state and local legislation and regulatory requirements, as well as those requirements adopted through the Michigan Business Pollution Prevention Partnership Policy.

Above all, Campbell & Co. employees will strive to continuously improve our efforts to create a cleaner and safer environment.

_____

David Scheinberg, President & CEO

Created: June 6, 2000
Revised: October 6, 2000

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Village Of Chelsea, Michigan

Statement Of Environmental Policy

The Village of Chelsea is committed to continual improvement of its Environmental Management System and is in compliance with all relevant federal, state, and local environmental legislation and regulations. The Village of Chelsea will meet and strive to exceed all environmental requirements and will seek to prevent pollution before it is produced. To sustain this commitment, the requirements of the Environmental Management System described in this Manual apply to all activities and employees. The Village's Department Superintendents are the Village's Management Representatives who have the responsibility and authority to plan, enforce, and maintain the Village's Environmental Management System. This responsibility also includes stoppage of activities that deviate from the requirements of this Manual. The EMS Management Representative may delegate some of this authority downward through the organization in order to implement the system effectively. We will continuously seek opportunities to improve our adherence to the principles of environmental management.

Policy adopted by Village Council on March 11, 1997.

_____

Village President

_____

Village Clerk

[Signatures included in original policy.]

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Saint Joseph Mercy Hospital (in Michigan) demonstrated that an environmental policy can be written in the form of a procedure. One advantage of this approach is that hospital staff can make a direct connection between the policy and their departmental responsibilities for implementing the policy. The hospital includes its policy in the Administrative Policy Manual because that manual was already well established and widely distributed. Integrating EMS requirements with existing manuals, procedures, training, and responsibilities was a key implementation strategy for the hospital.

Saint Joseph Mercy Hospital

Administrative Policy and Procedure

Subject:	Environmental Compliance Policy
Effective Date:	September 14, 1998
Revised Date:	
Approved By:	President and CEO

POLICY

It is the policy of St. Joseph Mercy Hospital (SJMH), which includes all SJMH owned and operated buildings and services, to conduct all of its operations in an environmentally responsible and sensitive manner. St. Joseph Mercy Hospital will fully comply with both the letter and the spirit of all applicable federal, state and local regulatory requirements governing hazardous materials and wastes, pollution prevention and environmental protection. It is recognized that the health and well being of the environment contributes to the health and well being of the communities and populations we serve. St. Joseph Mercy Hospital will strive to continuously improve its systems and procedures related to environmental protection and pollution prevention activities. St. Joseph Mercy Hospital will manage its facilities and properties in an environmentally responsible manner. St. Joseph Mercy Hospital will participate as appropriate in community, industry, and/or governmental sponsored groups addressing environmental issues affecting the communities we serve.

NARRATIVE

Environmental protection is the responsibility of all SJMH departments and employees. As a health care organization, SJMH must handle and manage a wide variety of potentially hazardous or polluting materials including medical wastes, radioactive materials and hazardous chemicals and wastes. Many of our processes present potential water and air quality issues that demand continuous monitoring and control. Proper and responsible handling of these materials and processes is imperative to prevent pollution, reduce waste and protect our environment. A host of federal, state and local regulatory requirements are in place to guide this organization in achieving environmental compliance.

PROCEDURE

I. Each department will continuously assess its operations to identify potential safety hazards and pollution risks. Each department is responsible for establishing and maintaining department specific policies and procedures designed to reduce or eliminate environmental hazards and minimize any negative environmental impact when applicable.

   A. Potential risks will be minimized to the extent possible by seeking out less environmentally hazardous products, equipment or procedures.

   B. Appropriate engineering controls will be implemented when it is not possible to eliminate an environmentally hazardous material or

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procedure.

C. All departments and employees will strive to reduce all types of wastes through identifying and eliminating wasteful practices and products and participate in organizational recycling and waste reduction programs.

D. Departments will educate and communicate organizational and department specific environmental policies, goals and objectives to employees as required.

E. Departments will consider using products that have recycled content taking economic and quality factors into account.

II. The Safety Steering Committee is responsible for monitoring environmental compliance issues recommending and assuring that corrective action is implemented as warranted to correct deficiencies.

A. Objectives and targets will be established to assure continuous improvement in organizational environmental performance. Safety Committee structure is responsible for establishing goals and implementing programs to meet targets. The Safety Steering Committee is responsible for monitoring progress and reporting activities to Executive Management.

REFERENCES

- Safety Steering Committee
- Hazardous Material and Waste Committee
- Product Value Analysis Committee
- Safety Policy Manual Section III_300 – “Hazardous Materials and Waste”
- Departmental Specific Hazardous Material/Pollution Prevention Policies and Procedures

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Environmental Impact Identification and Evaluation: Techniques and Data Sources

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SOME TECHNIQUES AND DATA SOURCES FOR IDENTIFYING AND EVALUATING ENVIRONMENTAL IMPACTS

Process Hazard Analyses	Used to identify and assess potential impacts associated with unplanned releases of hazardous materials. Methodology in common use due to OSHA Process Safety Management regulations. Typically employs team approach to identify and rank hazards.
Failure Mode and Effects Analyses	Commonly used in quality field to identify and prioritize potential equipment and process failures as well as to identify potential corrective actions. Often used as a precursor to formal root cause analyses.
Process Mapping	**See Appendix C for details of this technique.**
Environmental Impact Assessments	Used to satisfy requirements of National Environmental Policy Act (NEPA) regarding the evaluation of environmental impacts associated with proposed projects. Methodology in common use, but not typically used to assess environmental impacts associated with existing operations.
Life Cycle Assessments	Used to assess full range of impacts from products, from raw material procurement through product disposal. Methodologies somewhat subjective and can be resource intensive. Described in ISO 14040-14048.
Risk Assessments	Used to assess potential health and/or environment risks typically associated with chemical exposure. Variety of qualitative and quantitative methodologies in common use.
Project Safety / Hazard Reviews	Used to assess and mitigate potential safety hazards associated with new or modified projects. Methodologies in common use. Typically do not focus on environmental issues.
Emission Inventories	Used to quantify emissions of pollutants to the air. Some data may already by available to the organization, based on EPCRA requirements and CAA Title V permitting program.
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 do not assess impacts associated with products or services.
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. Methodologies in common use. Scope and detail vary. Not typically directed at examining environmental impacts (particularly for products).

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Sample Procedure:
Instructions for Environmental Aspects Identification Form
(courtesy of ZEXEL Corporation)

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OPERATIONAL PROCEDURE		Issue Date: August 04, 2000
Number: OP-EV0100.R06	Author: Ronda Moore	Approval: _____ Vice President Operations
Title: Environmental Aspects & Impacts		Reviewed By: _____ Waste Water Group Leader

1.0 Purpose

The purpose of this procedure is to provide a system and instructions to identify environmental aspects of ZEXEL's activities, products, and services in order to determine those which may have a significant impact on the environment.

2.0 Scope

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

3.0 Reference Documents

Document Name	Document Number
Objectives and Targets	OP-EV0103
Management Review	OP-ZX006
Aspect/Impact Evaluation Form	WF-ES002
Aspect/Impact Listing - Decatur	WF-ES008
Aspect/Impact Listing - Arcola	WF-ES058
Initial Production Control	OP-ZX001
Contract Review	OP-SA001

4.0 Procedure

4.1 The procedure consists of an initial screening of activities, products, and services, based on data submitted to the ISO 14000 Task Force by the Area Managers. The Task Force assesses the aspects, determines associated impacts, and assigns an impact rating. The Task Force will review the evaluation results, and up-date as needed.

4.2 Area Managers are responsible for developing a flowchart for their department(s) showing all inputs and outputs to their processes. Inputs into the process may include supplies, raw materials, chemicals, packaging, and energy consumption. Outputs from the process may include products, solid wastes, liquid wastes, emissions, noise, and odor. The flowcharts shall also include the current method of handling generated wastes.

4.3 The Task Force shall evaluate the information submitted on the flowcharts. The Task Force may call upon other ZEXEL Team Members to assist, as needed. Each activity, product, and service shall be evaluated from the time the material is accepted on site through the time of sale, at the sale location. If a waste is being evaluated, the timeline to consider is the time the material is accepted on site through ultimate disposal, as displayed by the diagram below.

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Accept Material Sale Location

|----------Product----------| Ultimate Disposal
|----------Waste----------|

4.4 The Task Force shall assign an impact rating according to the scales described below, while considering each of the following stages: raw material storage, production (accidents, start up, and normal operation), product and waste storage, transportation, and ultimate disposal.

4.5 The Task Force shall ask for each aspect / impact evaluation:

a) Is it in our permits / permittable?
b) Is it regulated by law?
c) Do we have control over it?

If the answer to a and/or b is "yes", the impact *must* be included on the list of significant impacts. If the answer to c is "no", the impact shall not be included on the list of significant impacts. The following table explains the different possible answers.

Possible Answer	**Permitted / Permittable**	**Regulated by Law**	**Do we have Control**
Yes	must include	must include	may include
No	may include	may include	shall not include

4.6 When evaluating the "frequency", the number shall be determined from the following scale, based on documented evidence, by asking the following questions to determine frequency of use and of accidents: (1). How often does the process occur? and (2). How often has a problem occurred?

Frequency	**Scale**
Continuously	10
once per shift	9
once per day	8
Weekly	7
Monthly	6
Quarterly	5
semi-annually	4
Annually	3
once every 1 to 5 years	2
over 5 years	1
Never	0

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4.7 When evaluating the "severity" the task force shall assign an impact number by selecting the highest evaluated rate from the scale below, based on documented evidence. When considering human impact, it is important to include contractors, neighbors, customers, etc., as well as team members.

Severity Scale	Human Impact	Animal / Plant Effect	Public Relations
10	multiple deaths	widespread permanent destruction	plant closure
9	single death	on-site permanent destruction	permanent public disfavor
8	disabling injury	widespread genetic impact	interrupted operations
7	long term health effects	on site genetic impact	loss of historical assets
6	lost time Injury/Illness	wide spread disfigurement	state or national protest
5	restricted duty	on-site disfigurement	city or county protest
4	medical only	wide spread appearance	employee protest
3	first aid treatment	reduction of natural beauty	public inconvenience
2	Discomfort	on-site appearance	public disfavor
1	None	none	none

4.8 Impact ratings shall be determined by multiplying the frequency and severity numbers. The Task Force shall determine an appropriate cutoff level for significant impacts.

4.9 The Environmental Manager shall work closely with ZEXEL's Plant Management to ensure that the identified significant environmental aspects are considered in establishing environmental objectives and targets for ZEXEL, as stated in the Objectives and Targets OP.

