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**ENVIRONMENTAL
MANAGEMENT SYSTEMS:
A GUIDE FOR METAL
FINISHERS**

**NSF International
Ann Arbor, Michigan**

**Michigan Manufacturing Technology Center
Ann Arbor, MI**

**Environmental Consulting and Technology, Inc.
Northville, Michigan**

December 1998

**This work has been supported through the US EPA Office of
Research and Development, Grant R82442-01-0**

NSF International

ENVIRONMENTAL MANAGEMENT SYSTEMS: A GUIDE FOR METAL FINISHERS

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**This work has been supported through the US EPA Office of Research and
Development, Grant R82442-01-0**

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Published by NSF International
E-mail: information@nsf-isr.org

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Acknowledgements

This project would not have been possible without the participation of the following metal finishing companies:

Acme Industrial Group
Alta Plating and Chemical
Armorclad, Inc.
Controlled Plating Technology
Delta Faucet Company
Industrial Coating
Klein Plating Works, Inc.
Marsh Plating Corporation
Master Finish Company
Plastic Platers, Inc.
Whyco Chromium Company

Special thanks are due to Richard Burton and Daryl Taschwer of Acme Industrial Group and to Michael P. Ricci of Klein Plating Works, Inc., for providing extra efforts in contributing materials and for reviewing this document.

Ken Saulter of the Michigan Manufacturing Technology Center (formerly the Industrial Technology Institute), together with Gordon Bellen and Craig Diamond of NSF International deserve recognition for the original conception and design of the project.

Many people from the EPA assisted in problem solving and in review of our progress and work products, notably Greg Ondich, Deborah Hanlon, Bill Sonntag, and Mindy Gambol.

The project management team from NSF International provided critical support in keeping the project going forward despite changes and delays. These included: Gordon Bellen, Craig Diamond, Anita Cooney, and Petie Davis.

Finally, my thanks go particularly to Petie, for her willingness to take an active role towards making this document a tool that will hopefully prove valuable to metal finishers and others interested in environmental management systems.

This work has been supported through the US EPA Office of Research and Development, Grant R82442-01-0

Chris Branson, ECT, Inc.

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Executive Summary

- **Project Background and Objectives**

- **Lessons Learned about EMS Implementation**

- **Benefits and Costs of Environmental Management Systems**

Project Background and Objectives

Funding for this project was received under the Environmental Technology Initiative, through a joint proposal submitted in the fall of 1995 by NSF International, and the Michigan Manufacturing Technology Center, both of Ann Arbor, Michigan.

The project began in March of 1996. The project involved 11 metal finishing companies in a pilot project with the following objectives: 1) to demonstrate Environmental Management Systems (EMS) implementation in the metal finishing industry, and 2) to better define the resulting costs and benefits. The ISO 14001 (1996) Environmental Management Systems Standard was used as the basis for defining an environmental management system.

The companies were recruited through an intensive survey and interview process. Letters of invitation were mailed to over 450 companies across the country, and the final panel of 11 companies (listed in Acknowledgements) were selected from a pool of 28 candidates. The selection process was intended to provide a spectrum representative of the types of metal finishing companies, ranging from very small job shops to large job shops and captive operations.

An Advisory Committee was convened to advise the project staff on participant selection and on the overall design of the project. The Advisory Committee met once, and participated in two follow-up conference calls. It included representatives from the metal finishing industry, the main trade associations (American Electroplaters and Surface Finishers and the National Association of Metal Finishers), and from EPA's Office of Research and Development. Updates on the project were also given periodically to the Common Sense Initiative Metal Finishing Subcommittee, the EPA Design for Environment Program, and to the joint EPA/AESF annual conferences held in 1997 and 1998.

The companies attended 4 two-day sessions held in Ann Arbor, Michigan. The first session provided an overview of the project, the objectives, and some training on EMS. The next two sessions involved extensive training on EMS implementation, and provided an opportunity for the companies to obtain assistance, and to share their progress with each other. The final session provided an opportunity for the companies to discuss progress, and to provide information about the costs and benefits they had realized.

Site visits were made to all 11 facilities by project staff during the summer of 1996, in order to obtain a baseline assessment of pre-existing environmental management systems and programs.

The initial design of this project allowed the metal finishing companies to progress towards implementation of the EMS at their own pace (as was the case in earlier NSF/EPA EMS demonstration projects). Following the third meeting of the project in February 1997, it was noted that most (8 of the 11) companies had made very little progress in completing their EMS. The main cause for the lack of progress was that most of the participating companies were heavily engaged in implementation and registration of their QS-9000 quality management system. Registration to QS-9000 was mandatory for GM suppliers by the end of 1997. The EMS program was temporarily delayed as most companies lacked sufficient resources to do both programs simultaneously. Discussions were held with EPA staff to determine a course of action that would provide some additional assistance to companies desiring to continue participation in the project.

The final official meeting of the project was held in December 1997. At that point, one facility had completed its EMS to the point of readiness for registration, and did in fact become registered to the ISO 14001 Standard in the spring of 1998. Two other companies submitted their completed EMS documentation for a preliminary conformance review (similar to a "Desk Audit), and received in return a conformance report indicating areas that needed improvement. One of these companies is pursuing registration in the spring of 1999.

The other participants were polled. They continued to express interest in moving forward with their EMS implementation, but requested that the project find ways to provide more structured implementation assistance. Following discussion with the EPA Program Managers and project participants, the project was extended to the end of 1998 in order to allow more time for participants to make additional progress on EMS implementation. Participants also were offered an opportunity to participate in a pilot version of the "EMS Fast Track[®]" correspondence course courtesy of Environmental Consulting and Technology, Inc.(ECT), of Northville, Michigan. The course has ten modules, and is intended to assist companies in development of an EMS (based on the ISO 14001 Standard) within 6-9 months, depending on level of effort. The "EMS Fast Track[®]" modules included background information and explanations, examples, and specific action items, including assignments. Completed assignments were faxed back to ECT, and were reviewed by experienced EMS consultants. Feedback and implementation coaching were provided on an individual basis in follow-up conference calls.

The deliverable from this project is this document: *Environmental Management Systems: A Guide for Metal Finishers*. The Guide is based on the materials submitted by the participants during the course of the project, and from completion of the “EMS Fast Track[®]” modules.

The *Guide for Metal Finishers* has two parts. The first part (Executive Summary and Chapter 1) provides general information about the project, the lessons learned about implementation, and suggestions on how to use the guidance. The second part (Chapters 2 through 4) provides the implementation guidance, following the implementation plan described in “How to Use this Guide” in Chapter 1. Each related section of the ISO 14001 Standard is explained, along with typical starting points for participating companies, implementation tips, examples from the companies involved in the project, a conformance check indicating areas where the Standard was not met (non-conformance) based the materials submitted, and a description of the links between the different sections of the ISO 14001 Standard.

Lessons Learned About EMS Implementation

Following is a summary of the top ten lessons learned from working with the metal finishing companies involved in this project. These are general observations, useful as “food for thought” for companies considering implementation of an EMS.

Lesson #1: An EMS must be supported by top management

All of the companies that made substantial progress had sustained, direct involvement by top management (President, Vice-President level). Top management participation proved especially helpful in writing, reviewing, and implementing EMS procedures. Conversely, companies with no representation by top management on their implementation teams tended to lose momentum between the sessions and continually struggled to find the time and resources necessary to complete assignments. This was especially true for the larger companies with more complex operations. Smaller companies may actually have an edge in EMS implementation, in that it is easier for them to make changes in their management procedures and to maintain top management commitment and involvement over the course of implementation.

Lesson #2: Finish implementation within a reasonable period of time

Many of the companies experienced significant job turnover during the course of the project. Five of the 11 companies lost key implementation team members during the course of the project (typically the environmental manager or operator), and had to start over in recruiting and training replacements. For this reason, companies should strive to complete the “first draft” of their entire EMS within a relatively short time frame (6 to 9 months is recommended). The companies that successfully completed this EMS pilot project did exactly this. Early on in the project, they set aside adequate time to develop an overall framework for the EMS (even though it was sketchy in areas at the beginning and required changes and improvement). Then, they spent time refining it, adding procedures and work instructions as necessary as they implemented the program, completing employee training and communication elements of the system as time allowed. Starting and stopping the implementation process costs extra time and money in training and re-training the implementation team, and may disrupt the implementation process.

Lesson #3: Commit necessary resources up front

The overall EMS implementation effort for small shops typically does not require large cash outlays. However, it certainly has an opportunity cost for the company in that it temporarily removes highly valued employees from their regularly scheduled duties. Companies that did not recognize and plan for this “opportunity cost” placed a lot of stress on the implementation teams, requiring them to work on the EMS “in their spare time.” Hopefully, this Guide will assist companies in recognizing the extent of involvement necessary to put an EMS in place, so that the implementation process can run more smoothly. See the section on Benefits and Costs of EMS Implementation below for more detail on costs.

Lesson #4: There *really* are benefits to having an EMS

The successful EMS implementers appreciated that having an EMS would positively impact their business, now and in the future. These companies recognize that the globally competitive nature of their business (particularly for automotive and electronics supply chains) will likely require them to have an EMS in place soon, possibly within the next 1-3 years. They also were sensitive to issues around “compliance assurance,” recognizing that the EMS would help them to avoid costly environmental problems in the future. Additionally, some shops also quickly realized bottom-line cost savings by implementing pollution prevention and energy efficiency projects they identified as part of their environmental management program.

Lesson #5: An EMS manager doesn’t need to be an environmental expert

Non-environmental experts led two of the most successful EMS implementation teams. In both cases, however, they had direct experience with implementation of their facility’s Quality Management System. This gave them a head start in writing and implementing the necessary EMS procedures, some of which are directly linked to the quality management system procedures. They were able to call in the necessary environmental expertise as required, either by staff, or by hiring outside consultants. They had a better grasp of the structure and function of management systems, and didn’t seem to get bogged down in the implementation process. Teams led by environmental managers or operators seemed to struggle most with the development and implementation of key cross-management functions of the EMS, such as training, communication, nonconformance and corrective and preventive action, auditing, and management review. Remember, however, that some level of environmental expertise is necessary to set up the

environmental management program and to establish appropriate environmental operations and control.

Lesson #6: Keep your EMS simple

Although your EMS system needs to have all of the components, there can be a real advantage to keeping them as simple and as straightforward as possible. Strive to have a minimum of “boilerplate.” This is especially important when it comes to setting objectives and targets, in EMS documentation, documentation control, developing operational procedures, and in establishing monitoring and measurement requirements. Additionally, look for opportunities for combining components in ways that requires the least amount of resources. For example, monitoring and measurement procedures should assist in the process of regulatory reporting. Training programs can be combined with existing health, safety, and employee orientation programs. Look for ways of building on what you already have. This is especially important for facilities that already have good standard operating procedures and for those with quality management systems in place.

Lesson #7: Demonstrate success with your EMS early and often

Demonstrating success early on can greatly boost implementation efforts. Success can include, for example, documented cost savings resulting from energy or water conservation projects that are part of the environmental management program. For this reason, you may wish to set some environmental objectives and targets that can be easily achieved early on in the implementation process. Start with a limited number (3-5 is recommended) of objectives and targets, and add to the list as you achieve them. Look for less tangible benefits from the implementation effort. For example, one company mentioned that they felt that their EMS greatly improved communication across the company, and that this benefit alone helped justify the implementation costs.

Lesson #8: Add improvements to your EMS over time

The EMS does need to have a functional set of components (as described in this Guide), but it does not have to be perfect or represent the “cutting edge” from the start. For example, a company may develop a long list of possible objectives and targets for their environmental management program, but initially only be capable of addressing the top two or three. Initial training may be the minimum required initially, but could be expanded as the system evolves and the employees’ knowledge and capability grows. Nonconformance reviews and a strong preventive and corrective action program will allow you to catch the

critical flaws or missing pieces, and the commitment to continual improvement will cause the system to improve gradually over time.

Lesson #9: Complete the entire implementation process

A partially implemented EMS is of limited use, and may provide less than optimal performance. The entire system needs to be in place. For example, a stand-alone environmental management program could be effective in establishing targets and objectives, but may lack elements necessary to actually achieve them, such as monitoring, performance tracking, corrective action, training, communication, and essential operational procedures. Auditing and review by top management are also key components that help maintain a system that gives consistent results over time.

Lesson #10: Consider the timing for getting registered to ISO 14001

This guide is based on the ISO 14001 Standard because it continues to be the most widely recognized internationally used EMS standard. This Guide is intended to provide a better understanding of these essential EMS components by explaining the key elements of the ISO 14001 Standard and discussing how they are linked together in a functioning system.

If your facility needs to become registered to the ISO 14001 Standard, note that you must have a fully operational system and have gone through at least one internal audit and management review prior to a registration audit. You must also have collected sufficient records so that the auditors can assess whether or not the system is functioning as intended. This means that you will typically need to have your system in place a few months prior to the registration audit.

Decisions about qualifying suppliers may increasingly be made informally through “preferred supplier” purchasing decisions, rather than by announcing formal qualification procedures with specific deadlines. This may make it difficult to determine a “date certain” by which you must achieve registration. Several Tier 1 Automotive Suppliers are preparing their facilities for registration at the time of this publication. Project staff informally interviewed several Corporate Environmental Managers about the ISO 14001 registration issue. They strongly encourage Tier 2 and 3 suppliers to get involved with EMS implementation as soon as possible. This is especially important if a facility is vulnerable with respect to environmental compliance. Original Equipment Manufacturers (OEMs) and Tier 1 customers are becoming increasingly sensitive to consumer pressures regarding environmental stewardship. They do not wish to risk

losing their reputation and business by purchasing products and services from environmental “bad actors” if there are any economically feasible alternatives.

Benefits and Costs of Environmental Management Systems

Benefits: Why Companies are Investing in EMS

The following is a summary of the benefits the project participants realized as a result of EMS implementation.