4.10 The results of the most recent environment aspect / impact identification is reviewed as part of the Management Review process, as specified in the Management Review OP. From this review ZEXEL Management determines the need to update the environmental impact evaluation. Factors considered in the determination to update the assessment include improved methodologies, and major changes in ZEXEL's policies, products, or processes. Aspect reviews may also be triggered from the Initial Production Control (IPC) and Contract Review process. Environmental impact evaluations shall be conducted at least, on an annual basis, *by the end of each calendar year,* even if none of the factors listed above dictate a review.

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ASPECT / IMPACT EVALUATION

Aspect/Impact/Activity: Date:

		Frequency		Severity			
Category	Stages	Use	Incident	Human Impact	Animal/Plant	Public	Impact Rating
Air Quality	Raw Material Storage						
Water Quality	Production (Start-Up)						
Land Quality	Production (Normal)						
Consumption	Product/ Waste Storage						
	Transportation						
	Ultimate Disposal						
					Overall Rating		

Please note: Significant Impact if
- permittable
- required by law
- over the establish cut off

	Severity			
Frequency	**Human Impact**	**Animal/ Plant Effect**	**Public Relations**	**Scale**
continuously	multiple deaths	widespread perm. destruction	plant closure	10
1 per shift	single death	on-site permanent destruction	permanent public disfavor	9
1 per day	disabling injury	widespread genetic impact	interrupted operations	8
weekly	long term health effects	on-site genetic impact	loss of historical assets	7
monthly	lost time injury/ illness	widespread disfigurement	state or national protest	6
quarterly	restricted duty	on-site disfigurement	city or county protest	5
semi-annually	medical only	widespread appearance	employee protest	4
annually	first aid treatment	reduction of natural beauty	public inconvenience	3
1 every 1 - 5 yrs	discomfort	on-site appearance	public disfavor	2
over 5 yrs	none	none	none	1
never *(Use Only)*				0

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Environmental Aspects Identification Form
(courtesy of Johnson Controls, Inc. – Automotive Systems Group)

Note: The instructions and form were developed within the context of a comprehensive EMS. References are made to processes outside of the instructions.

This is intended as an example, not a stand-alone document.

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Instructions for Environmental Aspect Identification Form

Responsibilities

The facility Cross Functional Team (CFT) led by the Management Representative (MR) is responsible for completing this form for each Core Process and Supporting Activity within a facility. If possible, members of the CFT must conduct a physical inspection when completing this form. The completed form is a material balance of a process or activity and is used to identify Environmental Aspects. The facility CFT compares the resulting material balance and list of facility-specific aspects to any information available in the form of generic "HSE Process Profiles" produced for similar type processes or activities.

At a minimum, the CFT will review and revise the completed forms, by means of physical inspection, as necessary at issuance, annually, prior to and immediately following implementation of new or modified processes/activities.

All environmental aspects are evaluated for significance and managed as defined in the Environmental Aspects Control Plan form.

Conducting a Material Balance

The material balance consists of identifying all raw materials, chemicals, and utilities used as input along with their relative usage rates, and all output as product and by-products produced. The latter is all wastes produced, all recycled materials, water discharges, and air emissions known for the process(es), and any available rates of production.

1.0 Record the Plant Name, Process/Activity Name, and Location.

2.0 Provide a description of the process/activity.

3.0 Determine and record if the Process/Activity is a Contracted Process/Activity.

4.0 Record Material Inputs and Outputs. If the Process/Activity is installed or in place, conduct the identification by means of physical inspection.

Raw material inputs

- Parts: Enter the major, non-chemical parts/supplies used in the process.
- Chemical: Enter any chemical materials used in the process.
- Energy: Enter energy type and usage. (Levels are relative to the facility.)
- Other Input: Enter inputs that are not covered clearly in other categories. (e.g. packaging, containers)
- Water Use: Enter water type (e.g. city, well, storm, process, chilled) and usage. (Levels are relative to the facility.)

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Process Output

- List all products produced by the process specifically produced for sale. Recyclable and Chemical By-Product (e.g. Rebond) outputs are entered in the waste section.
- List all air emissions whether they are drawn directly through a stack or are discharged into the room and escape as fugitive emissions. Include noise and odor as an air emission if potentially noticeable outside the facility.
- Enter wastes. Wastes are any materials intended to be discarded or disposed of, whether regulated or not, and include liquids, solids, and gases. Also include recycled materials, returnable containers and chemical by-products under this category
- Check the recycled box if the material is currently recycled, internally or externally. It does not include materials that go directly back into the process (i.e., Calibration shots returned to day tanks, etc.)
- Include containerized wastewater transported off-site.
- Enter all wastewater streams that discharge directly to storm or sanitary sewer systems or surface waters. Containerized wastewater should be included in the waste section. In the bottom portion of the wastewater section, list any treatment that occurs before the water is discharged.

5.0 Compare the completed form to any information available in the form of generic “HSE Process Profiles” produced for similar type processes or activities.

6.0 Sign and date the form with the date the form was completed or revised.

7.0 Collect all completed Aspect Identification forms and enter data into the supporting Environmental Aspect Control Plan form.

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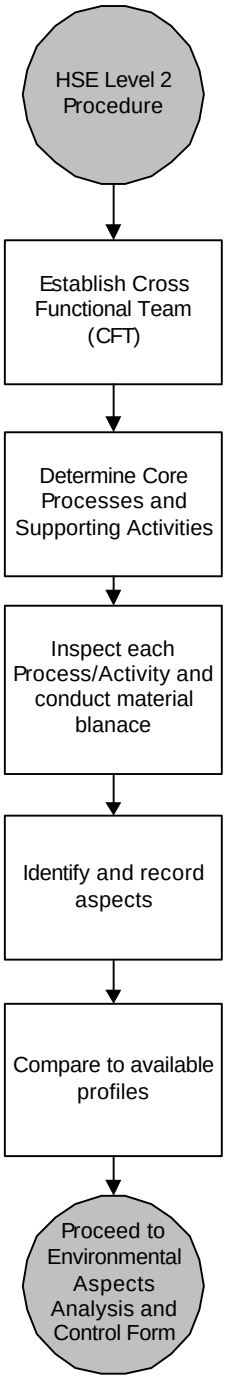
Environmental Aspects Identification Process Overview



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ENVIRONMENTAL ASPECTS IDENTIFICATION

Plant: _____ **Process/Activity:** _____

Contracted? _____ **Process/Activity Location:** _____

RAW MATERIAL INPUTS

PARTS

CHEMICAL MATERIAL

ENERGY USE:

TYPE:	USAGE High	Medium	Low
Electricity			
Natural Gas			
Propane			
Steam			
Compressed Air			
Hydraulics			

OTHER INPUT:

Provide brief description of process/activity

Optional: Attach and circle photo, schematic, sketch drawing, detailed description

PRODUCT OUTPUTS

AIR EMISSIONS
(include noise & odor)

WASTE (& BYPRODUCTS)
(Solid & Liquid)

Check if Recycled

WATER

WATER USE:

TYPE:	USAGE High	Medium	Low

WATER DISCHARGES

On site Treatment (Type)

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Sample Environmental Aspect Evaluation and Scoring Tools

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Sample 1: Environmental Aspect/Impact Scoring Worksheet

A company identified "Spills from Unloading Trucks" as an environmental aspect of its operations. The company used the following worksheet and rating criteria to determine whether the environmental impacts (on water quality and/or soil contamination) of this aspect should be considered significant.

First, the company determined that the LIKELIHOOD of a spill was low, since it had not experienced any spills of this type in the prior three years. Second, they determined that the MAGNITUDE (or SEVERITY) of the environmental impact would be moderate for most of the types of materials that they unload from trucks at the loading dock. The company noted, however, that certain chemicals are regulated and that spills of such materials in reportable quantities would require an appropriate response to regulatory agencies.

Using the "**Key to Impact Rating**" (see below), an environmental impact with a Low Likelihood and a Moderate Magnitude received an overall score of "low impact significance". Thus, "spills from unloading trucks" was not considered a significant environmental aspect.

Area or Activity	Aspect	Impacts	Impact Scoring (see below)	Significance
Shipping Dock	Spills from Unloading Trucks	Water Quality and Soil Contamination	Likelihood is **low** Magnitude is **moderate** ***OVERALL IMPACT SCORE IS LOW***	**Not Significant** (Note: spills of reportable quantities of certain chemicals must be reported)

Key to Impact Rating

Likelihood of Occurrence or Impact(s)	Magnitude (severity of impacts, actual or potential		
	Severe	Moderate	Low
High	High Significance	High Significance	Medium Significance
Medium	High Significance	Medium Significance	Low Significance
Low	Medium Significance	**Low Significance**	Low Significance

Excerpted from "Environmental Management Systems: A Guide for Metal Finishers" (NSF International), available for free download at www.nsf-isr.org.

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Sample 2: Environmental Aspect/Impact Scoring Worksheet

Approach
For each product, service or activity (or group of products, services or activities), each element in the table is assigned two scores, based on (1) the degree of impact and (2) frequency or likelihood of the associated environmental impacts.

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/Likelihood 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 but less than once / month)
1 = improbable / never (impact has never occurred or is highly unlikely to occur)

Scores are added for each indicator across the relevant life cycle stages (as shown in the example below) to generate a total impact score.

Category	Indicator	Pre-Production	Manufact-uring	Production/ Distribution	Use / Service	Waste Mgt	TOTAL SCORE
Human Health							
	Employees	*3/2*	*2/2*	*2/1*	*4/2*	*2/2*	**22**
	Surrounding Community	*2/2*	*2/3*	*2/2*	*1/2*	*2/2*	**20**
	Global	*1/2*	*1/2*	*1/3*	*1/2*	*1/3*	**17**
Environment							
	Air Quality						
	Surface Water						
	Ground Water						
	Land / Soil						
	Ecosystem Effects						
	Noise						
Resource Use							
	Fuels						
	Water						
	Raw Materials						

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Resources for Tracking Environmental Laws and Regulations

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Resources for Tracking Environmental Laws and Regulations

Over the last few years, the Internet has emerged as a tremendous tool for tracking and obtaining information on environmental laws and regulations. For example, the USEPA home page (see address below) in one quite useful Internet source. See **Appendix F** for additional information on resources.

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 EPA or NSF of any commercial products listed here.

Source	Description
USEPA Small Business Ombudsman (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).
USEPA Web Site	Provides a variety of information of environmental laws and regulations as well as tools and compliance guidance. (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 (202-512-1800)	Federal Register published daily with all federal proposed and final rules. (Also available on line via *GPO Access)*
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.
Business & Legal Reports, Inc. (1-800-727-5257)	Access to federal and state regulations with monthly, updates on available on CD-ROM.
Aspen Law and Business (1-800-638-8437)	Publishes compliance manuals with regular update service for RCRA and Clean Air Act.

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Sample Process Tool:
Setting Objectives & Targets

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Sample Process Tool for Setting Objectives & 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:

Name	Contacted?
•	•
•	•
•	•
•	•
•	•
•	•

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

Information Sources	How they will help e.g.,
• process maps • waste, and emission data • site maps • compliance audit reports • list of identified environmental aspects and impacts • communications from interested parties • others?? • • *(you may also want to do a plant tour or "walk through" to identify other issues)*	*• identify process steps with environmental aspects* *• determine current wastes and sources* *• etc.*

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

Other Information Needed	Where we will get it
•	•
•	•
•	•

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Step 4: **List the significant environmental impacts** (you identified these earlier). You can **categorize** these impacts by type:

Energy Use	Raw Materials	Air Impacts	Water Impacts	Waste Impacts	Land Issues	Other (specify)

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.)

Process or activity	Issues	Possible Objectives & Targets

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

Regulations, other requirements	Possible Objectives & Targets

Step 7: Consider inputs from **interested parties**. Any need for additional objectives related to views of neighbors, community groups or other parties?

Inputs from Interested Parties	Possible Objectives & Targets

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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 other organizational plans/goals, and
- affordable.

List preliminary objectives and targets based on this exercise:

Selected Preliminary Objectives
•
•
•
•
•

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).

Selected Objectives	**Performance Indicator(s)**

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

Selected Objectives	**Responsibility for Action Plan**

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Sample Procedure:
Setting Objectives & Targets

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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 organizational 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.

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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.

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Sample Tools:
Environmental Management Program

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Sample Environmental Management Program Form

(Note: Use one form per objective)

Date (_____/_____/____)	**Individual Responsible:**
Environmental Objective:	
Related Target(s):	
Related Significant Environmental Aspect(s):	
Specific Function and/or Department:	
Target Date (Month/Year): (_____/_____)	
Environmental Management Program: Action Plan	
How will this objective be met? (attach additional pages as necessary)	
What operational controls might support the achievement of this objective?	
How will this objective be tracked? (attach additional pages as necessary)	
What resources will be required to achieve this objective? (attach additional pages as necessary)	

Adapted from the EPA/NSF guide "Environmental Management Systems: A Guide for Metal Finishers" (December 1998). Available for free download at www.nsf-isr.org.

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Environmental Management Program - Sample Tool

Objective / Target #1: _____					
Action Items	**Priority**	**Respon-sibilities**	**Schedule**	**Resources Needed**	**Comments**

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Sample Responsibility Matrix

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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	

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Sample Environmental Training Log

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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

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Sample Procedure: Communications with External Parties

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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.

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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. 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 communications regarding emergency response are addressed in Procedure #.

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Sample Document Index

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Sample Document Index

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

Revision Number

Document	1	2	3	4	5	6
Environmental Policy	*John Smith Plant Manager 1/1/98*	*John Smith Plant Manager 1/1/99*				
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)						

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Outline of Sample EMS Manual and Other EMS Documents

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Outline of Sample EMS Manual and Other EMS Documents

Basic EMS Manual

- **Index / Revision History / Distribution List**
- **Environmental Policy**
- **Description of How Our EMS Addresses Each of the EMS Elements (and linkages among these elements)**
  - How We Identify Significant Environmental Aspects
  - How We Access and Analyze Legal and Other Requirements
  - How We Establish and Maintain Objectives and Targets
  - How the Organizational Structure Supports EMS (organization charts, key responsibilities)
  - How We Train our Employees and Ensure Competence
  - How We Communicate (internally and externally)
  - How We Control EMS Documents
  - How We Identify Key Processes and Develop Controls for them
  - How We Prepare for and Respond to Emergencies
  - How We Monitor Key Characteristics of Operations and Activities
  - How We Identify, Investigate and Correct Nonconformance
  - etc.

Environmental Management Program Description

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

EMS Procedures

- **Index / Revision History / Distribution List**
- **Organization-wide Procedures (for some EMS elements there might be more than one procedure)**
  - 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

Other EMS Documentation (Emergency Response Plans, etc.)

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Sample Records Management Form (supplied courtesy of General Oil Company)

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Title: EMS RECORDS MANAGEMENT TABLE **Revision Date:** November 7, 2000 **Print Date:** February 15, 2001 (Uncontrolled document if printed)	**Doc. No.:** EMF-4.5.3 **Approval by:** **Page 135 of 1**

EMS Records Management Table

The following table lists records related to the Environmental Management System, in accordance with EMP-4.5.3 (Record keeping procedure).

Record Type	Person Responsible	Location	File Method	Retention minimum
ADMINISTRATION				
Records on costs - purchasing, operations, and disposal	Office Manager	Admin. Office	Date order	3 years
Utility bills	Office Manager	Admin. Office	Date order	3 years
Record of annual waste quantity received	Office Manager	Admin. Office	Date order	Life of Co.
Certificates of Insurance	Office Manager	Admin. Office	Date order	Life of Company
Waste Analysis Sheets	Office Manager	Admin. Office	Customer name	3 years
Waste Manifests - outgoing	Office Manager	Admin. Office	Date order	3 years
ENVIRONMENTAL				
Incident Reports	Env. Dept.	Env. Office	Date order	3 years
Complaint Reports	Env. Dept.	Env. Office	Date order	3 years
EMS Communications with external parties	Env. Dept.	Env. Office	Issue	3 years
Decision regarding external communication of significant environmental aspects	Env. Dept.	Env. Office	Date order	3 years
Major Source Determination Records	Env. Dept.	Env. Office	Date order	Life of Co.
Title V Permit Exemption	Env. Dept.	Env. Office	Date order	Life of Company
Correspondence regarding Air Notices	Env. Dept.	Env. Office	Date order	5 years
Odor Control System Permit	Env. Dept.	Env. Office	Date order	5 years or per Permit
Air Emission Reports	Env. Dept.	Env. Office	Date order	5 years
Records on waste disposal sites used	Env. Dept.	Env. Office	Site name	Life of Co.
EMS Monitoring Inspection reports	Env. Dept.	Env. Office	Date order	5 years

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Sample Procedure:
Corrective and Preventive Action
(includes tracking log)

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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 that 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 database, 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.

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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. Any employee may request a CAN or PAN. 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.

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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:

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CORRECTIVE ACTION TRACKING LOG

CAN Number	Requested By	Issued To	Plan Due (Date)	Plan Completed (Date)	Corrective Action Completed (Date)	Effectiveness Verified (Date)	CAN Closed (Date)

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Sample Environmental Records Organizer

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Environmental Records Organizer (SAMPLE)

Air Emissions Regulations

Air Emissions Fees

Air Emissions Inventories

Air Emissions Permits

Air Permit Applications

Air Permit(s): Historical

Annual Licenses & Fees

Compliance Reporting

Compliance Plans

Community Right-to-Know

EPCRA Regulations

EPCRA Reporting

Hazardous Waste Regulations

Hazardous Waste Permit/ID Number

Hazardous Waste Fees

Hazardous Waste Biennial Report

Hazardous Waste: Open Manifests

Hazardous Waste: Closed Manifests

Historical Data

Indoor Air Quality

Loss Prevention Information

Other Permits & Permit Applications

Pollution Prevention (P2) Regulations

Pollution Prevention Fees

Pollution Prevention Reporting

Recycling Information

Recycling Projects

Special Wastes

Solid Waste Permit

Solid Waste Fees

Spill Reports

Spill Response Actions

Stormwater Regulations

Stormwater Permit

VOC/HAPs Reporting

VOC Annual Analysis

Wastewater Regulations

Wastewater Fees

Wastewater Permit

Wastewater: Semi-Annual Reporting

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Sample Procedure: EMS Audits

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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.

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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.

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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 is 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.

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Audit Plan

Area or Function to be Audited	Lead Auditor	Audit Team Members	Target Date	Special Instructions
• Purchasing	• Jim H.	• Linda B. • Joe S.	• 11/10/00	- Verify corrective actions from previous audit - Interview new employee in department
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

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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.

__ Policy

__ Environmental Aspect identification

__ Environmental Management Program

__ Training, Awareness, Competence

__ EMS Documentation

__ Operational Controls

__ Monitoring and Measurement

__ Records

__ Management Review

__ Legal and Other Requirements

__ Objectives and Targets

__ Structure and Responsibility

__ Communication

__ Document Control

__ Emergency Preparedness

__ Nonconformance / Corrective Action

__ Management System Audits

Special Instructions:

ISO Representative (signature)

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Sample EMS Audit Forms

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EMS AUDIT SUMMARY SHEET

Organization Audited:_____

Lead Auditor: _____ **Date:** _____

ELEMENT NUMBER AND DESCRIPTION		AUDIT RESULTS	
		No. of Majors / No. of Minors	A, N, or X*
4.2	Environmental Policy		
4.3	*Planning*		
4.3.1	Environmental Aspects		
4.3.2	Legal and Other Requirements		
4.3.3	Objectives and Targets		
4.3.4	Environmental Management Program(s)		
4.4	*Implementation and Operation*		
4.4.1	Structure and Responsibility		
4.4.2	Training, Awareness, and Competence		
4.4.3	Communication		
4.4.4	EMS Documentation		
4.4.5	Document Control		
4.4.6	Operational Control		
4.4.7	Emergency Preparedness and Response		
4.5	*Checking and Corrective Action*		
4.5.1	Monitoring and Measurement		
4.5.2	Corrective and Preventive Action		
4.5.3	Records		
4.5.4	EMS Audit		
4.6	Management Review		
TOTAL			

Legend: A = Acceptable: Interviews and other objective evidence indicate that the EMS meets all the requirements of that section of the standard.	N = Not Acceptable: The auditor has made the judgment that, based on the number and type of nonconformances, the requirements of that the section of the standard are not being met. X = Not Audited

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EMS AUDIT FINDINGS FORM

Type of Finding (circle one):

Nonconformance: Major Minor Positive Practice Recommendation

Description (include where in the organization the finding was identified):

_____
_____
_____
_____
_____
_____
_____

ISO 14001 (or other EMS criteria) Reference: _____	**Date:** _____	**Finding Number:** _____
Auditor:_____	**Auditee's Rep.:** _____	

Corrective Action Plan (including time frames):

_____
_____
_____
_____
_____
_____

Preventive Action Taken:

_____
_____
_____

Individual Responsible for Completion of the Corrective Action: _____	**Date Corrective Action Completed:** _____

Corrective Action Verified By:

_____**Date**:_____

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Sample EMS Audit Questions
(by organizational function)

The following questions are excerpted from a comprehensive list of EMS audit questions contained in the NSF-ISR project report, "Implementing Environmental Management Systems in Community-Based Organizations: Part 2".