- 1) **Competitive Advantage:** An EMS is increasingly being adopted as an internationally accepted approach to environmental management and protection, particularly in countries that lack strong environmental regulatory programs of their own. Currently, countries in the Pacific Rim have led in registrations to the standard, followed closely by Europe. India and China are also actively pursuing their own environmental programs. The likelihood is that companies in industry sectors that create significant environmental impacts, and that operate in the international arena, will eventually be required to have an EMS based on the ISO 14001 Standard. Industry sectors that are currently facing increased customer requirements for EMS include automotive, electronics, chemical, pharmaceutical, aerospace, and utility.
- 2) **Improved Compliance:** Many of the metal finishers involved in this project mentioned the importance of having a strong EMS in order to be sure that they stay in compliance with Federal, State, and Local environmental regulations. This is especially important when failure to comply could subject the owner/operator to substantial personal liability, as well as jeopardize the survival of the business. One owner mentioned, “just being able to sleep better at night and maybe take a vacation without worrying about what’s happening back at the shop” as more than enough justification for the investment of time and effort in improving their company’s EMS. A strong compliance assurance system as evidenced by an EMS can go a long way towards establishing the company’s “due diligence.” This improves a company’s position with respect to negotiating regulatory settlements, and in defending itself in court.
- 3) **Cost Savings:** The third reason many companies are interested in EMS is that they recognize that they have many opportunities for reducing waste in their processes (and therefore reducing costs). Putting an EMS in place gives them the management structures (programs, plans, communication, training, procedures and practices) necessary to actually realize the savings, and to track them over time. Several participating companies were able to make significant savings in energy and materials use, just by going through the planning and program part of the EMS implementation process.

- 4) Improved Communication: A hidden benefit mentioned by several metal finishers is the degree to which their overall operations improved simply by the fact that they involved their employees in the EMS implementation process. Improved internal communication also can support improved community relations--as the families of employees, the neighborhood, and surrounding community appreciate a business that demonstrates active concern and involvement in minimizing negative impacts on the environment. This also can pay side dividends in terms of employee job satisfaction, increased retention, and improved labor relations.

Costs of Implementation

Companies involved in implementation in this project typically spent between 250 to 500 hours developing the necessary EMS components, including the policy, documents, procedures, and work instructions. Note that these statistics may not be reliable given the small sample size. Depending on how you calculate costs for your facility, this could represent a range of \$5,000-\$60,000 in staff costs. More complex operations may require additional time for team and top management meetings, and for writing, reviewing, and approving EMS procedures, operational procedures, and work instructions. This is especially true where implementation requires employees from several areas or departments.

In this project, implementation teams varied in size from one individual, to a multi-functional team involving five employees. Most teams had 2 to 3 members. In addition to EMS development time, implementation requires other time consuming efforts such as training, auditing, and management review. Project staff were not able to track these costs during this project. Some companies involved in the project had additional out of pocket costs associated with additional assistance they obtained from outside consultants. These included primarily additional EMS implementation assistance, and environmental compliance assistance.

Chapter
1

Getting Started on an EMS

- 1.1 What is an Environmental Management System?
- 1.2 How to Use this Guide
- 1.3 About ISO 14001 and Registration

1.1 What is an Environmental Management System?

As the name implies, an EMS is a system of management practices and related documentation, procedures, and work practices that are put in place to manage a company's environmental impacts. Most metal finishers already have environmental management programs based on the need to comply with Federal, State, and/or Local environmental regulations and permit conditions. However, a compliance-based environmental management program may not continue to be the best option for all metal finishers, for the reasons mentioned in the Executive Summary. This Guide for Metal Finishers is based on the ISO 14001 Environmental Management Systems Standard and related guidance documents. There are three basic principles to consider in this type of EMS:

- 1) The EMS relates to all of the environmental impacts (positive or negative) that result from a company's activities, products, and services. No absolute performance criteria are suggested by the ISO Standard. The system should continually improve over time. Improvement may start with the EMS itself, but ultimately this may result in environmental performance that goes beyond that required for compliance. See Section 2.2 *Identifying Significant Environmental Aspects and Impacts* for more discussion about the definition of environmental impacts.
- 2) The EMS is a management driven process, not a manual. EMS implementation requires top management commitment to the EMS process, including provision of adequate resources (time and staff) to complete the process within a reasonable time frame, and periodic guidance in setting policy, program objectives and targets, in reviewing overall progress, and in continually improving the EMS.
- 3) The EMS is a system, not just documents and records in a notebook or file. The system is based on a cycle of management activities that require the company to periodically plan, do, check, and act in order to improve the system based on the evidence collected by the system. The documents and records provide evidence that the system is functioning based primarily on whether or not it is giving the intended results. The system a company initially develops is rarely perfect from the beginning, but when all of the elements of the management system are in place and functioning (as described in the Standard), eventually the system will act to correct any incorrect or missing pieces.

1.2 How to Use This Guide

How This Guide is Structured

This Guide is structured around the ISO 14001 Standard (1996) because it continues to be the most widely recognized and used international standard. Chapters 2, 3, and 4 include the actual guidance on EMS implementation. Chapter 2 covers the process of setting up the Environmental Management Program, Chapter 3 covers EMS Operations, and Control. Chapter 4 covers EMS Auditing and Management Review. The relevant the ISO sections are indicated in brackets following the section titles in the Guide. Each section in of the Guide includes the following information:

- What the ISO Standard Requires: a brief overview of what the ISO 14001 Standard requires. Note that the standard does not always require written procedures. However, it is advisable to provide written documentation of all EMS procedures to be sure that the EMS functions as intended.
- Starting Points: background information on typical starting points for the metal finishers involved in the project
- Implementation Tips: how to get started on implementation, lessons learned from the participants
- Examples: approaches, language, and worksheets as appropriate.
- Conformance Check: a review of documents submitted by project participants for conformance with the ISO 14001 (1996) Standard
- EMS Links: indicating how the various sections of the standard relate to each other.

Implementation Action Plan

Individual implementation processes vary considerably between companies. The following implementation action plan is intended to be used as a starting point. Modify the plan to accommodate your existing management structure and systems, and your current EMS and programs. This chart incorporates specific action steps taken during implementation, and does not include actions necessary to gear up for implementation, such as identification and training of the implementation team and development of the implementation plan and timeline. Refer to

Environmental Management Systems: An Implementation Guide for Small and Medium Organizations (Cooney and Stapleton, Nov. 1996, NSF International, see www.nsf-isr.org or call 1-800-NSF-MARK) for a good discussion of the overall implementation process.

Note that this EMS Guide is laid out sequentially based on this implementation action plan, which caused the ISO 14001 Standard sections referenced to occasionally appear out of sequence. This sequencing allowed participating companies to progress through the implementation process with a minimal amount of “back-tracking” between steps. For example, it was difficult for companies to address assignment of Structure and Responsibilities (ISO Section 4.4.1) and to identify needs for Training, Awareness, and Competence (ISO Section 4.4.2) until they had completed development of the required operational procedures and work instructions (ISO Section 4.4.6 and 4.5.1). Adapt your approach to whatever works best in your situation.

Implementation Action Plan

Implementation Activity	EMS Guide Section	ISO Standard Section
1. Establish an Environmental Policy Statement for your company	2.1	4.2
2. Identify Significant Environmental Aspects and Impacts, and decide how you will keep the list up to date	2.2	4.3.1, 4.3.2
3. Identify Legal and Other Requirements and provide access to this information and ways of updating it periodically	2.3	4.3.2
4. Set Objectives and Targets, based on policy commitments, aspects and impacts, and legal and other requirements	2.4	4.3.3
5. Establish an Environmental Management Program Decide what needs to be done by when Assign responsibility Provide resources necessary to accomplish this	2.5	4.3.4

Implementation Activity	EMS Guide Section	ISO Standard Section
<p>6. Decide what operational controls, procedures, work instructions, and monitoring are necessary</p> <p>Determine key operating criteria and decide what procedures and work instructions are necessary (using an <i>operational control worksheet</i>)</p> <p>Develop (or refer to existing) required operational procedures, work instructions, and related records. This must include procedures for periodic evaluation of your compliance with applicable environmental regulations and legislation.</p> <p>List these on an <i>environmental control log</i> to designate which operational procedures, work instructions, and records are considered to be part of the EMS. If you have a Quality Management System, you can develop a combined table or matrix indicating which procedures are related to each system or to both systems.</p>	3.1	4.4.6, 4.5.1
<p>7. Review your existing emergency preparedness and response plans for adequacy. Revise or develop operational procedures as necessary and incorporate them in the environmental control log.</p>	3.2	4.4.7
<p>Designate who is responsible for carrying out specific responsibilities of the EMS.</p> <p>Designate the person(s) responsible for overall EMS implementation, maintenance, and operation.</p> <p>Review the Environmental Management Program and the operational procedures listed in the environmental control log to be sure that responsibilities are clearly defined in each procedure.</p> <p>Review resource needs and availability to be sure that the designated person(s) can carry out their responsibilities</p>	3.3	4.4.1
<p>Decide what EMS training needs to be provided and how to accomplish it</p> <p>Consider who at the facility needs to have general awareness training about the EMS</p> <p>Review the responsibilities identified in #8 and determine specific training needs</p> <p>Decide how to integrate environmental training needs in to your existing procedures and programs</p>	3.4	4.4.2
<p>Decide how to handle communication about environmental operations, environmental aspects and performance, and about the EMS, internally and externally</p>	3.5	4.4.3
<p>Describe the EMS, include a description of ea. component of the system and how they relate to each other</p>	3.6	4.4.4

Implementation Activity	EMS Guide Section	ISO Standard Section
Decide how to manage the documents and records that are related to the EMS	3.7	4.4.5, 4.5.3
Decide how you will handle any problems that arise with respect to environmental management, including the performance of your EMS	4.1	4.5.2
Decide how you will periodically check the system to be sure that it is performing as you intended	4.2	4.5.4
Decide how you will integrate the EMS in to your current management review procedures, and ensure that the EMS continually improves over time	4.3	4.6

1.3 About ISO 14001 and Registration to the Standard

ISO is the International Standards Organization with headquarters in Zurich, Switzerland. They currently maintain a large body of International Standards, covering a range of activities. Some important points to consider about ISO and the 14001 Standard follow.

ISO is not a regulatory body. They have no particular authority. Representatives from many countries use the ISO process to come to agreement on the requirements to be met by parties to a certain type of activity or transaction. Generally, the parties request the standards because there is a need to “level a playing field” with respect to international trade. The ISO process makes it possible for a company that wants to sell to any number of foreign countries to meet a single standard (if it is accepted by all of the countries), rather than having to meet each individual country’s requirements.

ISO does not register companies to the standard. It’s totally up to each member country to set up and manage the registration process. Sometimes the registration process is managed by an independent organization such ANSI/RAB (American National Standards Institute/Registration Accreditation Board) in the U.S. Sometimes, a government will elect to manage the process itself, as in Japan.

Companies can demonstrate that they meet the ISO 14001 Standard requirements in three basic ways:

- 1) A Company can self-declare their conformance to the Standard. There are no guidelines for self-declaration.
- 2) A Company can use a second party or independent third party to verify conformance with the standard. While this gives more assurance that the system meets the requirements, it may or may not be adequate to meet customer requirements. Sometimes Original Equipment Manufacturers (OEMs) will require second party, or even independent third party audits performed by their own staff. This type of program was put in place by some of the OEM automakers during the adoption of quality system standards for their suppliers, before they adopted the QS-9000 system.
- 3) A Company can verify conformance with the standard by using an independent Registrar. Registrars are accredited—they have to pass a stringent set of requirements to ensure that they are competent, that they follow the agreed upon protocols, and that their findings remain neutral and independent with respect to their clients. The accreditation

body (such as ANSI/RAB in the U.S.) sets the requirements for the Registrars. The advantage of using an accredited Registrar is that there is generally a much more careful consideration of the entire EMS, and an ongoing program for maintaining conformance by periodic surveillance audits. The Registrars issue the actual certification of the system.

The terms registration and certification are often used interchangeably. However, it is most technically correct to say that a product is certified, whereas a system is registered.

Basically, the marketplace will dictate the approach a particular company should take. The costs and benefits of the various options should be carefully considered as part of a company's long-term marketing strategy. A list of U.S. accredited registrars is available at www.rabnet.com or call the Registrar Accreditation Board at 1-888-248-1946.

Environmental Management Programs

- 2.1 Establishing an Environmental Policy Statement
- 2.2 Identifying Significant Environmental Aspects and Impacts
- 2.3 Legal and Other Requirements
- 2.4 Setting Environmental Objectives and Targets
- 2.5 Establishing an Environmental Management Program

2.1 Establishing an Environmental Policy Statement [ISO 4.2]

What the ISO Standard Requires

The ISO 14001 Standard requires that top management define the environmental policy. The scope of the policy should be appropriate to the nature and scale of the business, and it should cover environmental impacts resulting from the company's activities, products and services. In addition, the policy statement should include the “three pillars”: (1) commitment to continual improvement, (2) commitment to prevention of pollution, and (3) commitment to compliance with applicable environmental legislation and regulations and with other requirements to which the company subscribes (for example, the CSI Metal Finishing Strategic Goals Program). The environmental policy statement provides the framework for establishing and reviewing the environmental management program's objectives and targets. The policy statement must be documented and must be implemented and maintained. It must also be communicated to all employees, and made available to the public.

Starting Points

About half of the companies had previously existing environmental policy statements (one had one in place for over 10 years), although none of these statements met all of the requirements of the ISO 14001 Standard, including especially the commitments to continual improvement, prevention of pollution, and compliance.

Implementation Tips

- 1) Strive to complete the implementation process, not to perfect the system from the beginning. The EMS you implement doesn't have to be perfect from the start, but it does need to include the major elements described in this Guide. Your policy of “commitment to continual improvement” requires you to pay attention to improving the EMS—determining how well it is functioning, and what needs to be changed or improved. System level procedures, such as Auditing, Preventive and Corrective Action, and Management Review, are intended to act together to create the conditions for identifying problems with the management system and fixing them.
- 2) Consider your first policy statement to be a draft. Include a process for revising it at towards the end of the EMS implementation process.

Companies have a tendency to get too attached to early versions of a policy statement. They may spend a lot of meeting time getting consensus among various groups and managers in the company as to the exact wording of the statement. However, when they have completed the EMS implementation process, they may find that this early version of the policy statement needs revision. The policy statement may include phrases that are difficult to implement, or it may miss significant components of the environmental management program that have been added (for example, energy efficiency programs, community education and outreach programs, or programs to reduce the use of toxic materials).

- 3) Integrate the environmental policy with other company policy statements. Consider integration of the policy statement with other company policy statements, such as Quality, or Health and Safety. The Environmental Policy should fit well with existing company policy, so it helps if it follows a similar format and framework. For example, many companies have existing Quality Policy statements. The Environmental Policy statement could be worded and documented in a similar fashion.
- 4) Develop a short summary of the policy to use in communication about the EMS. In order to effectively communicate the policy statement to all employees, consider writing a short summary statement that covers the key points of the environmental policy. This statement should be included in the Environmental Policy documentation.