For a complete list of EMS audit questions by function, download Part 2 of the project report from the NSF web site (www.nsf-isr.org)

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Function: TOP MANAGEMENT

4.2 Environmental Policy	
Top Management	***Objective Evidence***
a. Describe your role in the development of the environmental policy.	
b. How do you know that your policy is appropriate for your activities, products, and services?	
c. What is management's role in the review and revision of the policy?	
d. How does management ensure continued adherence to the policy throughout the company?	
e. How does the policy help guide organizational decisions?	
f. How are employees made aware of the environmental policy?	
g. How is the policy made available to the public?	
[Auditor Note: Is there evidence that the policy was issued by top management? (e.g., Is the policy signed? By whom? At what level in the organization are they?)]	

Notes:

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Function: TOP MANAGEMENT

4.3.3 Objectives and targets	
Top Management	***Objective Evidence***
a. What are the environmental objectives and targets for your organization? What is your role in approving them? **What are the relevant functions and levels within your organization that support the attainment each of the objectives and targets?**	
b. How are the environmental objectives linked to other organizational goals (and vice versa)?	
c. Are the objectives/targets consistent with the goals of the environmental policy for prevention of pollution and continual improvement?	
d. How were the objectives and targets developed by or communicated to management?	
e. How does management keep up with progress in meeting their objectives and targets throughout the year?	
f. How often are you informed of the status of the objectives and targets?	
g. On what basis are the objectives and targets reviewed and modified?	

Notes:

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Function: TOP MANAGEMENT

4.4.1 Structure and responsibility	
Top Management	***Objective Evidence***
a. At what level within the organization is the designated EMS representative placed? ***Auditor Note: Is the EMS representative at a level within the organization to effectively implement an EMS for his/her organization?]***	
b. What authority does the EMS representative have to carry out his/her responsibilities?	
c. How does the organization assess its resource needs for environmental management? How are these factored into operating and strategic plans (and vice-versa)?	
d. What resources (financial, technical personnel) has management provided to develop or maintain the EMS?	
e. How are you informed on the performance of the EMS? Do you receive routine reports?	
f. Are responsibilities for the environmental management of the organization documented? If so, where? **Is an integrated structure in place in which accountability and responsibility are defined, understood, and carried out?**	
g. **How are these responsibilities communicated to all employees (including managers)?**	

Notes:

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Function: TOP MANAGEMENT

4.4.3 Communication	
Top Management	***Objective Evidence***
a. How are you informed of the environmental issues within your organization? How often does this take place? Does this include compliance issues?	
b. How are you kept up to date with progress in meeting your organization's environmental objectives and targets? **How is this information passed on to your managers?**	
c. How do you communicate with the organization on environmental issues? **How is this done? How frequently?**	
d. How does the organization handle inquiries from interested parties (e.g., the public, regulators, other organizations) on environmental matters? **Who has responsibility for responding to such inquiries?**	

4.6 Management review	
Top Management	***Objective Evidence***
a. Describe the organization's management review process.	
b. How often are management reviews performed? How was this frequency determined?	
c. Who is involved in the management review process? What are their roles in this process?	
d. What changes have been made to the EMS as a result of the last review?	

Notes:

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Sample Procedure: Management Review

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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 are collected prior to the meeting.

B. At a minimum, each Management Review meeting will consider the following:

- suitability, adequacy and effectiveness of the environmental policy;
- suitability, adequacy and effectiveness of the environmental objectives (as well as the organization's current status in achieving these objectives);
- overall suitability, adequacy and effectiveness of the EMS;
- status of corrective and preventive actions;
- results of any EMS audits conducted since the last Management Review meeting;
- suitability, adequacy and effectiveness of training efforts; and,
- results of any action items from the previous Management Review meeting.

C. Minutes of the Management Reviews will be documented and will include, at a minimum the 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.

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Appendix B:

EPA's National Environmental Performance Track and Other Government EMS Initiatives

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National Environmental Performance Track Program

The National Environmental Performance Track is designed to recognize and encourage top environmental performers – those who **go beyond** compliance with regulatory requirements to attain levels of environmental performance and management that benefit people, communities, and the environment. As top environmental performers, participants earn access to a unique reward package that includes recognition, better information, and administrative streamlining.

The Performance Track consists of two levels. The first level, the **National Environmental Achievement Track**, is available now and is open to facilities of all types, sizes, and complexity, public or private, manufacturing or service-oriented. It is designed to recognize facilities that consistently meet their legal requirements and have implemented high-quality environmental management systems, as well as encourage them to even better achievement by continuously improving their environmental performance and informing and involving the public. The second level, the **National Environmental Stewardship Track**, is designed to recognize and encourage broader and higher levels of voluntary environmental performance than those expected under the Achievement Track. The Stewardship Track is still under development, and EPA plans to have it available by May 2001.

Any program for improving environmental performance must aim for participation by small businesses and other small entities, such as local governments. EPA is making every effort to make the Achievement Track accessible for small entities. This effort is reflected in several aspects of the design. For example, depending on the nature and extent of a facility's operations, the EMS for a small facility may be simpler than one for a larger, more complex facility. For the same reason, a small facility may have fewer environmental aspects. In addition, a small facility is not asked to make as many performance commitments as other participants.

Environmental Management System (EMS) Requirements

Facilities wanting to participate in the Performance Track must meet several requirements. A facility will certify that it has an EMS in place.[1] The EMS will include the elements listed below and will have gone through at least one full cycle of implementation (i.e., planning, setting performance objectives, EMS program implementation, performance evaluation, and management review). A facility that has adopted systems based on EMS models with a Plan-Do-Check-Act framework would meet most of these elements.

EPA recognizes that the scope and level of formality of the EMS will vary, depending on the nature, size, and complexity of the facility. EPA's experience with a variety of programs suggests that these EMS elements are within the capability of small facilities and can be met through a variety of approaches. To help small facilities implement an EMS, EPA will make guidance documents and assistance materials available.

A facility will certify that it has implemented an EMS that includes these elements:

[1] For purposes of the Achievement Track, an EMS represents an organization's systematic efforts to meet its environmental requirements, including maintaining compliance and achieving performance objectives that may be related to unregulated aspects of the organization's activities.

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Policy

A written environmental policy, defined by top facility management, that includes commitments to: (1) compliance with both legal requirements and voluntary commitments; (2) pollution prevention (based on a pollution prevention hierarchy where source reduction is the first choice); (3) continuous improvement in environmental performance, including areas not subject to regulations; and (4) sharing information about environmental performance and the operation of the EMS with the community.

Planning

- Identification of significant environmental aspects[2] and legal requirements, including procedures for integrating anticipated changes to the facility's requirements or commitments into the EMS.

- Measurable objectives and targets to meet policy commitments and legal requirements, to reduce the facility's significant environmental impacts, and to meet the performance commitments made as part of the facility's participation in the program. In setting objectives and targets, the facility should consider the following criteria: preventing non-compliance, preventing pollution at its source, minimizing cross-media pollutant transfers, and improving environmental performance.

- Active, documented programs to achieve the objectives, targets, and commitments in the EMS, including the means and time-frames for their completion

Implementation and Operation

- Established roles and responsibilities for meeting objectives and targets of the overall EMS and compliance with legal requirements, including a top management representative with authority and responsibility for the EMS.

- Defined procedures for: (1) achieving and maintaining compliance and meeting performance objectives; (2) communicating relevant information regarding the EMS, including the facility's environmental performance, throughout the organization; (3) providing appropriate incentives for personnel to meet the EMS requirements; and (4) document control, including where documents related to the EMS will be located and who will maintain them.

- General environmental training programs for all employees, and specific training

[2] An "environmental aspect" is defined as an "element of an organization's activities, products, or services that can interact with the environment." Facilities are asked to use their list of significant environmental aspects in selecting performance commitments under this program.

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for those whose jobs and responsibilities involve activities directly related to achieving objectives and targets and to compliance with legal requirements.

- Documentation of the key EMS elements, including the environmental policy, significant environmental aspects, objectives and targets, a top management representative, compliance audit program, EMS audit program, and overall EMS authority.

- Operation and maintenance programs for equipment and for other operations that are related to legal compliance and other significant environmental aspects.

- An emergency preparedness program.

Checking and Corrective Action

- An active program for assessing performance and preventing and detecting non-conformance with legal and other requirements of the EMS, including an established compliance audit program and an EMS audit program.

- An active program for prompt, corrective action of any non-conformance with legal requirements and other EMS requirements.

Management Review

- Documented management review of performance against the established objectives and targets and the effectiveness of the EMS in meeting policy commitments.

****

Although a third-party audit of the EMS is not necessary to qualify for the Achievement Track, a facility is asked in the application form if it has undergone such an audit. If it has not, it will have conducted a self-assessment. A facility will retain EMS documentation and provide a summary of its performance, including performance against objectives and targets, and a summary of the results of compliance and EMS audits, in its Annual Performance Report.

For more information about the National Environmental Performance Track, contact the EPA via:

Web: www.epa.gov/performance track
E-Mail: ptrack@indecon.com
Phone: 888-339-PTRK

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The Multi-State Working Group on Environmental Management Systems Overview of Organizational and State Activities

MSWG is an organization that convenes government, non-government, business and academic interests to conduct research, promote dialogue, create networks and establish partnerships that improve the state of the environment, economy and community through systems-based public and private policy innovation. Its quarterly meetings move around the US to accommodate participation. Meetings are open; everyone is welcome. All have a right to speak. Decisions are by consensus. The Council of State Governments (CSG) handles administration and to accommodate gifts has 501(c)(3) status. Voluntary dues support MSWG. NGOs do not pay dues. New members are welcome, especially businesses and NGOs. All 50 states are enrolled in MSWG and linked by e-mail. About 25 states regularly participate at quarterly meetings and 30-40 states attend the annual meeting and workshop. Check www.mswg.org for information.

What activities does MSWG sponsor?