Examples

- 1) Documentation: Several companies included the policy statement within the framework of an EMS procedure. The procedures typically included the purpose, scope, references and definitions, as well as the Environmental Policy statement itself. This framework makes the documentation part of the overall EMS documentation. Other companies simply issued a separate Environmental Policy document (appropriately signed and dated), which would be suitable for distribution for the public.
- 2) Commitment to the Three Pillars: Most companies explicitly stated the three pillars simply by committing to 1) prevention of pollution; 2) compliance with applicable environmental regulations; and 3) continual improvement of the EMS. Some were more specific about types of pollution as in the following example:

The primary objective of XYZ Plating is to preserve the environment by designing the operations in ways that reduce the use of hazardous substances, generate minimal amounts of waste, and reduce adverse impacts on the environment. We will comply with all environmental laws and regulations that apply to our operations. We will work continuously to improve the effectiveness of our environmental management.

- 3) Include a statement that indicates how the policy sets the framework for establishing and reviewing objectives and targets. One example of this:

XYZ Plating will seek to prevent pollution before it is produced and reduce the amount of raw materials used, as well as the amount of waste at our facilities, in an environmentally sensitive manner. We will reduce the amount and toxicity of the waste generated, and will ensure the safe treatment and disposal of such waste.

4) Communication

Most companies simply specified that the policy would be communicated to employees and the public without specifying the means of communication.

XYZ will communicate its commitment to environmental responsibility to its employees, customers, vendors, and the community.

Conformance Check

- 1) Nonconformances: The environmental policies reviewed showed nonconformance in two areas. One policy showed no evidence of being a controlled document. This is an example of where recognizing the links in your EMS is important. Section 4.4.5, Document Control states that “all documents required by this International Standard...” are to be part of an established document control system. The environmental policy falls in that category. Another policy included commitment to compliance and prevention of pollution but overlooked commitment to continual improvement of the EMS.
- 2) Going Beyond Requirements: Most of the metal finishers framed their environmental policy statement around the “three pillars of an EMS policy:” 1) commitment to continual improvement, 2) commitment to prevention of pollution, and 3) commitment to comply with environmental laws and regulations. Several of the policy statements went beyond conformance to standard requirements. For example:

"Continual Improvement: A commitment to continuously improving our EMS, *our compliance record, and our prevention of pollution in all areas of our business.*" (Emphasis added)

"We will continue to strive for continuous improvement of our *environmental performance*" (emphasis added)

It is important to note that the standard requires continuous improvement of only the EMS, not environmental performance, which is much broader in scope and more difficult to sustain. It is not wrong to go beyond the requirements of the standard but when it comes to the policy, the foundation of your EMS, be cautious in what you claim. Here are other examples:

"We promote cooperation and coordination between industry, government, and the public toward the shared goal of environmental protection."

"We are committed to excellence and leadership in protecting the environment."

Grand, sweeping statements such as these can be a flag for an auditor (either your internal EMS auditor or a registrar) to ask for evidence of how you meet your policy commitments. If your company does not intend to actively "promote coordination with the public," or make the investment to be a leader in protecting the environment, do not include such statements in your policy, no matter how good they sound.

- 3) Communication: Half of the policies reviewed included "Communication" as a major objective of the EMS along with commitments to compliance, continuous improvement, and prevention of pollution. In addition to communicating the policy to employees (which is a requirement), these policies included communication of the policy to customers, vendors, contractors, consultants, the community, and other interested parties. While the standard requires that the policy be made available to the public, it does not require that your policy be proactively communicated or that you disclose environmental performance information. While it is fine

to go beyond standard requirements, in an EMS audit, nonconformance with a self-imposed requirement carries equal weight to a nonconformance with a standard requirement.

- 4) **Added Features:** One policy included the signatures of all key management positions in the company, President, Operations Manager, VP Sales, Quality and EMS Manager, Plant Operations Manager, Office Manager, and Controller. This helps to demonstrate management awareness and support of the EMS. In several cases, the policy was part of a procedure that included a scope statement, and listed responsibilities for implementation, revision, and communication of the policy.

EMS Links

- Environmental aspects: This link is indirect. The standard requires that the policy provide the framework for setting and reviewing objectives and targets. An organization's significant aspects are one consideration in determining objectives. Thus, a change in an environmental aspect may change an objective, which in turn may necessitate a change in the policy.
- Legal and other requirements: The requirements in this section support commitment to comply with regulations.
- Objectives and targets: The connection between this section and the policy is important to recognize. Your objective and targets should reflect a commitment to the prevention of pollution as described in your policy.
- Training, awareness, and competence: The policy is a key component of your environmental training. For example, employees should be knowledgeable of the policy, understand its importance, and know their role in achieving conformance to the policy.
- Communications: Communicating the standard to the public may be a part of an organization's process for managing external communications.
- Document control: The environmental policy should be a controlled document.
- Operational controls: Companies often overlook the link between operational controls and the policy statement. The policy will help a

facility determine which of its operations fall under operational control requirements.

- Monitoring and measurement: The requirement to periodically evaluate compliance with regulations directly supports the commitment to compliance in the policy.
- Management review: One objective of the management review is to address the possible need for changes to the policy.

2.2 Identifying Significant Environmental Aspects and Impacts [ISO 4.3.1, 4.3.2]

What the ISO Standard Requires

The ISO 14001 Standard requires you to have a procedure to identify your environmental aspects. Important considerations:

- 1) Aspects cause, or could possibly cause, impacts on the environment. These are environmental aspects. Some companies are also including health and safety aspects in their program so they can have a combined Environment, Health, and Safety (EH&S) Management Program, but this is not necessary for registration to the ISO 14001 Standard. It may also complicate the auditing and registration process unless the system is carefully designed.
- 2) You need to consider your activities (operations), and your products and services. For example, if you provide a shipping service for your customers, that would need to be included along with other operations. Note that you also will need to consider non-routine operations such as maintenance, start-up, shutdown, and emergency conditions (ISO Section 4.4.6) and goods and services that you use (ISO Section 4.4.6 c).
- 3) Do not include aspects if you cannot control them, or at least have an influence on them. This is a best judgment call. You may revise your decisions over time through the management review process.
- 4) Rate the preliminary list of aspects based on how significant the impact on the environment is (or would be if it occurred). Significant impacts are given top priority when you establish your environmental objectives and targets, and when you consider your environmental operations and control, including emergency prevention and response. Remember it is not mandatory to set an objective or target for each significant aspect you identify, although they should be at the top of the list to consider. Also remember, that aspects can have positive or beneficial impacts on the environment as well as negative! For example, planting trees around the company's property could be an aspect of your operation that improves air quality and reduces noise pollution.

Starting Points

Most of the companies in the project had the most difficulty with this section of the standard. Very few small companies have thought through the “big picture” of how their company’s business can have a positive or negative impact on the air, water, groundwater, and land of their surrounding communities. As a starting point, most companies can list the environmental permits that they have and relate any routine discharges to significant impacts. Listing types of wastes that are hauled off-site, waste water discharges to Publicly Owned Treatment Works (POTWs), and existing air permits can serve as simple starting points for an emissions inventory. Some small shops are not so certain that they are currently in compliance. A better starting point for them would be to do a preliminary compliance audit including a waste characterization.

Many shops had much less information about aspects of their operations that related to non-routine or incidental activities, particularly with respect to emergency prevention and response, and non-routine maintenance activities such as tank clean-outs. None of the small shops had previously considered the aspects that relate to the goods and services they provide. While most shops collect Material Safety Data Sheets (MSDS) routinely on the goods they purchase—very few had a process for considering the environmental impact of using those goods. None of the small shops had programs to orient outside contractors about requirements to control their activities in accordance with the company’s policies.

Implementation Tips

- 1) Consider starting the process of identifying your impacts (and the aspects of your operations that cause those impacts) by listing all of the environmental emissions you currently are aware of. These include:
 - Wastes you ship off site (whether or not they are reclaimed, or treated). This includes solid hazardous and non-hazardous waste, and any sludge or liquids you ship out.
 - Discharges of water or wastewater to sewers, ponds, lakes, streams, and groundwater. Cooling water should be included, although it may not end up being a significant aspect for your particular facility. This includes wastes you have hauled off site for treatment and/or disposal.
 - Air emissions. Start by noting any hoods, fans, and other ventilation systems that you have in place. Also, consider “fugitive”

(uncontrolled) emissions from sources such as spray cans, open tanks or pits.

- 2) Make a list of all of the environmental permits that you currently have and the criteria for compliance. The activities associated with these criteria are the aspects of your operation that are causing (or could cause) significant impacts.
- 3) Look over your current emergency response plan and your stormwater discharge plans and permits. These will indicate aspects of your operations that could cause non-routine or incidental problems (significant impacts) if there were an accidental spill, leak, or other uncontrolled release of materials or wastes.
- 4) If you currently have pollution prevention or energy conservation programs in place, add the activities that create the most waste or use the most energy to the list. Use the 80/20 rule here. Generally, people can identify a few significant activities that account for 60-80% of the problems, and do not need to spend time getting details on the rest.
- 5) List the types of products and services you provide. Could any of these cause significant environmental impacts? One example: if you ship parts to your customers with your own fleet—have you considered ways of reducing the amount of fuel they use by careful scheduling and planning of routes?
- 6) What about the products and services you purchase. Do you review your material safety data sheets (MSDS) for toxic or hazardous materials? Are there more environmentally friendly alternatives?
- 7) Consider contractors you use—and note significant impacts from their activities (typically maintenance or construction), but also beware of vendors who routinely bring in uncontrolled samples of materials and leave you to dispose of them.

Examples

1) *Common Types of Environmental Impacts*

There are a limited number of the common types of environmental impacts that metal finishers should generally consider. Examples of these include:

- 1) Impacts on air quality, resulting from the following types of aspects:
 - Air emissions from tanks, containers, process lines, dryers, etc.
 - Spills and leaks of volatile substances
 - Use of energy from power sources that generate air emissions (generators, boilers, lift trucks, heaters, etc.)
 - Vehicle emissions (fleet emissions, employee vehicles used for transportation to and from work)

- 2) Impacts on water quality, resulting from the following types of aspects:
 - Wastewater discharges from process lines, parts washers, grinders, etc.
 - Cooling water discharges and cooling tower discharges
 - Liquid process maintenance waste from tank clean out, boiler blow-down, etc.
 - Spent process fluids (plating solutions, cleaners, hydraulic fluid, lubricants, coatings, etc.)
 - Spills and leaks that enter sewer or drain systems (interior floor drains, roof drains, parking lots, loading docks, etc.)
 - Non-point discharges from maintenance of parking lots, grounds (fertilizers, pesticides)

- 3) Impacts on ground/soil quality, resulting from the following types of aspects:
 - Hazardous and solid waste shipped off-site for land disposal
 - Spills and leaks that contaminate soils around the facility
 - Run-off from parking lots and grounds (salt, fertilizers, oils, etc.)
 - Leaks underneath the facility caused by improperly designed or poorly maintained flooring materials

- Leaks from poorly designed or maintained underground storage tanks
- 4) Impacts on groundwater quality, resulting from the following types of activity:
- Contamination of aquifers caused by discharges to soil (see the above aspects)
 - Discharges of liquid process waste into poorly designed or maintained underground injection wells
 - Use of cooling and process water from underground aquifers
 - Leaks resulting from poorly designed or maintained lagoons, surface impoundments, catch basins, etc.
 - Leaks from underground storage tanks
- 5) Non-renewable resource use, resulting from the following types of aspects:
- Use of energy generated from non-renewable sources
 - Materials use (metals, cleaners, solvents, etc.)
 - Water use (process, cooling, cleaning, etc.)
 - Use of paper, cardboard, plastics (packing materials, masking materials, office wastes, cafeteria wastes, etc.)
- 6) Other environmental quality issues, resulting from the following types of aspects
- Visual impairments due to facility lights, noise, odors, traffic flow, etc.
 - Improved environmental awareness of surrounding community due to external communication programs
 - Reduced traffic flow through the area due to employee car-pooling efforts
 - Site improvement projects such as tree planting, clean-up campaigns for surrounding areas (parks, streams, fields), hiking and biking trails, etc.

2) Methods for identifying aspects

Most companies used a cross-functional team to identify their aspects.

"The environmental manager assembles a cross-functional team to perform the evaluation. The team may include representatives from environmental, health & safety, product design, line management, maintenance, and shipping/receiving, or other functions as appropriate. Separate teams may be formed to evaluate particular groups of products, activities, and services. The team may call upon other individuals in the organization as appropriate."

A "plant walk through" was a common element required in all procedures. Some plants developed checklists to help guide the process, using checklists similar to Example 2.2.1.

"The Core Group and the shop personnel shall consider all aspects of the physical areas during the Facility Walk-through of the organization's products, services, and activities, including (where appropriate): shipping/receiving, storage/handling, offices/labs, manufacturing/production, maintenance, emissions, waste treatment, all general areas."

Example 2.2.1 Walk-through Checklist

Impact	Aspect	Typical Functional Areas
Air Quality	Air Emissions	<input type="checkbox"/> Plating Operations <input type="checkbox"/> Coating Operations <input type="checkbox"/> Part Drying <input type="checkbox"/> Rack Stripping
Surface Water/Soil Contamination	Spill, Leaks Reactions/Explosions Storm water Discharge	<input type="checkbox"/> Chemical Storage Area <input type="checkbox"/> Shipping Receiving Areas <input type="checkbox"/> Chemical Handling <input type="checkbox"/> Maintenance
Water Contamination	Wastewater Discharge	<input type="checkbox"/> Plating Lines <input type="checkbox"/> Waste Treatment Plant <input type="checkbox"/> Rack Stripping
Hazardous Waste Sent to Landfill (soil/water contamination)	Sludge Disposal Drum and Packaging Disposal Container Disposal	<input type="checkbox"/> Shipping & Receiving <input type="checkbox"/> Waste Treatment Plant <input type="checkbox"/> Maintenance
Non-Renewable Resource Utilization	Energy Use	<input type="checkbox"/> Plating Lines <input type="checkbox"/> Part Drying <input type="checkbox"/> Shipping <input type="checkbox"/> Plant Utilities (Air Compressors, Blowers)
Resource Utilization	Metals Use Water Use	<input type="checkbox"/> Plating Lines <input type="checkbox"/> Plant Utilities (DI Water Units, Coolers, Chillers)

Some companies also completed process flow charts for significant operations.

"To complete the aspects identification process, XYZ's next step will be to conduct a more detailed aspects identification for each process. In order to establish some preliminary targets the following three aspects have undergone a more thorough process, which will be used throughout the facility. The following three were selected due to the fact that pollution prevention/waste minimization initiatives were either in progress or planned for these aspects."

3) Methods for Updating the List of Aspects and Impacts

Most companies decide whether to update the aspect list during the Management Review process.

"The results of the most recent environmental aspect/impact identification are reviewed as part of the Management Review process (See Procedure EMS-4.6). Based on this review, XYZ's management determines the need to update the environmental aspect evaluation. Factors such as improved assessment methodologies, or major changes to the organization's mission, products, and processes are considered in determining the need to update the assessment."

Additionally, some call for an annual review by an Environmental Planning Team of the entire operation. Changes in equipment or processes are reviewed for aspects and impacts before they are implemented.

"The annual walk-through will provide a baseline assessment and up-to-date information on environmental aspects and impacts for XYZ."

"New processes and equipment will be reviewed in relation to their environmental aspects and impacts prior to being put into use."

4) Methods for Screening for Significant Aspects

A common scoring mechanism used a combined score based on a subjective determination of the frequency and severity of impact. For an example of how this was done, see Example 2.2.2.

Example 2.2.2 Sample Aspect Scoring Worksheet

XYZ Company has identified “Spills from Unloading Trucks” as an environmental aspect of their operations. They used the following worksheet to determine whether the impact (on water quality and/or soil contamination) is (or would be) significant. First, they determined that the LIKELIHOOD of a spill was low (they hadn’t had any spills of this type in the previous three years). Second, they determined that the MAGNITUDE (or severity) of the impact would be moderate for most of the types of materials they received. However, they also noted that certain chemicals are regulated and that reportable quantities would require them to make the appropriate response to environmental regulators.

Using the “Key to Impact Rating”, an aspect with a Low Likelihood and a Moderate Magnitude received an overall score that makes it a low significance aspect.

Area	Aspect	Impacts	Impact Score:		Significance
Shipping Dock	Spills from Unloading Trucks	Water Quality Soil Contamination	Likelihood	Magnitude	LOW - (but spills of reportable quantities of certain chemicals are regulated)
			Low	Moderate	
			OVERALL SCORE: <u>Low Significance</u>		

KEY TO IMPACT RATING

Likelihood of Occurrence of Impact	Magnitude (severity of environmental impact, actual or potential)		
	<u>Severe</u>	<u>Moderate</u>	<u>Mild</u>
High	High Significance	High Significance	Medium Significance
Medium	High Significance	Medium Significance	Low Significance
Low	Medium Significance	<u>Low Significance</u>	Low Significance

Other worksheets used by the companies included additional factors that may be considered in the screening process. For example: Cost to Accomplish, Environmental Concern (Risk to Facility), Feasibility of Technology may also be included in determining whether the aspect is significant.

Example 2.2.3 Significant Impact Screening Worksheet

Aspect	Size of Impact	Cost to Accomplish	Environmental Risk?	Achievable?	Significant Aspect?
Energy Use	High Impact	\$50K - \$100K with a 1.2 year payback	No	Yes	Yes
Solid Waste-disposal of packaging material	Low Impact	Unknown	No	Unknown	No

Conformance Check

All the metal finishers had a good understanding of the broad scope of environmental aspects; that an examination of environmental aspects pertains not just to products but also to the activities and services of an organization. Several of the procedures clarified what was meant by activities:

"Activities are those activities that are not directly linked to a specific product, service or activity (such as equipment maintenance). Activities that are directly linked to the manufacturer of a particular product are evaluated when the product is evaluated."

The ISO 14001 standard requires the identification of only those environmental aspects over which the organization does have influence or may be expected to have influence. One company clarified this point of conformance with the following statement in their environmental aspect identification procedure:

“Environmental aspects are generally limited to those areas over which the facility has some degree of control. To limit the aspect identification to areas over which XYZ Corp. has control, we have defined boundaries to our environmental aspects on the output (product) side. Because XYZ Corp. produces components for customers who will use them in the manufacture of a finished product, we are defining the boundary of XYZ Corp.’s aspects as the end of their finishing process (including packaging and shipping). For example, the environmental aspects of a chrome-plated automobile bumper will end (for XYZ Corp.) with the shipment of that bumper from XYZ Corp. to the customer’s facility, and will *not* include the environmental aspects of the life cycle of the automobile to which the bumper will be attached.”

Keeping the aspects information up-to-date is often an area companies overlook or fail to implement. As noted in Methods for Updating the List of Aspects and Impacts in the Examples section above, linking a review of aspects to another part of your EMS (such as the Management Review, changes in operations, or new or modified products) helps to ensure that the list of aspects and impacts is current and that your company remains in conformance with the standard.

EMS Links

When you modify, add, or delete environmental aspects, the following parts of your EMS may also be affected and should be reviewed and revised as necessary.

- Objectives and targets: Aspects and objectives are closely linked in your EMS. The standard requires that aspects be *considered* when determining and reviewing environmental objectives. You *are not* required to have an objective for every aspect identified. Aspects are only one input into setting or revising objectives. Other factors include legal and other requirements, technological options, financial considerations, operational and business requirements, and the views of interested parties.
- Environmental management program: The link between aspects and the environmental management program is more indirect. If an aspect does result in an objective, which does require an environmental management program, then the objective and its associated program should be reviewed if the aspects change.
- Training, awareness, and competence: Identifying environmental aspects is the first step in determining significant impacts. Significant impacts are noted several times in the requirements for environmental training:

- significant impacts are a key criteria in determining who receives environmental training
 - direct training on the significant impacts of work activities is required
 - personnel whose work is tied to a significant environmental impact are required to be competent to do their job
- Communication: The environmental aspects and the entire EMS together form the basis for the communication of environmental information within your organization. You are required to have a process for responding to inquiries, comments, and other forms of communication from external parties. The standard does not require your company to publicly disclose information on your significant aspects. It says only that you must consider a process for the external communication of significant aspects and document your decision.
 - Operational control: Significant aspects related to the policy and objectives and targets are used to determine which operations and activities within your company require written (or “documented procedures”) operational control procedures.
 - Monitoring and measurement: The link between aspects and monitoring and measurement is through significant impacts. Aspects again direct you to the parts of your operation requiring written procedures. The standard requires written procedures to monitor and measure operations and activities that can have a significant impact on the environment.

2.3 Legal and Other Requirements [ISO 4.3.2]

What the ISO Standard Requires

The ISO Standard requires organizations to have a procedure that specifies how relevant legal (and other) information is identified and how access to that information is provided. A written procedure is not required in this case.

Starting Points

Most small companies have difficulty obtaining up to date information about current environmental regulations and about proposed (or scheduled) changes to regulations. Many of them rely on the local and state inspectors (such as the local Publicly Owned Treatment Work) and on regulatory agencies to inform them about regulatory requirements. However, this situation is changing, especially within programs that involve the smaller facilities. Some examples of these programs include, for example, the storm water discharge regulations, hard chrome Maximum Achievable Control Technology (MACT) standards, and Title V – Volatile Organic Compound (VOC) regulations. Federal and State agencies have increased efforts to improve the quality and quantity of information and assistance programs available, especially to small business owners.

Also, several trade associations such as the American Electroplaters and Surface Finishers (AESF), the National Association of Metal Finishers (NAMF), and the Metal Finishers Suppliers Association (MFSA) provide regulatory updates and other specific assistance to their members. These are available in their trade publications, and in special programs and guides.

Several states (such as Pennsylvania, California, and Illinois) have developed compliance checklists for use by small businesses, and provide other “user friendly” tools and information sheets to make regulatory information much easier to understand and act on. The Internet has made much of this information readily accessible to businesses. However, unless a business continues to periodically update and screen this information—and makes an effort to see that everyone who needs to know does—it is still possible for some critically important regulatory issues to slip through the cracks.

Implementation Tips

- 1) Use your current list of permitted or regulated activities as a starting point. How does your company stay current about legal requirements in these areas? Are there particular sources of information that you find valuable? Does everyone who needs to have access to this information receive it on a timely basis?
- 2) Consider having a compliance audit by an outside consultant. This can give you a good baseline of information from an outside perspective. If you are concerned that you may have some compliance issues, be sure to contact a good environmental lawyer who is familiar with the compliance audit policies in your state, before you schedule an audit. Many states are offering various types of regulatory flexibility for companies who want to improve their track records. Ask for recommendations on reliable sources of local and state regulatory information.
- 3) Contact your state environmental regulatory agency to find out what types of information are available. Other programs that may provide environmental assistance include organizations such as your local Small Business Development Center, or Manufacturing Extension Partnership or Manufacturing Technology Center. Many states have developed compliance checklists that they can send out to you as a starting point, and several have developed excellent Internet sites, periodic newsletters and special programs, training events, and conferences.
- 4) Formalize your regulatory review process: Include a time frame for the performance of the regulatory review (e.g., monthly, quarterly) and document that the review has been completed. One procedure stated, "If no information is found during these [regulatory] reviews, a dated written statement from the EMS Representative will serve as evidence of quarterly review."
- 5) List the requirements: Maintain a list of requirements, both regulatory and voluntary, that are applicable to your organization. This is not a requirement of the standard but is useful in training, as a reference for future regulatory updates, and in developing appropriate operational procedures. While most of the metal finishers did not develop a complete list their identified requirements, some did include a list of the sources for obtaining regulatory information as part of their "Legal and other requirements" procedure. See Example 2.3.1 as an example. This list provides a good mechanism for ensuring that the most current

list of sources is available. However, it must be updated when new or revised sources of regulatory information are identified.

- 6) Include local requirements: Companies often use commercial databases and professional organizations as sources for information. These are good resources but are often not all-inclusive. Be sure to consider local environmental requirements as part of your legal review (for example, local ordinances may include solid waste management, wetland preservation, noise control, landscape and screening, sediment and erosion control, wastewater pre-treatment, and stormwater discharge).
- 7) Have access to requirements: The requirement under “Legal and other requirements” to identify and provide *access* to legal and other requirements,” does not mean that the requirements have to be copied and distributed to everyone. The location of the requirements should be clearly communicated to appropriate individuals and the files made readily available. In addition, if your company subscribes to a metal finishing code of practice such as the CSI Metal Finishing Strategic Goals Program, be sure that the appropriate employees have access to information about those requirements as well.
- 8) A good overall question to ask yourself is, “ If there were a change or a proposed change in an applicable law or regulation, how would the right people in my company find out about it?”

Examples

Example 2.4.1 Sources of Legal and Other Information

Source	Item	Information Tracked
Internet	Federal Register (FR) Tracker)	Daily Updates to the FR
Internet	National Metal Finishing Resource Center (NMFRC)	Laws and Regulations, Includes State Regulations
CD-ROM	SmartCite (Bureau of National Affairs - BNA)	Applicable Laws for Each Facility
BNA Subscription	Federal Register Updates	Weekly FR Update Report
Trade Publications	AESF, NAMF	Monthly Columns on Environmental Regulations
AESF/NAMF Metal Finishing Guidance Manual	Chapters on Federal Regulations	Air, Water, Hazardous Waste, EMS,
Consultants and Attorneys	Legal Opinions	Decisions on specific situations and applicability of regulations to our operations
Small Business Assistance Programs	Newsletters, seminars	Updates on State and Local Regulations

Conformance Check

All of the metal finishers elected to go beyond strict conformance with the ISO 14001 standard and have a written procedure to meet this requirement. Many used the sample “Regulatory Tracking and Analysis” found in *Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations* as their starting point. No omissions in conformance to the standard were noted.

EMS Links

- Environmental aspects: The laws and regulations you identify as pertinent to your company must be directly applicable to your environmental aspects. Metal finishers are often aware of their regulatory compliance requirements before they begin EMS development and aspect identification. If this is the case, linking each aspect you identify to a requirement serves as a double check to be sure that you have considered all the pertinent legal requirements.
- Objectives and targets: Legal and other requirements are only one consideration in setting or revising objectives. Other factors include environmental aspects, technological options, financial considerations, operational and business requirements, and the views of interested parties.
- Training, awareness, and competence: The roles and responsibilities of employees for complying with the environmental requirements (i.e., regulations plus voluntary standards or codes) of your EMS is an important part of environmental training.
- Operational control: The link between operational controls and legal and other requirements is through the environmental policy. When determining which operations/activities should have operational controls, consider your objectives, commitment to prevention of pollution, and “commitment to comply with relevant environmental regulations, and with other requirements to which the organization subscribes.”
- Monitoring and measurement: The link with legal and other requirements is direct. The standard requires you have a written procedure for evaluating your compliance with environmental regulations. Companies often build on their internal environmental compliance auditing program to meet this requirement.

2.4 Setting Objectives and Targets [ISO 4.3.3]

What the ISO Standard Requires

The ISO Standard requires companies to set targets and objectives for the relevant departments and functions. These must be documented, and kept up to date.

In setting the objectives and targets, companies are to consider:

- Legal and other requirements that the company subscribes to (such as the Metal Finishing Strategic Goals Program, Responsible Care, and local initiatives such as watershed quality initiatives)
- Significant Aspects as previously identified
- Technological Options
- Financial, Operational, and Business requirements

Starting Points

Many companies are comfortable with the process of setting goals and objectives, usually within the context of a Management By Objectives (MBO) approach to financial planning and project tracking. However, setting environmental objectives and targets typically requires access to information that many small companies lack. For example, if you decide to reduce energy use, but know very little about which of your processes use the most energy, your first step may be to do an energy audit of your facility. Then, you could target certain operations, and determine which practices and technologies could improve your performance.

Implementation Tips

- 1) Start with a short list of objectives. The specific list is up to each company to decide, based on the EMS planning process. Consider what your overall program should include in order to meet your environmental policy objectives (including prevention of pollution, commitment to compliance, and continual improvement). Small companies may not have the resources available to take on more than two or three objectives at one time. This is perfectly acceptable, since you will add new objectives over time as you complete them.

- 2) Get good background information so that the targets you set are realistic and achievable. Seek assistance from programs that can provide low or no cost assessments, such as the Manufacturing Technology Centers, Retired Engineers Technical Assistance Program, Manufacturing Extension Partnership, or Industrial Assessment Centers available in your area. Contact your local Chamber of Commerce, or Small Business Assistance Center for sources of assistance and contact information. Many states and counties have also established Pollution Prevention programs that provide a wealth of information, contacts, and resources.
- 3) Revisit your objectives and targets periodically, and revise them as necessary. Consider how and when you will do this.
- 4) Make your targets measurable, using information you already collect whenever possible. Use the appropriate metrics, tied to production rates as appropriate. For example, you won't be able to reduce your energy use 10% if your production rate is drastically increasing at the same time. You should express your goals in ways that are tied to the production rates, such as Kilowatt hours used per \$100,000 sales, or gallons of waste water discharged per pounds product shipped.
- 5) Track Objective and Target Progress: List the method for tracking progress in meeting your environmental goals as part of your Environmental Management Program. This allows top management and others involved in the EMS to monitor your progress. This also links to your Environmental Operations and Control procedures, since you have to establish procedures for generating and keeping the information. Note that if for some reason you are not meeting your targets as you planned, the EMS will require you to figure out why, and to make changes necessary to get back on track.