- Pilot projects: In partnership with the U.S. EPA, the Environmental Law Institute, and University of North Carolina-Chapel Hill, MSWG states sponsor about 75 EMS pilot projects that produce data for a national database project funded by the EPA's Office of Water. The purpose of the pilots is to evaluate the ability of environmental management systems to improve the environment. Information is at: www.eli.org/isopilots.htm
- EMS Research: MSWG held six EMS research roundtables at major universities that led to a Research Summit, held in 1999 at The Brookings Institution in cooperation with CSG and the National Academy of Public Administration. The Summit produced an EMS research agenda. Summit papers are included in a textbook, edited by Harvard University and the Massachusetts Institute of Technology, published in 2001 by Resources for the Future. Plans are being made for a second summit.
- EMS Policy Academy: With funding from The Joyce Foundation to CSG and support of business, MSWG has a design team of business, government, academic and NGO appointees preparing recommendations for a national EMS Policy Academy. The "virtual" Academy will focus on learning about public policy EMSs, not those within the confines of a private organization and will complement and not compete with existing services. Public policy EMSs have designed to have credibility with business, government, NGO, consumer and enlightened shareholder interests.
- Workshops: Each June or July, MSWG sponsors, with support from EPA and businesses, an annual EMS workshop. It is a "hands-on" event that hosts EMS practitioners from the US and abroad. It has grown from 75 participants in Cary, NC 1998 to nearly 300 in San Diego, CA in 1999.
- Networking: MSWG provides a networking function between states and EMS support functions, especially those focused on EMSs that fit into a public policy strategy. Technical assistance centers in Florida, Georgia, Iowa, Kentucky, Massachusetts and South Carolina help MSWG participants.
- Other activities: MSWG members contribute to numerous public policy-related environmental initiatives and discussions including EPA's Performance Track, ISO 14001 revisions; Environmental Council of States forums; Global Environmental Management Initiative meetings; professional and trade association programs and Commission for Environmental Cooperation.

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MSWG is state-driven. Several states sponsor EMS pilot projects and contribute data to the UNC-ELI database. They are: AZ, CA, IL, IN, NC, NH, OR, PA VT and WI. These states have or are developing public-policy-related EMS policies, programs, internal EMSs or environmental laws that recognize EMSs: AZ, CA, CT, FL, IA, IL, IN, LA, MA, ME, MN, NC, NH, OH, OR, PA, SC, TX, VA, WA, VT and WI. Contact Marci Carter, carterm@uni.edu for state contact information or questions. Many MSWG states participate in EPA's performance track program, whose businesses use EMSs for public policy purposes.

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Implementing Environmental Management Systems In Government Entities

Fourteen government entities were selected from an applicant pool of 50 to participate in a pilot project designed to assist public-sector organizations develop and implement an environmental management system (EMS) based on the ISO 14001 protocol. The U.S. Environmental Protection Agency's (U.S. EPA) Office of Water, Office of Compliance, and Office of Air and Radiation, including Regions I and IX, jointly sponsor this initiative which runs from April 2000 to January 2002.

Each participating organization has selected a facility/organization ("fenceline") in which to implement the EMS, as noted below.

Public Entity	Fenceline
City of Berkeley, CA	Solid Waste Management Division
City of San Diego, CA	Refuse Disposal Division
City of Detroit, MI	Department of Recreation & Public Lighting
Florida Gulf Coast University - Fort Myers, FL	Solid Waste Activities and Services
Port of Houston, TX	Container Terminal and the Central Maintenance Department
Jefferson County, AL	General Services Department
Little Blue Valley Sewer District - Independence, MO	Wastewater Treatment Facility All operations
Louisville and Jefferson County Metropolitan Sewer District Louisville, KY	Wastewater Treatment Facility and Purchasing Department
Wisconsin Department of Natural Resources - Madison, WI	Air Management Bureau
Tri-County Metropolitan Transportation District Portland, OR	Maintenance Facilities
King County Solid Waste Division - Seattle, WA	Entire Division - Eight Transfer Stations & one Regional Landfill
Massachusetts Department of Environmental Protection Lawrence, MA	Wall Experiment Station Analytical Laboratory
University of Massachusetts - Lowell, MA	Olney Science Building - Laboratory
New Hampshire Department of Transportation Concord, NH	Bureau of Traffic

In 1997, U.S. EPA sponsored the first two-year EMS project for nine local governments. Participants experienced compelling environmental and economic benefits over the two-year project period:

- **Improved Environmental Awareness -** "*There's a much better understanding of environmental issues in every department of the fenceline, not just in the environmental department. We are recognizing simple internal "housekeeping" measures that are having a positive effect on our environmental performance. We have self-imposed additional requirements to help prevent pollution, reduce energy use, manage our contractors, and expand environmental education for our citizens. Employees are bringing ideas for reducing our waste streams, for less toxic products. There has been a definite improvement in involvement and morale."*

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- **Improved Efficiency -** "*Systematically analyzing compliance issues revealed an opportunity for cost savings. Fifteen departments were responsible for obtaining their own air quality permits - 23 altogether. The implementation team consolidated these permits into eight, saving the city $16,000 per year."*

- **A Positive Effect on Environmental Compliance and Performance -** "*With regards to environmental compliance, we have a better understanding of our legal requirements. We have better-trained employees whose competence in their work area is critical to the environment. We expect that our EMS efforts will increase our ability to stay in compliance."*

For case study information, see the final report at www.getf.org/projects/muni.cfm.

THE SECOND GOVERNMENT EMS INITIATIVE

Due to the overwhelming success of the first program and local governments' growing interest in EMSs, U.S. EPA decided to conduct a second EMS initiative to gather additional data about the value of EMS tools in government organizations. The Global Environment & Technology Foundation (GETF) was again selected to lead the effort, providing in-depth training, coaching and on-site technical assistance to help participants design and implement their EMS's.

Jim Horne, the National Project Manager, from U.S. EPA's Office of Water said,

"The U.S. EPA team was extremely gratified by the level of interest shown by local governments for this second initiative and the level of sophistication of the applications. It is clear that public-sector organizations are rapidly becoming aware of the value of implementing EMS's and the value of working with U.S. EPA. We are delighted with the diverse range of organizations that were selected and expect great things from each of them."

During the two-year project, participants attend five comprehensive workshops. At each they receive training, materials, and technical assistance to help them accomplish EMS milestones in each of the four implementation phases.

The Houston Port Authority, TX had the following to say about the project:

"*This will be an interesting two-year process, learning with and from other organizations who share our interest in protecting the environment while providing public services. We plan to convey all that we learn to our tenants, the city and county, and other port authorities so that we can all do a better job as stewards of the environment."*

For more information on the Local Government EMS Initiative, please contact Craig Ruberti (cruberti@getf.org) at 703-750-6401, Faith Leavitt (fleavitt@earthvision.net) at 941-489-1647, or Jim Horne (horne.james@epa.gov) at 202-260-5802 **or** visit the project web site (http://www.getf.org/projects/muni.cfm) for regular updates on the project.

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NEIC Compliance-Focused Environmental Management System

Since the late 1980s, civil multimedia compliance investigations conducted by the EPA National Enforcement Investigations Center (NEIC) have increasingly involved identifying causes of observed noncompliance. In a significant number of cases, the causes arise from inadequate environmental management systems (EMSs). NEIC, in response, developed key elements for a compliance-focused EMS (CFEMS) model, which have been used as the basis for EMS requirements in several settlement agreements. The CFEMS, which includes a guide for using it in settlement agreements, was published in August 1997 and revised in January 2000.[3]

The CFEMS elements are as follows:

1. Environmental Policy
2. Organization, Personnel, and Oversight of EMS
3. Responsibility and Accountability
4. Environmental Requirements
5. Assessment, Prevention and Control
6. Environmental Incident and Noncompliance Investigations
7. Environmental Training, Awareness, and Competence
8. Environmental Planning and Organizational Decision-Making
9. Maintenance of Records and Documentation
10. Pollution Prevention Program
11. Continuing Program Evaluation and Improvement
12. Public Involvement/Community Outreach

To achieve maximum benefit from the CFEMS elements, the overall EMS in which they are incorporated should embody the “plan, do, check, and act” model for continuous improvement. Consequently, the compliance-focused EMS model described here is intended to supplement, not replace, EMS models developed by voluntary consensus standards bodies, such as the ISO 14001 EMS standard developed by the International Organization for Standardization.

Settlement agreements that require an EMS typically include a requirement that the organization conduct an initial review of its current EMS, followed by development of a comprehensive CFEMS that must be documented in a manual. The EMS manual must contain policies, procedures, and standards for the 12 key elements, at a minimum, and should also identify other, more detailed procedures and processes (e.g., inspections and self-monitoring) that may be located elsewhere at the facility. After the organization has had sufficient time to implement and refine the EMS (usually 2 to 3 years), the agreement should require at least one EMS audit by an independent third-party auditor, with results reported to both the organization and EPA. However, additional audits may be required, as individual circumstances dictate

[3]The document is available on NEIC’s website. http://es.epa.gov/oeca/oceft/neic/12elmenr.pdf

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The intended result of this approach is twofold: first, to have the organization develop an EMS that will both improve its compliance with applicable environmental requirements and, second, to improve its environmental performance by achieving the organization's environmental targets and objectives.

The January 2000 revision involved enhancing several of the elements and more completely incorporating the due diligence provisions of the EPA audit policy. Refinement continues through settlement negotiations, and discussions with EPA staff, EMS consultants, and environmental personnel from several companies with medium-size and large facilities.

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Appendix C:

Information on Process Mapping and Design for Environment

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Introduction to Process Mapping

Organizations operate using a collection of processes. A process can be defined as a method of doing something, generally involving a number of steps or actions. An EMS is one example of linked organizational processes that are directed at a specific purpose. Most organizations employ a variety of processes to carry out their core functions, such as manufacturing a product or providing a service.

A process typically has four components. Two of these are inputs (the items to which action is done) outputs (the results of those actions). In addition, a process has controls (which direct the action) and mechanisms (which are the resources that actually perform the action). Mechanisms can be people or machines that change the inputs to the outputs. Other concepts that are important to process mapping are process boundaries (which define the limits of a particular process from its larger environment), suppliers (who provide the process inputs) and customers (whoever receives the output of the process).

Process mapping is a tool that allows an organization to visualize and understand how work gets accomplished and how its work processes can be improved. It is a simple but powerful tool through which an organization can focus its efforts where they matter most and eliminate process inefficiencies. Used properly, process mapping can help an organization understand its environmental aspects and reduce wastes and pollution. It also can help an organization to reduce operating costs by identifying and eliminating unnecessary activities.