Examples

Most companies developed a target tracking worksheet to list all of the objectives and targets they have established, along with the specific measurements that will be used to determine when the target is met (see Example 2.4.1). As an alternative, targets could also simply be listed on the Environmental Program Log (see Example 2.5.1). Other companies developed a Target and Objective Tracking Form with one page per target (see Example 2.4.2). This gives more information about how and when the target is to be established, and who is responsible.

Example 2.4.1 Objective Target and Measurement Worksheet

Sample Objectives	Sample Targets	How to Measure
Reduce Water Use	Reduce water used in scrubbers by 50% by January, 2002	Water Meter, Gallons
Improve Environmental Image	External: Set up Environmental Web Page	Complete? (yes/no)
Reduce Hazardous Waste Generation	Reduce F006 generation by 10% by January, 2000.	Hazardous. Waste Manifests, pounds per 100,000 parts shipped
Reduce Energy Use	Decrease electricity used by 25% per \$100,000 in sales	Utility Bills, KW hours per year per \$100,000 in sales

Example 2.4.2 Objective and Target Tracking Form

Use One Form per Objective or Target

Date (____/____/____)	Individual Responsible:
General XYZ Objective:	
Specific Function/Department:	
Target Date (Month/Year): (_____/_____)	
Specific Objective	
Specific Target	
Environmental Management System Program Action Plan	
How will this objective be met (attach additional pages as necessary):	
How will this objective be tracked (attach additional pages as necessary):	

Conformance Check

All of the contributing project participants met the standard requirement to establish documented environmental objectives and targets. Not all, however, chose to have a written procedure for developing objective and targets. While there are many advantages to having a written procedure, the ISO 14001 Standard does not require it.

Some project participants formalized the EMS link between the Planning process (4.3) and Management Review (4.6) in the Objective and Targets procedure. For example;

"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."

This approach strengthens the EMS and helps to ensure conformance over time.

When developing objective and targets, it can be difficult for an organization to be sure the following requirements are considered each time objectives and targets are established:

- Legal and other requirements
- Significant environmental aspects
- Technological options and financial, operational and business requirements
- Views of interested parties

Some metal finishers incorporated these required points into their Objectives and Targets procedure as responsibilities rather than by simply listing them as considerations. The following composite examples show how these points were incorporated into objectives and targets procedures.

Legal and other Requirements and Significant Environmental Aspects:

The Environmental, Health and Safety Director reviews the objectives proposed by the EMS Team and provides feedback on applicable laws and regulations and significant site environmental aspects relative to those objectives.

Technological options and financial, operational and business requirements:

Each shop supervisor and manager evaluates the potential impact(s) of the proposed objectives on his/her functional (e.g., finance, production) or shop area (e.g., plating, grinding).

Views of interested parties:

The EMS Team holds a meeting of all staff members to discuss the development of environmental objectives (this considers the internal interested parties). The Environmental, Health and Safety Director is responsible for considering the views of external interested parties.

Of the metal finishers that elected to write a procedure for objectives and targets, the requirement for consistency between the environmental policy (including the commitment to prevention of pollution) and the objectives and targets was included.

EMS Links

When you modify the environmental objectives and targets (e.g., as a result of Management Review, or new or modified activities, products, or services) many other parts of your EMS may also be effected. The following EMS links should be reviewed and revised as necessary:

- Policy; Environmental management program: It is important for the long-term maintenance of your EMS to recognize the strong link between objectives and targets and the environmental policy. The objectives and targets must be consistent with your policy. Therefore, when your objectives, targets, and environmental management program changes, check whether or not the changes are consistent with your policy statement.
- Environmental aspects; Legal and other requirements: These two parts of the standard provide input to setting objectives and targets. Other impacts include technological options, financial considerations,

operational and business requirements, and the views of interested parties.

- Communication: The standard requires you to communicate information regarding the EMS (which includes objectives and targets) to various levels within your company. If you decide to relay environmental information to interested parties, the objectives and targets may be part your communication.
- Operational control: The standard does *not* require written procedures for every operation or activity. Objectives and targets are one of the criteria you should use to determine operations and activities require written procedures.
- Management Review: One objective of the management review is to determine if the objectives and targets need to be modified.

2.5 Establishing an Environmental Management Program [ISO 4.3.4]

What the ISO Standard Requires

The Standard requires that the company does what is necessary to actually achieve the objectives and targets it sets. This would include (at a minimum): designating who is responsible for achieving them; and specifying how and when they will be achieved. Also, companies should be sure that environmental project management is also a part of the companies' engineering project management process. That is, if a particular project is related to new product or process development, or new activities and services, the normal project management procedures should be changed to reflect the environmental management program.

Starting Points

Many small companies are used to implementing projects, particularly environmental improvement projects, on an ad-hoc basis. The planning process called for in the ISO standard improves the possibility that planning efforts actually succeed, and result in a measurable change in performance. This also greatly improves the perceived "value added" of the overall EMS to the company. By integrating environmental projects into the companies' existing project engineering and management system (or establishing one as required), environmental projects will achieve the same level of project management attention as other manufacturing process/product improvement efforts.

Implementation Tips

- 1) Take time to do careful project planning up front. Think through each project, identifying possible obstacles, resource needs, time lines, and deciding who will do what specific tasks.
- 2) Set up a project management reporting and review system. This can be simply a periodic management review of progress, and problem solving. Remember that the targets you set can (and will) be revised based on your experience. Periodic reality checks help to ensure that you can actually deliver what you thought you could. This review can also assist multiple project managers in resolving conflicts, and in obtaining the necessary resources to bring about success.
- 3) EMS Linkages: The EMP(s) should be clearly linked to each objective and target. This can easily be shown in the EMP form or table.

Examples

Most companies used a form of a “Log Sheet” to record the essential information related to the Environmental Management Program (Example 2.5.1).

Example 2.5.1 Environmental Management Program Log Sheet

Project #	EMS-001
Project Name	Solid Waste Reduction
How this relates to our Environmental Policy Commitment	Pollution Prevention Continual Improvement
Objective	Reduce D007 Waste
Target	Reduce the number of 55 Gallon Drums Shipped per year per \$100,000 sales, by 10% by 1999
Resources Needed	Outside service to compact drums
Timing	Project started February 1998, immediate 50% reduction in drums shipped out
Project Manager	L. O. and J. H.

Conformance Check

All of the metal finishers met the requirements relating to what should be in each environmental management program: designation of responsibility, means, and time frames by which each objective is to be achieved. An important part of the 4.3.3 environmental management program requirement was often overlooked; amend your program, if needed, in light of new developments or new or modified activities. One procedure stated that a review would take place of the effects of new processes or equipment on the environmental management program but changes to existing processes or equipment were not mentioned.

EMS Links

When you change your environmental management program, the following parts of your EMS may also be affected and should be reviewed and revised as necessary.

- Environmental aspects; Objectives and targets: The environmental management program is the planning mechanism by which the objectives and targets are achieved. Aspects are one consideration in developing the objectives and targets and each objective and target is required to have an environmental management program.
- Structure and Responsibility: The environmental management program is tied to structure and responsibility in two ways. First, the responsibility for achieving each objective and target must be defined, documented, and communicated. Secondly, management is to provide resources necessary to implement the environmental management program (or as stated in the standard, “resources essential to the implementation and control of the environmental management system.”).
- Training, awareness, and competence: The environmental management program is a requirement of the EMS and the roles and responsibilities related to the program should be part of environmental training.
- Monitoring and Measurement: The standard requirement to track performance, operational controls, and conformance with the objectives and targets provides the feedback you need to measure the progress of your environmental management program.

Chapter
3

Chapter 3: Environmental Operations and Control

- 3.1 Operational Control, Monitoring, and Measurement
- 3.2 Emergency Preparedness and Response
- 3.3 Structure and Responsibility
- 3.4 Training, Awareness and Competency
- 3.5 Communication
- 3.6 EMS Documentation
- 3.7 Document Control and Records

[NOTE: This EMS Guide is laid out sequentially based on a typical implementation action plan. This causes the ISO 14001 Standard sections referenced to occasionally appear out of numerical sequence. This altered sequencing allowed the participating companies to progress through the implementation process with a minimal amount of “back-tracking” between steps. For example, it was difficult for companies to address assignment of Structure and Responsibilities (ISO Section 4.4.1) and to identify needs for Training, Awareness, and Competence (ISO Section 4.4.2) until they had completed development of the required operational procedures and work instructions (ISO Section 4.4.6 and 4.5.1). Adapt your approach to whatever works best in your situation.]

3.1 Operational Control, Monitoring, and Measurement [ISO 4.4.6, 4.5.1]

What the ISO Standard Requires

The ISO Standard covers environmental operations in two sections: Operational Control and Monitoring and Measurement.

Section 4.4.6 (Operational Control) requires the facility to establish the necessary procedures so that all of its operations and activities related to significant environmental aspects (as covered in the sections on policy, objectives and targets) are working as intended. Procedures must specify the necessary operating criteria (for example, flows and concentrations in regulated wastewater discharges). This also must include the significant aspects of goods and services used by the facility. This means that some suppliers and contractors may also be covered by some of the operational procedures, such as in maintenance and purchasing.

Section 4.5.1 (Monitoring and Measurement) requires the facility to have procedures to collect the information necessary to ensure that they are actually achieving the desired outcomes for environmental management. This includes tracking performance towards achieving objectives and targets, meeting the specified operating criteria in procedures, and periodically evaluating compliance with relevant environmental legislation and regulations. Any equipment used to measure or monitor performance (for example laboratory equipment, meters, and scales) must be calibrated and maintained as specified in the operating procedures.

Starting Points

Most of the metal finishers in the project felt that they needed to make improvements in providing written procedures for their environmental operations. A few of the larger shops already had written operating procedures that covered most standard environmental operations (for example, wastewater treatment and discharge, air pollution control, and hazardous waste storage and shipment). Several of the smaller shops had no written procedures (other than specific work instructions related to equipment and process control). Only minimal procedural information was available on checklists and log sheets used to record information necessary to comply with regulations.

Implementation Tips

- 1) The main difficulty in addressing these elements of the EMS is to know where to start and when to stop when documenting procedures. Think about which procedures must be written down before you begin to write them, and attempt to keep the number of documented procedures and work instructions to a minimum. This section of the standard tends to be the place where most EMS implementation efforts get bogged down.
- 2) Procedures must cover significant environmental aspects in line with your policy, objectives, and targets. One way to tell if you need a procedure is to ask this question: If you didn't have these written procedures, would you have problems in deviating from your environmental policy, or would you be unable to meet your targets and objectives? For example, if reducing your wastewater discharge rate is one of your objectives, at a minimum you would need to check to be sure that you had documented the necessary operating criteria, procedures, and instructions. This would include for example, specifying what discharge rates are acceptable (or what is not acceptable), and writing instructions to cover activities that affect the discharge rates (e.g. rinse rates, tank dump schedules, maintenance activities).
- 3) Procedures must also provide for the collection of information necessary to track and evaluate performance. This includes keeping records (for example, log sheets or checklists), and ensuring that the information collected is accurate (by calibrating any equipment used in monitoring or measurement).
- 4) One way of starting the process of documenting operational procedures is by making a list of key operating criteria related to your significant environmental aspects, objectives and targets. Based on this list, you can identify the related procedures, work instructions, and records. These may already exist, or you may have to develop new ones. For an example, see the Key Operations Worksheet in the next section. You should cover three main types of activities in defining your key operating criteria:
 - activities related to on-going regulatory compliance
 - activities related to achieving objectives and targets as specified in your environmental management program
 - activities related to emergency prevention and response

- 5) Don't forget to consider activities related to maintenance, and to outside contractors, and suppliers, in documenting your operational procedures. These would include any activities related to emergency response; to compliance; and to meeting objectives and targets. Contractors and suppliers that provide these types of activities must be covered by the appropriate procedures and informed by the facility when they apply. For example, you may require vendors to provide Material Safety Data Sheets to allow control of samples and test materials. All vendors must be informed of this requirement.
- 6) In writing procedures and work instructions, strive to keep them simple. Bulleted or numbered lists may be more useful than a lot of text. Pictures or graphics also help to make things more clear. Include appropriate sample record forms (e.g. log sheets, checklists).
- 7) Be sure that you are actually doing what you say you are doing. If you are already performing a particular activity (for example, shipping hazardous waste), start by simply "saying what you do." Some facilities have found it helpful to use an outside person who is not familiar with the operation to start the process of documenting procedures. It is sometimes easier to capture the essential points quickly if you are not the expert. Then, others can review the draft procedure to be sure that it is accurate, and revise it as necessary. Remember that these procedures will also play a key role in on-going training of employees who perform these activities.
- 8) Check to be sure you have included the necessary procedures for Monitoring and Measuring with your operational control procedures. The ISO 14001 Standard requires procedures related to monitoring and measuring key characteristics of operations that can have a significant impact on the environment. These procedures could be incorporated into existing procedures (such as process or quality control procedures), or could be a stand-alone procedure. Again, the choice should be made based on the existing management system documentation.
- 9) Check to be sure that you have the necessary procedures to enable you to meet your environmental policy objectives. For example, if you state that you utilize the most energy efficient technology available, be sure that your engineering and purchasing procedures include appropriate language to actually achieve this.
- 10) You must have a means of periodically evaluating your compliance with applicable environmental regulations. Decide how you will accomplish this. You may wish to develop a compliance audit procedure. Seek

advice from your company's attorney to be sure that your approach is legally sound.

Examples

- 1) Build on existing operational control procedures. Several facilities had existing methods for documenting essential day-to-day operational procedures, generally related to their ISO or QS-9000 Quality Management System. They started development of their environmental operational procedures by reviewing existing standard operating procedures. Then they determined which procedures required revisions (or needed to be added) based on their EMS requirements. Other facilities chose to develop a stand-alone Environmental Operations Manual, because they already had an existing manual and/or operational procedures in place. Both of these approaches are acceptable. Use whatever system works best for you.
- 2) Use a master environmental operational control procedure to serve as the main reference document. Several of the metal finishers involved in this project established a "master" environmental operational control procedure. This procedure serves as the "umbrella" and references all of the related environmental procedures and documentation. The related procedures are typically located in several areas of the facility (for example, in SOP manuals, waste water operating manuals, lab manuals, maintenance manuals, and other company procedural manuals). Additionally, the master procedures included information related to EMS procedures not covered by other procedures (for example, activities related to contractors and suppliers).
- 3) Use a Key Operations Worksheet to decide which procedures need to be documented. Several of the metal finishers used a Key Operations Worksheet to decide which procedures needed to be developed. The Worksheet also served as a reference document for the master Environmental Operational Control Procedure.

A sample Key Operations Worksheet included the following headings:

- Environmental Aspect or Target
- Related Area or Function
- Specific Control Criteria (for example, permit conditions, standard operating parameters)
- Related Procedures (name and number, location)
- Related Work Instructions (if applicable)
- Related Records
- Related Calibration Procedures (if applicable)

- 4) Develop an Environmental Operations Log to serve as a master document list. Any standard operating procedures and work instructions that are designated as part of the EMS should be clearly identified as such. One simple way of accomplishing this is to provide a master table or log sheet, which can also become part of the master Environmental Operational Control Procedure. The table should include information about distribution, locations and responsibility for developing and maintaining procedures. This greatly simplifies the process of making changes and in auditing the system.**

Headings for an Environmental Operations Log typically included:

- Title of Procedure
- Date of Last Revision
- Responsibility for Developing and Maintaining Procedure
- Distribution of Procedure (by name or job function and location)
- Related Work Instructions
- Distribution of Work Instructions (name or job function and location)
- Related Records
- Responsibility for Record Keeping

Conformance Check

Operational Control (ISO 4.4.6)

The ISO 14001 Standard does not require written procedures for every operation and activity but they are required for operations and activities associated with significant environmental aspects, the environmental policy, and objectives and targets. In the following example one project participant developed guidelines on the management of their operational control procedures:

Scope: This procedure applies to the areas where lack of controls could cause a significant environmental impact for XYZ, Inc.

The EMS Group shall conduct an evaluation throughout the shop to identify which of XYZ Inc.'s operations, activities and services are significant environmental aspects.

Metal finishers generally overlooked the role of the environmental policy and objectives and targets in establishing operational controls.

You should not assume that your EMS is in conformance to the standard if you have procedures for all operations within your shop. You may have an objective (e.g., recycling paper waste, reducing electricity usage) that is not based on a significant aspect but which requires a procedure under the operational control requirements.

There are two other requirements under operational controls that are often overlooked: planning maintenance activities and communicating with subcontractors. Half of the metal finishers overlooked maintenance in the operational control procedures reviewed. The other half of metal finishers noted preventative maintenance (for equipment used in plating process) as part of the quality process control procedure.

The metal finishers did include subcontractors in their general operational control procedures, for example:

XYZ Inc. shall establish and maintain a procedure that shall assist in the identification of significant environmental aspects of goods and services being used by XYZ. XYZ will communicate any relevant procedures and requirements to its suppliers and subcontractors.

Another metal finisher submitted their quality procedure for selecting and evaluating subcontractors as meeting the requirements under

“Operational control” but had not modified the procedure to address ISO 14001 Standard requirements.

Monitoring and Measurement (ISO 4.5.1)

The monitoring and measurement portion of the ISO 14001 Standard can be confusing to implement because it contains a variety of requirements from tracking objectives and targets to calibrating and maintaining equipment to evaluating compliance with environmental regulations. The metal finishers seemed to understand these varied requirements and developed general guidelines for meeting all the requirements.

However, monitoring and measurement is one of the few elements of the standard where formal written procedures are required. Procedures are required for:

Monitoring and measuring key characteristics of operations

Evaluating compliance with environmental regulations

In the first area, the metal finishers gave a good description of the general process for monitoring and measurement: how data would be collected, what would be calibrated and how, who was responsible, and provided references to relevant procedures.

In the second area, a typical description of a compliance program follows:

XYZ Inc. shall periodically evaluate compliance utilizing relevant environmental legislation and regulations.

This statement is a re-wording of the standard requirement and does not constitute a procedure. With this statement alone, XYZ Inc. would receive a nonconformance during an EMS audit (either internal or external). Another metal finisher tried to describe their regulatory compliance verification this way:

Sampling and testing of waste streams is performed according to documented work instructions.

The primary source of regulatory compliance verification is through daily sampling of the wastewater treatment system discharge.

In addition to being very narrow in scope, these brief statements do not describe a procedure for periodically evaluating compliance.

The requirement to evaluate your level of environmental compliance is an important part of the standard and is directly linked to your environmental policy (commitment to compliance). The evaluation may be combined with other evaluations that you do (such as safety or health) but the standard requires a procedure.

EMS Links

Operational Control (ISO 4.4.6)

- Policy; Environmental aspects; Objectives and targets: As noted above, the operations and activities associated with these three elements of the standard must be identified before you determine which of these operations/activities require operational controls.
- Training, awareness, and competence: Operational control is one of the few elements of the ISO 14001 Standard where written procedures are required. The training requirement of the standard states that employees should be aware of their roles and responsibilities in achieving conformance with procedures and on the importance of conforming with procedures. Therefore, employees should receive training on operational control procedures.
- Monitoring and measurement: On a functional level, operational controls often include requirements for monitoring and measurement of equipment, processes, emissions, or discharges.

Monitoring and Measurement (ISO 4.5.1)

- Policy: The link with policy is clear: the environmental policy commits your facility to comply with regulations and under monitoring and measurement, you must develop a procedure describing how you will evaluate your compliance status. A less obvious link with policy is through the objectives and targets. The policy should set the framework for establishing objectives and targets and under monitoring and measurement, you should be tracking your progress in meeting your objectives and targets.
- Environmental aspects; Objectives and targets: The planning elements of the standard require that you identify aspects and establish and maintain objective and targets. Monitoring and measurement requires that you track your performance in meeting objectives and targets.

- Training: Employees must be aware of the procedures that govern their work including any monitoring or measurement that is part of their job.
- Operational controls: The link between operational controls and many of the requirement under monitoring and measurement is direct. The standard states that you are required to track performance, *operational controls*, and conformance with objectives and targets. In addition, some of your equipment or process monitoring may also be part of your operational control procedures.
- Environmental management systems audit: The results of the program you establish to evaluate environmental compliance will provide input to your internal EMS audits.
- Nonconformance and corrective and preventive action: Any regulatory noncompliance that you identify as a result of monitoring and measurement (including your compliance evaluation procedure) would be a nonconformance of your EMS. The noncompliance should be followed-up according to the process you set in place under the nonconformance and corrective and preventive action requirement.

3.2 Emergency Preparedness and Response [ISO 4.4.7]

What the ISO Standard Requires

ISO 4.4.7 requires an organization to have and maintain procedures related to accidents and emergency situations, and to prevent and mitigate any environmental impacts that may be associated with these events. When an actual event occurs, the organization must review its emergency preparedness and response procedures and revise them as necessary. The organization must also test these procedures as practicable.

Starting Points

All of the facilities involved in this project had some existing documentation related to responding to emergency conditions, as required by existing environmental regulations. However, some room for improvement was noted in that they generally kept these plans “on the shelf,” and did not have a way of making sure that appropriate procedures would actually be followed in the event of an emergency. In several cases, the plans had been essentially written by a consultant or drawn from boilerplate texts, and had not actually involved the facility in identifying specific potentials for accidents and emergency situations (for example, tank loading and unloading, shipping and receiving docks, inspection of pipelines). None of the facilities had performed tests of their procedures. In cases where there had been actual emergency events, none of the facilities had actually gone through the process of reviewing and considering revisions to their procedures. Several facilities failed to maintain the necessary emergency response supplies (absorbent materials, buckets, shovels, mops, personal protective equipment, etc.).

Implementation Tips

In general, the metal finishers had a good start on the plans and procedures required by regulations, but needed to follow through in several areas.

- 1) Review your emergency plan to be sure that it covers all of your identified significant aspects. Check especially “high risk” areas and activities. For example, does your plan adequately cover all tanks and storage areas, shipping and receiving areas, loading and unloading activities?

- 2) If you have had emergency situations in the past, did your procedure require you to investigate the causes and determine the adequacy of your response? Did you make the necessary revisions to your procedure and re-train your personnel as necessary? All of these follow-up activities determine whether or not you have a sound EMS that allows you to learn from your past mistakes so that you can avoid them in the future.
- 3) Be sure that you have incorporated your emergency preparedness and response procedures into your day-to-day activities and operational procedures as necessary. For example, you may need to write specific procedures to cover: periodic checks of tank levels to spot potential leakage conditions, on-going maintenance of tank couplings, pipelines, pumps, and valves, and for making sure that emergency response supplies and equipment are maintained.

Examples

Generally, the Emergency Preparedness and Response Procedures developed by the metal finishers served two purposes:

- 1) It served as a reference document to existing emergency response programs and plans. In one case, a company referred to their existing Emergency Response Program Manual, and in another, to a "Preparedness, Prevention, and Contingency Plan" approved by a state regulatory agency.
- 2) It identified the scope, the responsibility for maintaining the procedure, and for implementing it.

EMS Group: Responsible for the implementation and maintenance of the procedure.

Environmental Health and Safety Director: Responsible for coordinating and maintaining this procedure on a day to day basis.

Conformance Check

The emergency preparedness and response element of the ISO 14001 Standard is an area where metal finishers should be able to build on their existing emergency response plans.

Emergency plans developed for regulatory compliance (e.g., Resource Conservation and Recovery Act, and Spill Prevention Control and Countermeasures) should address part of the requirements of this

section but not necessarily all. Two requirements of the standard are often overlooked: developing and maintaining procedures to 1) identify the potential for accidents and emergency situations, and 2) prevent and mitigate impacts. Check your emergency response plan to be sure these requirements are incorporated.

Testing of emergency response procedures may not always be practical (e.g., of equipment may be damaged or employee safety may be compromised) and is not required by the standard (“test such procedures where practicable”).

EMS Links

- Environmental aspects: The environmental aspects you have identified represent your most important interactions with the environment. Review your aspects when identifying potential emergency scenarios. Environmental aspects should be reviewed after an emergency response incident.
- Structure and responsibility; Training: The emergency response procedures you develop must be communicated to employees. Employees must also be aware of their roles and responsibilities regarding emergency response.
- Operational control: Simply revising your response plan may not prevent an emergency, mitigate an environmental impact once it has occurred, or prevent reoccurrence of an emergency. Review your operational controls to check for changes that would support emergency preparedness and response efforts.

3.3 Structure and Responsibility [ISO 4.4.1]

What the ISO Standard Requires

The ISO 14001 Standard requires facilities to clearly define, document, and communicate environmental management roles and responsibilities. In particular, one or more person(s) must be designated as the EMS representative, who has the responsibility of making sure that the EMS requirements are established, implemented, and maintained, and for taking the lead in reporting on the performance of the EMS to top management in periodic reviews. Management has the responsibility to provide the necessary resources to make the EMS work, including skilled personnel, technology, and financial resources.

Starting Points

Most of the companies had only one clearly defined role in environmental management—the person(s) responsible for compliance with environmental regulations. Generally, this person was also the designated contact for emergency response, although the actual contact would typically be made through maintenance personnel or shift supervisors. This indicates that it is worthwhile for companies to take the time to clearly identify who is responsible for operations and activities that may have a serious impact on the environment. Companies can also benefit by making sure that everyone knows the key contact people.

Several metal finishers had failed to provide adequate resources (time, technology, and money) to support staff who were assigned responsibility for environmental management (reported in interviews with staff). The scarcest resource mentioned by the metal finishers was time, given that environmental staff typically carry a number of other responsibilities besides environmental management.

Implementation Tips

- 1) Spell out specific responsibilities in job descriptions for key personnel involved. This should include top management, shift supervisors, and maintenance personnel, in addition to the designated EMS Representative.
- 2) The EMS Representative does not have to be the Environmental Manager or Engineer for the facility (or the Environment, Health, and Safety Manager). In fact, we found that those facilities who appointed a person with some quality systems background actually made faster

progress in developing and implementing their EMS. This is because the key skill for the EMS Representative is an understanding of the systems-based approach to management, and an ability to work cross-functionally within the organization to get buy-in. Environmental knowledge is another key, of course, but this resource can be obtained from outside of the company as necessary to complete the more technical sections of the EMS (aspect and impact identification, environmental management program, and operational control procedures).

- 3) Interview shop floor personnel to determine who they currently think is responsible for managing the day to day environmental impacts (including waste hauling, spill cleanup, air emissions). This allows you to check your assumptions about how well informed people are—and to educate as necessary.

Examples

- 1) To meet reporting requirements under the “Structure and responsibility” section of the standard, the majority of procedures reviewed specified that the Environmental Management Representative was to report to Senior Management or to the EMS Implementation Team. The best examples included a specific time frame for this reporting.

The Management Representative shall be responsible for reporting the performance and continuous improvement strategies to the EMS Group on a monthly basis.

- 2) One procedure emphasized management’s critical role in providing resources for the EMS.

Management provides resources for implementation and control of the EMS.

The need for more resources is communicated to Senior Management through the Environmental Management Representative, Environmental Committee, and department supervisors.

Conformance Check

The documentation on structure and responsibility provided by the metal finishers was in the form of procedures. While the procedures defined the roles and responsibilities for the EMS, there are other important standard requirements that could not be assessed based on paperwork alone. Review your EMS for the following:

- Top management (or management) is mentioned in the standard only three times: under policy, management review, and structure and responsibility. One of management's key responsibilities is to provide adequate resources for the EMS. If EMS implementation is repeatedly delayed or the EMS is not being maintained as defined by the organization, management may not be providing adequate resources.
- Be sure responsibilities are communicated throughout your facility. An EMS auditor (internal or external) will interview employees at all levels to determine if they understood the environmental responsibilities of their jobs.
- An auditor of your EMS will also look for evidence of reporting to top management on the EMS performance and how this information was used to make improvements in the EMS.
- Has top management documented their appointment of a specific management representative? This requirement of the standard is often overlooked. The procedures reviewed did describe a position as responsible for EMS development (e.g., EH&S Director, Management Representative) but it was not clear if the procedures were issued by top management. In addition, an auditor of your EMS might note if the EMS representative was high enough in the organization to have the authority to establish, implement, and maintain the EMS.