As an EMS tool, process mapping can help an organization to:

- **improve its understanding of existing processes**, including the key **inputs** (such as chemicals, raw materials and other resources used), **outputs** (including products, wastes, air emissions, etc.) and **interactions** with other processes.

- **identify areas for process improvement** that can result in environmental performance improvements (such as pollution prevention opportunities)

Over time, processes are often modified many times in seemingly small ways. Over time, these process modifications can result in a process that is ineffective. This is one of the bases for the concept of “re-engineering” which seeks to examine processes in a holistic manner to ensure they are effective and necessary to achieve an organization’s mission.

Getting Started on Process Mapping

- **Select a process** (or set of related processes) to examine. Processes might be prioritized for review based on a number of criteria, such as relevance or importance to the organization, prior assessments of the process, existing knowledge of the environmental significance of the process, or history of problems with the process, among others. Define the process boundaries.

- Use a **team** to understand and map how these existing process(es) work. At a minimum, the team should include the process “owner” as well as individuals that are actively involved in carrying out the process. Many organizations use a facilitator that is independent of the process under review to manage team meetings. Don’t be surprised

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if a diversity of opinions exists among team member exist regarding how the existing process works.

- **Clarify the objectives** of the process under review. Each process should have a primary customer and a primary performer, although additional (secondary) customers and performers also might exist.

- As a team, **determine the level of detail** needed to accurately map your processes. Initially, you might map at a fairly high level, then get into more detail as improvement opportunities as identified.

- Decide on a **set of symbols** that the team will use to visually describe the process. For example, use one symbol for work steps, another symbol for process inputs, a third symbol for process outputs, a fourth symbol for decision points, a fifth symbol for measurement points, etc.

- **Identify the key steps** (or "unit operations") in the process first, then go back and **analyze** each of these steps in more detail. Use lines or arrows to show the relationships among individual process steps. Use brainstorming and/or storyboarding techniques to identify the process steps, then agree upon the sequence of these steps.

- Start with the **preparation of an "as is" map** that describes how the process works now, including key process inputs to and outputs. For environmental purposes, key inputs might include energy and other resources consumed, and raw materials and chemicals used. Outputs might include products or services, air emissions, wastewater discharges, solid and hazardous wastes. This "as is" map can be analyzed to identify environmental aspects and key opportunities for improvement.

- Some processes can be extremely complex and might consist of numerous **sub-processes**. If the team gets bogged down, it might examine and map some of the key sub-processes first, rather than trying to tackle the entire process at once. As a rule of thumb: If the process is so complex that it cannot be shown on a single page, then it might be a good candidate for re-engineering.

- Depending on the purpose of the process mapping exercise, the analysis of the "as is" map can lead to the preparation of a **modified map** that defines how the re-engineered process is intended to function.

- A variety of **tools and materials** can be used to prepare process maps. For example, a number of commercial software packages exist. However, you can also employ simpler methods, such as self-sticking removable ("Post-It") note pads. These are particularly useful for moving individual process steps around on a board.

A **sample process map** for a printing operation is shown at the end of this section.

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Conclusion

Process mapping can provide a solid foundation for understanding and continually improving an organization's processes.

Viewing processes graphically helps an organization to see things that otherwise might not be apparent. Once a process map has been prepared, it can be used as training tools as well as for internal and external communications.

Process mapping has several important benefits for an EMS. First, it allows an organization to understand its current environmental aspects and impacts as well as the specific operations and activities from which they arise. Second, it provides a basis for enhancing an organization's processes in a manner that can improve both environmental and financial performance.

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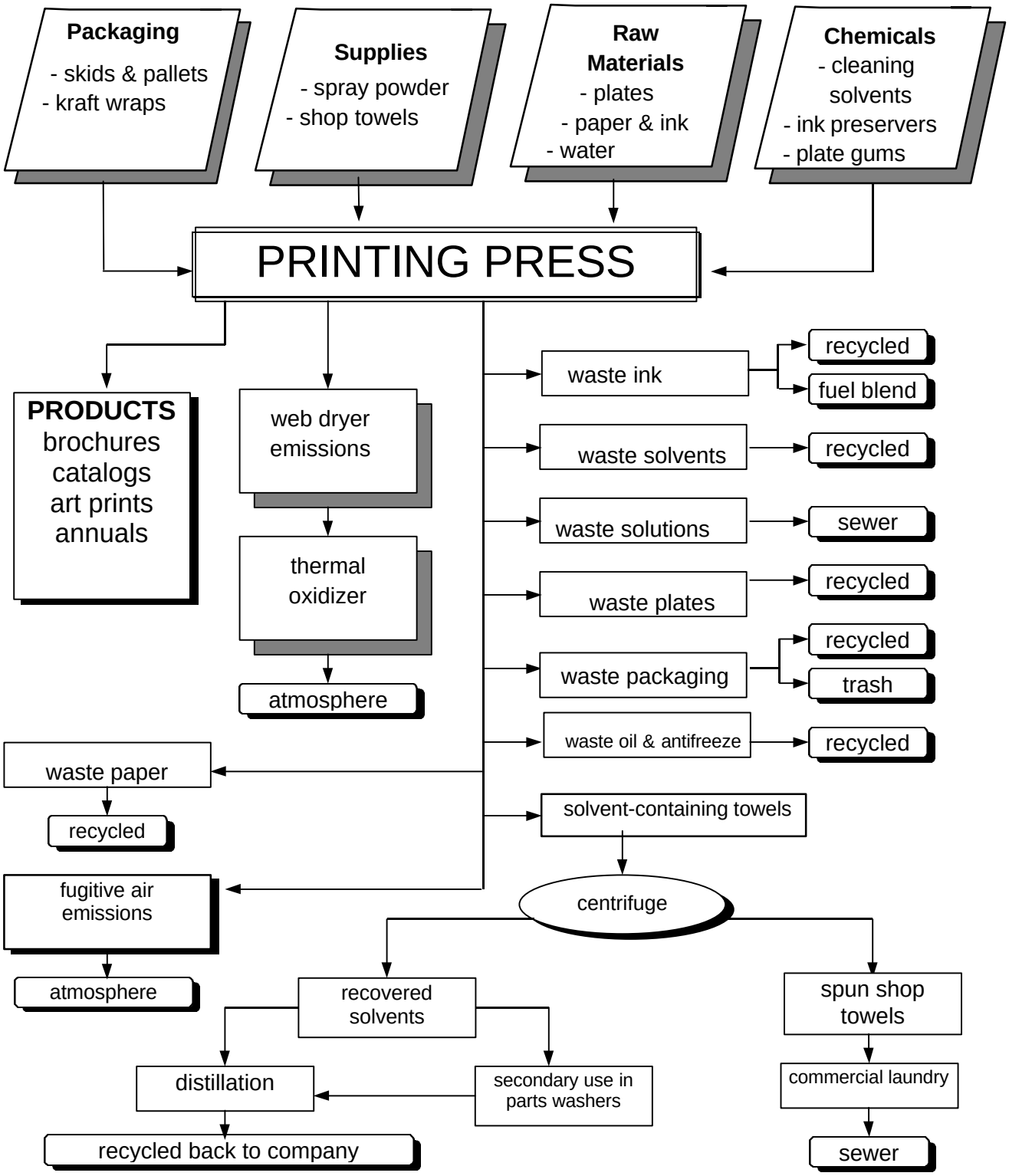
Sample Process Map for Printing Operation



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Information on Design for Environment

Every product or service has some impact on the environment. Such impacts can occur at many stages of the product or service's life cycle, from raw material acquisition to ultimate disposal or reuse. Just as the quality and performance characteristics of a product are significantly affected by decisions made at the development stage, so are the product's environment attributes. Consideration of potential environmental impacts throughout the product or service development process can improve both environmental and financial performance. By looking at each stage of a product or service life cycle, an organization can better understand and control the potential environmental impacts.

Design for Environment (DFE) is based on techniques for integrating environmental considerations into an organization's decisions concerning its products and services, as well as manner in which these products and services are generated. In involves an understanding of materials flows (and the environmental effects of such material flows) as well as the comparison of alternative approaches to producing a product or service.

DFE is grounded in the use of life cycle assessment to evaluate the full range of impacts associated with a product or service. Such life cycle assessments allow an organization to evaluate potential environmental impacts and identify opportunities to make improvements.

DFE is based on an assessment of the performance, costs and risks associated with alternatives. The technique seeks to encourage front-end innovation through product or service redesign, rather than reliance on "end of pipe" controls in order to manage risks to the environment. As such, use of the technique might result in redesign of a product formulation, a manufacturing process, or a management practice, among other possibilities.

In general, the earlier that environmental considerations are taken into account in the product or service development process, the more effective the results will be with respect to environmental performance. Organizations can use an approach that includes:

- Evaluating information on the environmental attributes of a product or service,
- Designing specific measures to reduce associated environmental impacts.
- Testing alternatives that seek to reduce impacts, while considering other importance product characteristics (such as quality and performance), and
- Applying the resulting "lessons learned" to subsequent product or service development.

While it might be simpler to implement DFE practices on new products or services, an organization also might find opportunities to apply DFE in their existing products or services. In conducting such evaluations, an organization could consider a number of goals, such as:

- Minimizing the use of toxic materials
- Minimizing compliance costs
- Avoiding chemicals that are banned or restricted by customers / other parties
- Minimizing packaging
- Minimizing energy use
- Minimizing use of water, other resources
- Maximizing reuse potential

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A product or service's environmental impacts are largely based on the inputs used to make the product (or provide the service) and the outputs generated at various stages of its life cycle. An organization can start to apply DFE concepts by using a simple matrix to assess the environmental impacts associated with a product, such as shown below (1).

	Potential Environmental Issues				
Product Life Cycle Stages	Material Selection	Energy Use	Air Emissions	Water Discharges	Solid Wastes
Premanufacture (Product design)					
Product Manufacturing					
Product Packaging & Delivery					
Product Use					
Product Disposal or Reuse					

For many organizations, the effective application of DFE concepts involves working closely with their suppliers and customers. Effective communications with supply chain partners can be critical in ensuring that an organization's products or services satisfy all their performance needs (i.e., performance, durability, environmental, safety, cost, etc.)

More information on DFE can be obtained from a variety of sources (see Appendix F for additional information sources). In particular, organizations can access information on DFE tools and projects on EPA's DFE web site at *www.epa.gov/opptintr/dfe*.

(1) Adapted from "Best Current Practices: Design for Environment", Lucent Technologies, February 1997.

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Integrated Environmental Management Systems

What is EPA's DfE Program?