EMS Links

The structure and responsibility requirements of ISO 14001 pertain to every section of the standard. Roles, responsibilities, and authorities should be defined for each element of the ISO 14001 Standard. A double check for your organization is to look in the Standard where it states, "The organization shall..." and determine who or what group is responsible for developing, maintaining, or revising the particular standard requirement(s). Check to see where that responsibility is

documented and be sure that responsibility is clearly assigned to an individual. Avoid general responsibility assignments such as:

Management and administration are responsible for the implementation and maintenance of this [structure and responsibility] procedure and for coordinating and maintaining the procedure on a day-to-day basis.

3.4 Training, Awareness and Competence [ISO 4.4.2]

What the ISO Standard Requires

The ISO 14001 Standard requires the facility to provide appropriate training to all employees whose work could create a significant impact on the environment. Training is therefore required for key positions across the organization—not just the environmental representative. Training is required to make key people aware of the importance of conforming with the environmental policy, procedures, and with the EMS. They must also understand how their work could create significant impacts either actually or potentially, and their specific responsibilities as defined in environmental procedures and work instructions, including what could happen if they don't follow the procedures. A demonstration of competency is required, as evidenced by education, training, or experience.

Starting Points

Most facilities that have an environmental manager rely solely on the prior educational experience of that person. Other than legally mandated training for certain individuals, no training/skills assessment has been made across the facility. Therefore, companies are particularly vulnerable to problems that occur when a key person leaves. Typically, in small shops, no one may be ready to step in to carry the responsibility.

Implementation Tips

- 1) Most metal finishers started by listing the functional areas within their facilities that could create significant environmental impacts. A “training needs matrix” was used to identify the specific job classifications or specific individuals who required training. Include your existing environmental training needs, such as Hazardous Waste Operators and Waste Treatment Operators Training,
- 2) The minimum amount of training required is usually referred to as “awareness training,” and includes a brief discussion of the EMS, and the specific tasks, procedures, and work instructions that are related to significant (actual or potential) environmental impacts.
- 3) Cross check the training needs you have identified with your environmental operation and control procedures. Be sure that you don't overlook periodic functions, such as start-up and shut-down, maintenance, laboratory, and contract workers.

- 4) Remember that significant impacts covers your products and services as well as your operations and activities. You may need to provide some level of training for engineering and design staff as well. Rack design and maintenance areas are examples of these types of functions.
- 5) EMS training does not need to be stand-alone training. Look for opportunities to combine training with existing environmental, health, and safety programs. Formal training may be the most direct way to ensure employee awareness but it is not the only option. For example, employees can read training information and sign off that they read and understood the contents. Whatever option you choose, it's a good idea to have verifying signatures of all those who received training.

Examples

1) Procedures for Identification of Training Needs

The best procedures included a fairly detailed description of the process to be used for identification and review of environmental training needs. The procedures covered, for example:

- ❑ Basis for review
- ❑ Frequency of review (e.g. a minimum of once per year)
- ❑ What to consider (future requirements, technological advancements, environmental requirements, changes in company directives, cross-functional and specialized needs, new or revised policy and procedures)
- ❑ Development of a training program
- ❑ Mechanisms and responsibility for performing training
- ❑ Evaluation of training and record keeping (e.g. EH&S Director maintains a training file for each production employee)

2) General Awareness Training

The Standard requires employees at each relevant function and level to be made aware of certain aspects of the EMS. Some aspects (for example, the importance of conformance with the environmental policy and procedures) will be broadly applicable to most, if not all, of the employees at a facility. One company included a section on Awareness Training in their EMS Training procedure:

The Environmental Committee is responsible for making individuals and departments aware of:

- ❑ The importance of conformance with the environmental policy and procedures, and with the requirements of the EMS
- ❑ The significant environmental impacts (actual or potential) of their work activities and the benefits of improved performance
- ❑ Roles and responsibilities for achieving conformance with the requirements of the EMS, including emergency preparedness and response
- ❑ The potential consequences of departing from specified operational procedures

Conformance Check

The ISO 14001 Standard requires that “all personnel whose work may create a significant impact upon the environment” receive appropriate training. One metal finisher noted in their training, awareness, and competence procedures, that training needs would be identified by a review of:

- personnel
- process equipment
- the uniqueness of the process to be performed

The criteria for determining training needs did not include employees whose work may be linked to a significant environmental impact. While this omission is not in itself a nonconformance with the ISO 14001 Standard, it may lead to an important omission in determining training needs.

Note that you must actually train your employees. Simply referring to posted information or minutes from meetings would not provide effective training. An EMS auditor (internal or external) would verify implementation of a training program through interviews with employees throughout the facility. Employees may be asked questions such as:

- In your own words, what is your company’s environmental policy? What does the policy mean to you and your job?
- How does your job interact with the environment? What procedures describe what you do? What might happen to the environment if you did not follow procedures?

- What would you do if there were a spill in your area?
- What types of environmental training have you received?

In addition, an EMS auditor may request verification that training was provided (such as sign-in sheets) and ask how you determined the competence of individuals whose jobs may cause significant environmental impacts. (Note: The standard gives your company wide latitude in determining the basis for the competency of personnel).

EMS Links

- Policy: The connection between policy and training is direct. The ISO 14001 Standard requires communication of the environmental policy to all employees, but just sending them a copy of the policy is not enough. The standard also requires that employees are aware of the importance of conforming to the policy. This awareness is a key part of many company's general environmental awareness training.
- Environmental aspect: Aspects are linked to training through the references under the training, awareness, and competence section to environmental impacts (e.g., "It shall require that all personnel whose work may create a significant impact...", "The significant environmental impacts of their work...", "tasks which can cause significant environmental impact.."). It is important to remember to review your training program when new significant aspects (and therefore, significant impacts) are identified to be sure all appropriate personnel are receiving the necessary training.
- Structure and responsibility: Employees should be aware of their roles and responsibilities in conforming with the environmental policy, company procedures, and any other requirements the company has made part of their EMS.
- Operational control and Monitoring and measurement: Employees must be aware of the procedures that govern their work including any monitoring or measurement that is part of their job.
- Emergency preparedness and response: The standard specifically calls for employees to be trained on or aware of the facility's emergency preparedness and response requirements.

3.5 Communication [ISO 4.4.3]

What the ISO Standard Requires

The ISO 14001 Standard requires companies to develop procedure(s) for handling internal and external communication about their environmental aspects and their EMS. Internally, the communication procedure must address communication between the different levels and functions of the organization, and externally, the procedure must cover receiving, documenting, and responding to relevant communication from outside parties, such as neighbors, community groups, regulators, etc. The company must also consider providing additional communication to outside parties about its environmental aspects, and record the decision. The decision could be recorded, for example, in the minutes from a management meeting called to consider the question.

Starting Points

Environmental communication is a new concept for most of the smaller firms. They generally had no well established policy or procedure for handling requests for information, or recording or responding to complaints from neighbors, the community, or other outside groups. Often, calls are routed through an automated answering device, which makes it difficult to determine who could or should be the appropriate contact person. Generally, the companies had decided not to be proactive in communicating about their operations or their environmental aspects. Two of the companies had done some level of communication by inviting the spouses and families of workers in for an open-house.

Implementation Tips

- 1) List your current mechanisms for in-house communication. Generally, these include weekly safety/staff meetings, bulletin boards, inserts mailed in paychecks, company newsletters, etc. Whenever possible, use the existing channels of information to send information about environmental performance and the EMS to employees.
- 2) Set up a way of receiving information and suggestions from employees about environmental performance and concerns they might have. Obviously, this should be set up in such a way as to protect people from negative repercussions. Suggestion boxes and surveys are typical ways of getting employees involved.

- 3) In-house communication on the EMS should not be limited to the individuals developing the EMS but must occur throughout the organization.
- 4) Most of the metal finishers included emergency communication and employee safety and health in the scope of their internal communication procedures. All procedures clearly defined what position was responsible for handling internal and external communications.

Examples

- 1) In some instances, the metal finishers went beyond standard requirements of both internal and external communication.

The effectiveness of these (internal) communication processes is evaluated on an on-going basis, through employee surveys, environmental training program, organization audits and inspections, and informal discussions.

If you are going to include progressive statements in your procedures, assign a responsible party and a timeframe (as opposed to “an on-going basis) to the requirement. It is easy for an auditor, either internal or third-party registrar, to ask for documentation to verify whether or not you are meeting your own requirement.

Another example of going beyond standard requirements follows:

External 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.

Exercise caution in going beyond ISO 14001 Standard requirements. The statement, “or other actions that might affect the actual or potential environmental impacts of the organization’s products, activities, or services,” is very broad and could require external outreach every time there is a process change.

- 2) For the important function of communicating with regulators, one participant designated a back-up in their external communication procedure.

In the absence of the EH&S Director, communications with regulatory officials are delegated to the President.

- 3) One metal finisher helped to ensure a periodic evaluation of external communications efforts by tying it to their EMS management review. Their communication procedure called for a review and evaluation of proactive efforts to communicate with external parties as part of the management review process.

Conformance Check

The last sentence under 4.4.3 Communication element is one that often confuses organizations trying to implement an EMS. The ISO 14001 Standard requires only that an organization consider the process for external communication of its significant environmental aspects. This means what it says: you are not required to communicate anything regarding your environmental aspects to the public as part of EMS development but you do have to think about whether or not this communication is right for your facility. Participants were evenly divided on their approach to meeting this requirement: some included outreach to interested parties as part of their external communications procedure while others chose to respond only if asked by the public or required by regulations.

Whether or not a facility elects to communicate to interested parties on its significant environmental aspects, its decision must be recorded. This is a requirement that the metal finishers often overlooked, particularly if their decision was not to communicate to the public on significant aspects.

EMS Links

Remember that standard requirements for communication include both internal and external avenues and thus effect several other parts of your EMS.

- Policy: A facility's environmental policy is linked to both its internal and external EMS communications. Internally, the ISO 14001 Standard requires you to communicate your environmental policy all employees. The role of the environmental policy in your external communication is up to you. At a minimum, you must make it available to the public.
- Aspects; Objectives and Targets; Environmental Management Program(s): The most obvious linkage is with the standard requirement to consider a process for external communication of your environmental aspects (and therefore also possibly your objectives, targets, and environmental management program). However, internal

communication should be continuing on progress made toward meeting and revising objectives and targets.

- Training, Awareness, and Competence: Training your employees on the EMS policy, procedures, and other standard requirements, is a primary part of your internal EMS communication.
- Management Review: As noted above, some metal finishers reviewed their progress in meeting external communication goals during the management review and based on this review, will make any needed changes to the communication goals.

3.6 EMS Documentation [ISO 4.4.4]

What the ISO Standard Requires

ISO Section 4.4.4 (EMS Documentation) requires the facility to provide the “roadmap” to the overall EMS. It can be electronic or paper based, but it must provide a description of the components (“core elements”) of the EMS and how they interact, and how to locate the related documentation.

Starting Points

None of the metal finishers had the specific “roadmap” to their procedures and documents as required by the ISO 14001 Standard. Typically, this element is completed near the end of the implementation process because it links it all together. However, the metal finishers who had familiarity with ISO or QS-9000 Quality Management Systems had a head start in understanding how to lay out the EMS.

Implementation Tips

- 1) Think of the EMS Documentation requirement as the overall roadmap to your entire system. Generally, the final version of the map isn't complete until the entire system is implemented, but you should start with a general framework in mind. This can start with the “Table of Contents” of your EMS Manual. Then you can add descriptions of how the various sections relate to the requirements of the ISO Standard, and to each other.
- 2) Several metal finishers developed an EMS Documentation procedure. This procedure included the overall description of the system, and defined responsibility for maintenance, review, and for making revisions as necessary. This approach missed the requirement to describe how the elements of the system function, and how they are related to each other.

Examples

It was difficult to specify good examples from those submitted by the metal finishers (see the discussion on the Conformance Check below). This situation will be resolved as the participants complete their EMS documentation.

Conformance Check

The metal finishers in general had difficulty understanding how to implement the requirements of this section of the ISO 14001 Standard. Some metal finishers approached EMS documentation with an ISO 9000, document control mindset. This was reflected in the purpose statement of one EMS documentation procedure:

Purpose: To establish the procedure to establish guidelines for the preparation, approval, revisions, distributions and control of the documentation for the EMS.

Confusion may stem from the title of Section 4.4.4 of the standard “Environmental management system documentation” which some metal finishers may have assumed was covered by document control procedures. However, the standard requirements under EMS documentation do not refer to the control of documents but to a description of the 17 elements of your EMS (e.g., policy, operational control, monitoring and measurement) and their interaction.

The same metal finisher described his facility’s EMS manual in their document control procedure.

The EMS Manual is organized according to elements of the ISO 14001 Standard. Each section of the manual shall contain procedures with some or all of the following subsections included: purpose; scope; definitions; responsibilities; procedures; references; associated material; revision history.

If the intent of this EMS manual is to meet the standard requirements under EMS documentation, it will likely fall short in three key areas: 1) describing the core elements of the management system, 2) describing the interaction of the 17 elements, and 3) providing direction to related documentation. The standard does not intend the EMS documentation to be a collection of procedures but a descriptive document.

Another metal finisher had the right intent in their purpose statement:

This procedure defines the documentation associated with XYZ, Inc EMS, their interaction, and provides direction to related documentation.

However, the description that followed was of Tier I, II, and III documents (again, a document control approach), not of the elements of the EMS.

EMS Links

Since the EMS documentation must describe the core elements EMS and their interaction, Section 4.4.4 pertains to all numbered requirements of ISO 14001.

3.7 Document Control and Records [ISO 4.4.5, 4.5.3]

What the ISO Standard Requires

Two sections of the ISO Standard relate specifically to EMS Documents and Record Keeping: Document Control (4.4.5), and Records (4.5.3).

ISO Section 4.4.5 (Document Control) requires the facility to implement procedures to control all of the documentation required by the Standard. Specifically, documents must be able to be located, they must be periodically reviewed and revised as necessary, they must be approved by the designated personnel; and they must be made available as appropriate to be sure that the EMS can function effectively. The facility must implement procedures and designate responsibility for creating and modifying the various kinds of EMS documents.

Also, any obsolete documents must be removed or appropriately identified and controlled to be sure that they don't continue to be used unintentionally. To be sure that these requirements are carried out, EMS documentation must be clearly identified as such, be legible, appropriately dated (with revision dates noted), and must be orderly maintained and kept for the length of time designated in procedures.