EPA's Design for the Environment Program partners with stakeholders to help businesses help the environment. DfE projects help businesses design products, processes, and management systems that are cost-effective, cleaner, and safer for workers and the public. The DfE goals are to

- Encourage businesses to incorporate environmental information into their decision criteria, and
- Effect behavior change to facilitate continuous environmental improvement.

To accomplish these goals DfE and its partners use several approaches including cleaner technology and life-cycle assessments, environmental management systems (EMS), formulation improvement, best practices, and green supply chain initiatives.

To date, the DfE Program has brought environmental leadership to over 2 million workers at over 170,000 facilities. Small- and medium-sized businesses recognize DfE as a unique source of reliable environmental (as well as performance and cost) information.

DfE's Approach to EMSs

EPA's Design for the Environment (DfE) Program has developed an enhanced EMS approach called Integrated Environmental Management Systems (IEMS) to help companies achieve continuous environmental improvement. IEMSs emphasize reducing risk to humans and the environment, pollution prevention, and wise resource management. DfE's IEMS combines continuous improvement principles and tools with proven environmental assessment methodologies.

Key IEMS components that might not be included in traditional EMSs are

- Paying close attention to process and material flows,
- Obtaining knowledge of chemicals used and their hazards and exposures,
- Conducting substitutes assessments that can include full-cost accounting, and
- Considering and selecting cleaner technologies.

IEMSs assist companies in making sound environmental decisions as part of daily business practices. As a result, IEMSs help companies to

- Reduce cross-media impacts and Use energy and other resources efficiently,
- Better manage the risk associated with using hazardous chemicals (both regulated and unregulated),
- Practice extended product and process responsibility, and
- Integrate environmental and worker safety and health requirements.

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DfE's IEMS approach was piloted with several small and large screen printing companies and the Screenprinting & Graphic Imaging Association International. The pilots demonstrated that both small and large companies can develop and implement sophisticated, action-oriented IEMSs. Several of the pilot companies are applying for ISO 14001 certification.

What IEMS Materials Are Available?

To help organizations create and document their own IEMSs, DfE has developed an IEMS Implementation Guide (EPA 744-R-00-011), an IEMS Company Manual Template (EPA 744-R-00-012), and a website. The Implementation Guide walks an organization through the steps of developing an IEMS. It provides simple, thorough directions that are clear even to those unfamiliar with environmental management planning. The Guide includes worksheets, examples, and step-by-step guidance on process mapping, environmental policy development, risk assessment, and evaluating cleaner alternatives.

IEMS information and materials may be obtained by visiting the DfE website at www.epa.gov/dfe or by contacting EPA's Pollution Prevention Information Clearinghouse via email (ppic@epa.gov) or phone (202-260-1023).

Possible IEMS Roles for Lead Organizations, Associations, Technical Assistance Providers, and Large Companies

A lead organization such as an association, a technical assistance provider, or a large company can greatly facilitate development of IEMSs among its members, clients, or small suppliers. DfE's IEMS experience shows that the IEMS development process can be much more cost- and time-efficient and more fun if a lead organization takes on common activities, such as developing a basic process map or providing group training, that each company would otherwise do separately. Some additional ways in which a lead organization could help companies with IEMSs include

- Adapt the IEMS Implementation Guide and other tools to reflect a given industry sector's unique conditions,
- Organize and lead participating companies to develop an IEMS,
- Develop sector-specific pollution prevention and regulatory information,
- Help establish environmental improvement targets and evaluate results, and
- Recognize or certify companies that participate and demonstrate results.

Opportunities For IEMS Partnerships With DfE: If you are interested in becoming an IEMS partner and in leading IEMS efforts for an industry group or supply chain call DfE at 202-260-1678.

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Appendix D:

Registration of Environmental Management Systems

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Registration of Environmental Management Systems

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

Registration* vs. *Certification

Both terms refer to describe the third-party audit process. Technically speaking, "registration" applies to management systems, while "certification" applies to products. However, in common usage, they are synonymous.

Scope of Registration….

..is the activities and organizations that are included within the EMS.

The scope should be discussed with your registrar before Stage 1.

EMS registration in this appendix refers to the process whereby a non-biased third-party attests that an organization's EMS conforms with the requirements of the ISO 14001 Standard. ISO 14001 was written to describe the requirements for registration/self declaration and is the only one of the ISO series of environmental standards (such as environmental labeling or environmental performance evaluation) to which an organization may register. The third-party organization that performs the registration services is called the "registrar," and is selected by the organization that desires registration services.

An **accredited registrar** is one whose competence is evaluated by an independent third-party. Each country of the world has its own accreditation body established either nationally or by their government. In the United States, the accrediting body for both ISO 9000 and ISO 14001 is the **American National Standards Institute/Registrar Accreditation Board** (ANSI/RAB). ANSI/RAB has established criteria which registrars must meet in order to achieve accreditation. Accreditation is not a legal requirement. However, accreditation provides organizations assurance that their registrar has met ANSI/RAB requirements for things such as impartiality, confidentiality, a documented registration system, quality assurance, and policies to handle complaints and appeals.

The Registration Process

ANSI/RAB has established a two-stage registration approach for accredited registrars. Registrars may have different registration processes but must follow the basic two stage process:

Stage 1 Planning for the Audit

The purpose of Stage 1 is to determine the organization's preparedness for the registration audit. This stage includes a document review as well as on-site visit. A review of the EMS in light of the possible significant environmental aspects is a primary objective of Stage 1.

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What does registration really mean?

Registration to ISO 14001 does not mean that your organization is a "green" facility, is environmentally friendly or that you have demonstrated superior environmental performance.

It means that your organization can claim it has a documented EMS that is fully implemented and consistently followed.

Major Nonconformance occurs when……

- One or more of the numbered requirements of ISO 14001 have not been addressed and/or;
- One or more of the numbered requirements of ISO 14001 have not been implemented and/or;
- Several nonconformances taken together lead a reasonable auditor to conclude that one or more of the numbered requirements of ISO 14001 have not been addressed or implemented

Stage 2: Evaluating Implementation

Stage 2 always takes place at the organization's location. 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 and is implemented and maintained.

Once you achieve registration, regular surveillance audits by the registrar are required by ANSI/RAB. These may be conducted once per year (with a re-audit after three years) or at least twice per year with all 17 elements audited in a three year period.

To what do you conform?

The answer may surprise you. Naturally you have to conform to ISO 14001 Standard requirements but you also have to conform to:

- Your own organization's policies and procedures: The EMS an organization designs often goes above and beyond ISO 14001 requirements. Did your environmental policy say your organization would promote sustainable development? Be an environmental leader? Continually improve environmental performance? During a registration audit, your policies and procedures become criteria to which you will be audited.

- The policies and procedures of the registrar: You will not be audited to the registrar's policies and procedures but they will include your responsibilities (such as timeframes for corrective actions) and rights within the registration process (such as auditor approval), and processes you should be aware of (such as confidentiality and dispute resolution).

Why Register?

The ISO 14001 Standard does **not** require third-party registration. However, for some industries such as automotive, a registered EMS is a mandated requirement for thousands of suppliers to the major auto makers. In addition, 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.

Where registration is not a direct market driver, organizations may pursue registration for many reasons including:

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"Sufficient data on an organization's compliance with relevant legislation and regulations, gathered during the registration review and surveillance, are relevant and necessary to determine whether or the organization's systems conform to the standard. "

-ANSI/RAB Criteria for Bodies Operating Registration of Environmental Management Systems (E3.2)

- Maintenance of current market position;
- Opportunities for a competitive advantage;
- Help ensure regulatory compliance;
- Improve relationships with regulators and/or the surrounding community; and
- Support state and Federal regulatory incentive programs.

There are also important but often unrecognized *internal benefits* to registration. Registration is a way to protect the investment your organization has made in your EMS. Knowing that you will be audited regularly by an outside party helps to keep management's attention on the EMS and ensure that it has the resources it needs to improve over time.

Registration and Compliance

A registration audit is not a compliance audit. Difference in the two types of audits are highlighted in Table 1. An EMS auditor will not perform a detailed compliance inspection but the will gather data on how your organization manages its compliance program. Pertinent questions may include; How do you stay informed of new requirements? How are these communicated to employees? How do you evaluate compliance with regulations? What process do you have for resolving any noncompliances identified?

"…while compliance is part of the management system, the registration audit is not an audit of full compliance with all applicable regulatory requirements."

- ANSI/RAB Criteria for Bodies Operating Registration of Environmental Management Systems (E3.2).

Occasionally, an EMS auditor may identify a regulatory noncompliance during the registration audit. Does this mean you automatically fail the audit? No, it does not. The registrar must verify that the EMS is set up to handle noncompliances and that taken together, the noncompliances do not indicate a major nonconformance.

Accredited registrars are required to have a method for handling and reporting regulatory noncompliance identified during a registration audit. Ask your registrar for their policy or procedure for handling this situation.

Table 1. Difference between EMS and Compliance Audits

EMS Audit	Compliance Audit
• Focus is on systems	• Focus is on details of regulations
• Information gathered largely through interviews and document review	• Observation of activities is important
• Corrective action involves individuals outside of the environmental staff	• Corrective actions involve only environmental staff

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Appendix E:

Integration of Environmental Management Systems and Quality Management Systems

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Integration of Management Systems

Integrating management systems has become an increasingly important competitive issue. A growing body of information indicates that organizations that integrate their EMS and quality management systems (QMS) can realize significant benefits, such as streamlined operations and decision-making, simplified employee training, more efficient of resources and reduction in audit costs. Systems for managing health & safety and other organizational functions can be similarly integrated.

The two most common models for QMS and EMS (ISO 9001 and ISO 14001, respectively) share many common elements. This should be no great surprise, since ISO 9001 was one of the source documents used by the drafters of ISO 14001. The two standards are very compatible in their current forms. The ISO committees responsible for the development and maintenance of these two standards continue to examine potential opportunities to increase the compatibility or alignment of the two standards.

Organizations that choose to implement both of these standards generally find that they can use many common processes to conform. In general, the elements of a QMS and an EMS can be categorized as either (1) essentially the same, (2) similar or (3) unique (see table below). System elements in both the "essentially the same" and "similar" categories can often be addressed by a common procedure (or parallel procedures), although some customization may be needed to address the differing overall purposes of these systems. Unique elements are typically dealt with in separate (EMS or QMS) procedures. Some of the typical elements for integration include: document control, corrective/preventive action, training, records management and management review. However, some organizations have gone much further – for example, some have developed common (quality and environmental) policies. The degree of system integration varies widely from organization to organization.

While an EMS can be readily integrated with an existing QMS, the overall purposes of these two systems must be kept in mind. A QMS is intended primarily to ensure that an organization satisfies its customers by assuring the quality of its products. An EMS generally has a broader context – the relationship between an organization and the environment in which it operates. Also, an EMS often concerns itself with a broader range of stakeholders, such as neighboring communities, customers and regulatory agencies.

System integration can have environmental benefits. By linking environmental management more closely with day-to-day planning and operation, some organizations have been able to raise the visibility of environmental management as a core organizational issue. In addition, these organizations enhance their abilities to address environmental issues when making modifications to products or processes for quality purposes.

Organizations that have a QMS in place generally are better off when implementing an EMS for several reasons. First, employees typically are already familiar with management system concepts and are involved in making the system work. Second, many of the processes needed for the EMS might already be in place. Finally (and perhaps most importantly), top management has committed the use of management systems to achieve organizational goals.

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A Few Tips on System Integration

For organizations that have an existing QMS and wish to integrate an EMS with it, some suggestions are provided below.

- ☞ Understand the existing QMS, its effectiveness and how the workforce perceives the system. Is the existing QMS documentation clear and workable? Do employees believe that the system is helping the organization to achieve desired results?

- ☞ Ensure that the scope of the two systems will be consistent (i.e., that the systems will cover the same facilities, products, activities and/or services). In particular, this will be an important issue if third-party registration will be sought.

- ☞ Establish a cross-functional team (including, at a minimum, representatives from the environmental and quality functions) to determine the optimal approach to system integration.

- ☞ As needed, manage resistance to change. Some employees and managers may be reluctant to change a system that they are already familiar with and/or in which they have important roles.

- ☞ Understand how QMS and EMS differ in purpose. While there are many common management system elements, there are elements of each system that are unique (see below). In the case of EMS, these include for example, environmental aspects, communications, emergency preparedness and response. These differences must be acknowledged and accommodated within the integrated management system.

Relationship of EMS Elements to QMS (based on ISO 9001: 1994)

Elements that are Essentially the Same

- ☞ Training, Awareness & Competence
- ☞ Document Control
- ☞ Nonconformance, Corrective & Preventive Action
- ☞ Calibration (part of the Monitoring & Measurement element)
- ☞ Records

Elements that are Similar

- ☞ Environmental Policy
- ☞ Structure and Responsibility
- ☞ EMS Documentation
- ☞ Operational Control
- ☞ Monitoring & Measurement
- ☞ EMS Audit
- ☞ Management Review

Elements that are Unique

Environmental Aspects
Legal and Other Requirements
Objectives & Targets
Environmental Management Program(s)
Communications
Emergency Preparedness & Response

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- Modify system documentation as required. Keep procedures simple and clear for users. Review proposed changes with affected managers and employees.

- On a procedure-by-procedure basis, consider whether to integrate procedures or keep them separate. While integration can reduce the total number of procedures or work instructions, it also can confuse the overall purpose of such procedures in some cases.

- Once the integrated system documentation has been prepared, train managers and employees on the integrated system.

- Audit the integrated system and take actions as necessary.

A few final thoughts on system integration:

- Can your organization afford to have two or more separate systems?

- Are there compelling reasons to keep these systems separate?

- What is the optimal approach from a strategic and operational standpoint?

- What approach is best suited for the organization's change and growth?

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Appendix F:

Additional Sources of Information and Contacts

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Appendix F: Additional Sources of Assistance

There are many resources available to help your organization develop and implement an EMS that are free of charge or relatively inexpensive. The following is a description of some of these resources.

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 and fact sheets); and hotlines to answer questions about environmental issues. The Agency also has web sites for information on EMS's and Design for Environment. The USEPA's Office of Compliance has established national Compliance Assistance Centers for various industry sectors.

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 organizations that are developing an EMS. Many state environmental agencies also can provide publications, pamphlets, and on-line help related to state environmental laws, innovative pollution prevention technologies, waste reduction, and permitting. Some states (such as North Carolina, Wisconsin and Virginia) have developed programs to help organizations implement and EMS and/or seek ISO 14001 registration. Recently, several states (including Texas and Virginia) established "EnviroMentor" programs within their Small Business Assistance Offices. These mentoring programs are intended to help small companies comply with regulations.

Associations

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

Colleges and Universities

Some colleges and universities provide EMS-related training or manage EMS demonstration projects.

Chambers of Commerce

Your local or state chamber of commerce might 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.

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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 Organizations

Another recommended source of information and expertise is the organizations with which you do business. It is likely that your suppliers and customers have experience with many of the aspects of an EMS, and might be 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 users.

****

Additional EMS resources and contacts are described on the following table.

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Appendix F (cont'd.)
Additional Sources of Information and 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/service.

FEDERAL AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
US Environmental Protection Agency	Small Business Compliance Assistance Centers:	202/564-7066 (general information)	Centers are Internet Web Sites with comprehensive environmental compliance, technical assistance, & pollution prevention information for various industry sectors.
	Design for Environment Guide, Fact Sheets and DFE EMS Template	www.epa.gov/opptintr/dfe/tools/ems/ ems.html	Website contains information on EMS and how to incorporate DFE into an EMS. Provides a how-to manual for implementing a DFE-based EMS and a set of integration tools for companies that already have an EMS.
	Small Business Compliance Policy	202/564-7072 www.epa.gov/oeca/smbusi.html	Effective May 11, 2000, this policy supercedes the June 1996 version. Published in the Federal Register on April 11, 2000 (65FR19630).
	Compliance-Focused EMS – Enforcement Agreement Guidance	http://es.epa.gov/oeca/oceft/neic/ 12elemnr.pdf	Presents the key elements of a compliance focused EMS model.
	Environmental Compliance Auditing Protocols	EPA National Service Center 1-800-490-9198 www.epa.gov/oeca/ccsmd/profile.html	These protocols are intended to guide regulated entities in the conduct of compliance audits and to ensure that audits are conducted in a thorough manner.
	Code of Environmental Management Principles	www.epa.gov/oeca/cemp/cemptoc.html	Collection of five broad principles and performance objectives that provide a basis for environmental management among Federal agencies.
	Pollution Prevention Clearinghouse	202/260-1023	Technical Information on materials and processes, including publications related to waste minimization and pollution prevention.

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FEDERAL AGENCIES

	Office of Wastewater Management	www.epa.gov/owm/iso2/htm	Provides information on various EPA-sponsored EMS projects.
	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 ORD research information and publications.
	TSCA Hotline	202/554-1404	Assistance and guidance on TSCA regulations.
	Enviroene	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 agencies and EPA regional offices.
U.S. Small Business Administration	SBA Answer Desk	1-800-8-ASK-SBA	Information about SBA programs, and telephone numbers for local offices.
	SBA Home Page	http://www.sbaonline.sba.gov	Information about business services available to your organization, with links to other related sites.
Government Printing Office	GPO Superintendent of Documents	202/512-1800	Information about available documents and instructions on ordering GPO publications.
US Department of Energy	Pollution Prevention Information Clearinghouse	http://www.er.doe.gov/production/esh/epic.html	Pollution prevention and environmental design information.

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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 prevention program in your state.	Provides information and technical assistance on pollution prevention.
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.

Note: The list shown above represents only a sample of the resources that may be available from state agencies. Contact your state agency for details of existing programs and other forms of assistance available

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EMS SOFTWARE PACKAGES		
Organization	**Contact Info**	**Description**
Greenware	1-800-474-0627 www.greenware.com	Provides ISO 14001 assessment, implementation and audit software
EMSoft2000	1-800-241-3618 www.rmtinc.com	Software package based on LotusNotes to support EMS implementation
ISOXpert	1-800-ISO-EASY	Built on LotusNotes platform. Customizable document formats.
ISOSoft 14001	416-679-0119 www.isogroup.simplenet.com/soft14k	Provides ISO 14001 assessment, implementation and audit software. Co-developed with BSI.

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	Technical assistance to small and mid-sized manufacturers. Energy, environment, and manufacturing assessments, as well as performance benchmarking, and QS 9000 and ISO 14000 implementation assistance.
Manufacturing Extension Partnership (MEP)	Building 301, Room C121 National Institute of Standards and Technology Gaithersburg, Maryland 20899-0001	1-301-975-5020 1-800-MEP-4MFG Fax: 1-301-963-6556	Assists manufacturers with assessing technological needs, and works to help small manufacturers solve environmental problems with cost-effective solutions.
North American Commission on Environmental Cooperation “Improving Environmental Performance and Compliance: 10 Elements of Effective Environmental Management Systems”	www.cec.org/pubs_info_resources/publications/enforce_coop_law/ems.cfm?varlan=english	514/350-4334 (Commission) 202/564-7048 (USEPA)	Joint expression from three North American governments regarding how voluntary EMS’s designed for internal management purposes can also serve broader public policy goals, such as compliance assurance and improved environmental performance.

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INTERNET 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.
International Corporate Environmental Reporting Site	www.enviroreporting.com	International news about environmental issues and resources for environmental reporting.
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.
International Network for Environmental Management	www.inem.org	Case studies, publications and how-to information on environmental management. Interactive tools for assessing environmental policies and reports.
ISO 14000 Information Center	http://www.iso14000.com	Answers to questions on ISO 14000

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INTERNET RESOURCES		
Resource	**Internet Address**	**Description**
		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.
Multi-State Working Group	www.mswg.org	Describes the activities of this group regarding EMS and ISO 14001.
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-ISR Home Page	http://www.nsf-isr.org	Contains information on NSF International and its pilot projects in EMS implementation.

AUTHORIZED SOURCES OF THE ISO 14000 STANDARDS		
NSF International (NSF)	Phone: 1-888-NSF-9000 Fax: 1-734-827-6801	789 N. Dixboro Road Ann Arbor, MI 48105
American National Standards Institute (ANSI)	Phone: 1-212-642-4900 Fax: 1-212-398-0023	11 West 42nd Street New York, NY 10036
American Society for Quality (ASQ)	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

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Glossary of Acronyms

ACC	American Chemistry Council
ANSI	American National Standards Institute
API STEP	American Petroleum Institute's "Strategies for Today's Environmental Partnership"
CAA	Clean Air Act
CEC	Commission for Environmental Cooperation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERES	Coalition for Environmentally Responsible Economies
CFCs	Chlorofluorocarbons
CMA	Chemical Manufacturers Association
CWA	Clean Water Act
DFE	Design for Environment
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
P2	Pollution Prevention
QMS	Quality Management System
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)
VOCs	Volatile Organic Compounds

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