ISO 4.5.3 (Records) requires the organization to implement procedures regarding environmental records, specifically to include training records, and the results of audits and reviews. Records provide the hard evidence as to whether the EMS is functioning as intended, demonstrating whether the system conforms to the requirements of the Standard. To be sure that adequate records are kept and maintained, the Standard requires records to be clearly identified as such, including information on the activity, product or service involved. The records must be stored so that they can be readily retrieved, and must be kept for the length of time designated, protected from damage, loss, or deterioration.

Starting Points

Many of the facilities had a good basis for document control and record keeping because they had established similar procedures as required by the ISO or QS-9000 Quality Management System Standards. Integration of the two systems can be accomplished, but there are a few specific details that must be attended to as described in the Conformance Review section below. Environmental records were generally maintained as required for legal purposes. Most facilities lacked the procedures necessary for designating the responsibility for implementing, reviewing,

or revising documentation and the related records, and for managing their storage and retrieval of records.

Implementation Tips

- 1) What is the difference between a document and a record? This is a source of much confusion for companies implementing an EMS. To put it simply, a document describes how your EMS works (e.g., policy, procedures, work instructions, blank forms) and a record demonstrates that the system is actually working as intended.
- 2) Consider whether you wish to combine your EMS documentation procedures. The metal finishers submitted separate procedures for EMS Documentation Control, and for Records. This is perfectly acceptable. However, as always be sure that you actually cover the specific requirements of the Standard

Examples

Document Control

- 1) Document Control Procedures were fairly straightforward, although the scope in one case did not include all required documents (see the Conformance Check below). One way of getting around this is to keep a master list of all EMS Documents and their current revision level. One company included this statement in their EMS Documentation procedure:

The EMS Representative or his designate shall be responsible for updating all Environmental System documentation and removing obsolete documents from circulation when a revision has been made. A current Master List of all Environmental Management System documents and current revision level shall be maintained in the Documents Library in the Main Office.

- 2) In general, the metal finishers used procedural language consistent with their existing quality management systems procedures for documents and records. This is a good way to start, as long as the specific requirements of the standard are covered.

Conformance Check

Document Control

The metal finishers listed the documents to be controlled in the scope section of their document control procedure. A typical example follows:

This procedure shall apply to all of the following documents:

- ❑ The Environmental Management System Manual
- ❑ Standard Operating Procedures
- ❑ Work Instructions
- ❑ Forms, checklists, and drawings used for EMS purposes

While this list seems comprehensive, it leaves out some important documents. The ISO 14001 Standard requires that your facility establish and maintain procedures for controlling all documents required by the standard. In addition to the EMS manual (which is what many facilities term their EMS documentation) and procedures mentioned above, these required documents include:

- Environmental policy
- Environmental objectives and targets
- Environmental management program(s)
- Roles, responsibilities, and authorities (if covered outside controlled procedures (e.g., in organization charts)
- All EMS procedures where required by the standard (e.g., emergency preparedness, evaluating compliance)
- Other documents not specifically required by the standard that should be considered for document control include:
 - List of identified environmental aspects
 - List of significant environmental aspects
 - List of legal requirements

The document control procedures submitted by the metal finishers included other standard requirements such as clearly describing responsibilities for the creation and documentation of documents; ensuring that documents can be located, are reviewed, revised, and approved; and that current versions are available.

Pay close attention to your document control system. It is one of the elements of the standard most often cited in EMS audits.

Records

The records procedures submitted by project participants did not specify what documentation would be considered a record. One procedure scope statement simply read:

This (records) procedure refers to all company records which comprise the EMS.

Failure to be more specific can easily lead to a nonconformance. The standard give allows you to define what constitutes an environmental record for your facility as long as you include the following:

- Training records
- Results of environmental audits and management reviews
- Any other records which demonstrate conformance of your EMS to ISO 14001

The records procedures did include retention times, a process to store records, and assigned responsibility for records management. However, they did not include the standard requirement that environmental records be traceable to the activity, product, or service which generated the record.

EMS Links

Document Control

Document control (Section 4.4.5) directly links to all elements of the ISO 14001 Standard that require the generation of documents (including procedures). These include:

- Policy
- Objectives and targets
- Environmental management program
- Structure and responsibility

- Operational control
- Monitoring and measurement

Document control also applies to any additional part of your EMS where you have procedures or documents which describe how your EMS works (e.g., organization charts).

Records

In Implementation Tips above, it was noted that a record is a piece of paper that demonstrates that your EMS is working. You may create a record related to any of the 17 elements of your EMS. The following are examples of some typical EMS records generated. Italics denote a record required by the standard.

- Legal and other requirements: All submittals to regulators; permits; or violations
- Structure and responsibility: Appointment by management of an EMS management representative
- Training, awareness, competence: *Training records*; training matrix; job qualification requirements
- Communication: *The decision on whether or not to communicate your significant aspects to external parties*; internal communications (e.g., memos, meeting minutes, newsletters, reports to and from management) regarding the EMS; public complaints
- Operational control: List of operation and activities associated with significant aspects, the policy, and objectives and targets; communication with contractors to demonstrate that appropriate procedures and requirements were communicated.
- Emergency preparedness and response: Emergency response procedures; occurrence or incident reports; documentation on test drills
- Monitoring and measurement: Equipment inspections, maintenance and calibration records; compliance audit results; tracking of EMS performance, operational controls, and objectives and targets
- Nonconformance and corrective and preventive action: Nonconformances identified and corrective actions taken; root cause

analysis; preventive actions taken; changes in procedures resulting from corrective and preventive actions.

- Environmental management systems audit: *EMS audit report*
- Management review: *Management review report*, changes made to the EMS as a result of the report; information gathered for management to review

Be sure to include any other record(s) necessary to demonstrate conformance of your EMS to ISO 14001.

Chapter
4

Chapter 4: EMS Auditing and Management Review

- 4.1 Preventive and Corrective Action

- 4.2 EMS Auditing

- 4.3 EMS Management Review

4.1 Preventive and Corrective Action [ISO 4.5.2]

What the ISO Standard Requires

ISO 4.5.2 requires the organization to have and maintain procedures to identify, investigate, and take action to resolve any nonconformances in the EMS as a whole. Nonconformances result when the system is not performing as intended, based on evidence from records and periodic audits, as described in the next section. The response taken by the organization must be appropriate to the nature and magnitude of the problem identified, and to the impact. The corrective action taken may require revisions to the EMS, including changes in documented procedures. These changes must be recorded.

Starting Points

None of the shops had procedures in place that related to the identification and correction of environmental nonconformances (for example, non-compliance with environmental regulations). As environmental problems arose, they were dealt with in a case by case “fire-fighting mode,” which frequently resulted in re-occurrences of similar problems over time. Metal finishers that had ISO or QS-9000 Quality Management Systems in place had a good understanding of this requirement of the Standard. They understood the benefits of improved management, and were able to relatively easily adapt existing quality procedures to the EMS (refer the Conformance Check section below for some important distinctions).

Implementation Tips

- 1) Remember that the corrective action process you establish is a critical part of your EMS and merits special attention. Without an effective corrective and preventive action program, your EMS consists of a collection of procedures and is not a system that will last or improve over time.
- 2) Nonconformance with your EMS does not just refer to those identified during the EMS audit. A nonconformance occurs anytime your system:
 - does not meet the EMS criteria of the ISO 14001 standard or
 - implementation is not consistent with your EMS description

- 3) Where do nonconformances come from? They may result from EMS audits, compliance audits, monitoring and measurement, employee observations, incident reports, or other sources.
- 4) Tracking the results of your corrective actions is not required by the standard but it is a good idea. Tracking is an easy way to document what you found, how it was resolved, and will help you determine if the corrective action was effective.
- 5) Your corrective action process should be able to address the following points:
 - How do we fix the immediate problem? Has responsibility been assigned?
 - Where else in the organization may this same problem be happening? Who is responsible for determining this?
 - What can we do to prevent it from happening again? Who has responsibility for this step?
 - What are the time frames associated with each step?
- 6) Several of the metal finishers used the term “root cause” when describing their preventive action process. What this term really means for metal finishers is to look beyond the obvious or immediate reason for a nonconformance to determine why something happened.
- 7) The standard also requires only that you record changes to procedures that result from a corrective and/or preventive action. Any additional documentation or corrective action follow-up you build into your system goes beyond standard requirements. For example, one metal finisher required a root cause for all external corrective action requests.
- 8) A note of caution: do not design a system that requires extensive documentation and planning for each nonconformance unless you intend to follow-through for each small and large nonconformance equally. The level of effort that goes into the corrective and preventive action should vary with the severity of the nonconformance. One metal finisher attempted to do this by stating that corrective action should pertain to significant nonconformances but then did not define what was meant by “significant.”

Examples

Most of the metal finishers referred to their existing Quality System procedures in describing how they would identify and handle non-conformances:

This procedure is linked closely with XYZ's "Corrective and Preventive Action Procedure."

While this linkage is easy to make, be sure that the language is actually appropriate. For example, you may wish to distinguish how you identify and respond to external environmental non-conformances (e.g. regulatory or other stakeholder based non-conformances) from how you normally identify and respond to external quality non-conformances that are customer based.

Another area to exercise caution is in specifying the scope of the procedure. One company specified that the procedure applied to "any environmental problem affecting the organization." This may be unnecessarily broad.

Conformance Check

The standard first calls for the defining of responsibility to

- Handle and investigate nonconformances
- Mitigate impacts
- Initiate and complete corrective actions
- Initiate and complete preventive action

Metal finishers often forgot to include assignment of responsibilities in one or more of these areas. For example, none of the procedures reviewed described mitigating the impacts of an environmental nonconformance. These four areas above are also keys to what should be included in your corrective and preventive action procedures.

While the procedures submitted did describe a process for ensuring a nonconformance would not be repeated, they did not address what the metal finishers would do to prevent the nonconformance from happening in the first place. Both actual and potential nonconformances must be considered in your preventive action process.

Many of these difficulties metal finishers had with this element of the standard stemmed from relying on the existing quality assurance corrective action procedure without carefully incorporating the EMS requirements. For example, one EMS corrective action procedure simply referred to the QMS corrective action procedure. The QMS procedure listed the quality data that would be collected to determine preventive action (e.g., analysis of the corrective action database, cost of rework, and time delivery performance), but did not include similar criteria for the EMS.

EMS Links

- Operational control: The actions to correct a nonconformance and keep it from reoccurring and preventive actions to keep one from being identified in the first place, may often involve modification to your operational controls.
- Monitoring and measurement: This area links with corrective and preventive actions in two areas. First, as with operational controls, the corrective and preventive actions you take will often involve your procedures for monitoring and measurement. Secondly, the findings resulting from your system to verify compliance with environmental regulations should be resolved through the corrective and preventive action program.
- Environmental management systems audit: Nonconformances identified as a result of EMS audits are be resolved through the corrective and preventive action program you establish.

4.2 EMS Auditing [ISO 4.5.4]

What the ISO Standard Requires

Section 4.5.4 of the ISO 14001 Standard requires the organization to have and maintain an EMS auditing program and procedures necessary to determine whether the system is functioning as planned (including conformance to the ISO Standard), and has been implemented and maintained. Results from the audits are to be provided to management. The auditing program must be comprehensive, including audit scope, frequency, and methods for auditing that are appropriate to the importance of the activity being audited, and consider the results of previous audits.

Starting Points

None of the metal finishers had programs for periodic auditing of their EMS in place (with some exceptions for routine compliance checks). However, those companies with ISO or QS-9000 Systems were able to develop the appropriate procedures relatively easily.

Implementation Tips

- 1) Put EMS audits into perspective: You are getting feedback on your EMS throughout the year, not just when you conduct EMS audits. This includes obtaining information about the following:
 - Objectives and targets: How are we managing our aspects and impacts?
 - EMS audits: How are we conforming to our EMS?
 - Management review: Do we have the right EMS?
- 2) Metal finishers chose to conduct their own internal EMS audits with trained personnel. This is their option, not a standard requirement. You may also hire a consultant to conduct your internal EMS audits.
- 3) Tips on conducting EMS audits:
 - Collect objective evidence (e.g., documentation, forms, memos, procedures, policies, records) of conformance with requirements. An EMS audit is not a check on how well employees are doing their job. The audit should indicate management's commitment to

environmental performance. Also, look for evidence of conformance to your EMS requirements. Don't spend time during the audit figuring out why something did not work. That will come later during the corrective action plan.

- Focus on criteria. The criteria for your audit are the requirements of the standard and any additional requirements set by management. Auditor should avoid judgements based on what they think the EMS should be or would like to be.
- Focus on identifying improvements to the EMS, not on "gotchas." The quality of your audit will be judged by the quality of your findings, not how many findings your audit team identified.
- Train people outside of the environmental function, if possible. This can give you a fresh perspective on your operation.
- Develop corrective action plans for findings. If you do not follow-up on your findings in a timely manner, you are setting the stage for re-occurrence of the finding and possible future nonconformances.

Examples

- 1) If you do opt to use your existing procedure, be sure that you review it to make sure all EMS requirements are met.
- 2) A good sample procedure for conducting audits included the following elements:

- Audit Team Selection
- Audit Team Orientation
- Preparation of Written Audit Plan
- Prior Notification of Audit
- Procedure for Conducting the Audit
- Reporting and Distributing Audit Results
- Audit Follow-up
- Record Keeping

Conformance Check

The standard requires that your audit program include the following:

- Audit schedule
- Audit scope
- Frequency of audits
- Audit methodology
- Responsibilities relative to the audit program
- Requirements for conducting audits
- Reporting results to management

In addition, the audit program must be based on the environmental importance of the activities conducted in your shop and the results of previous audits. Some metal finishers overlooked this important requirement when scheduling their audits. For example, in one audit procedure a metal finisher stated,

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

Scheduling the EMS audit automatically on an annual basis is a nonconformance with the standard. Frequency must be tied to the importance of the activity and the results of previous audits.

Another metal finisher developed a one-page EMS audit procedure that simply referred to the quality audit system already in place.

EMS audits are conducted in accordance with the "Internal Quality Audits Procedure."

While there is nothing wrong with this strategy, the QMS audit procedure was not modified to include EMS requirements. The QMS procedure in this example did not define responsibilities for planning, conducting and reporting on the audit or describe how the EMS audit scope will be determined. All of these are requirements of the standard.

EMS Links

- Training, awareness, and competence; Structure and responsibility: Once you have defined the responsibilities for your EMS audit program (as required by the standard), be sure those employees involved are trained in their responsibilities. Several metal finishers included auditor training as part of their EMS auditing program (although this goes beyond standard requirements).
- Nonconformance and corrective and preventive action: All nonconformances identified during your EMS audit should be followed-up on according to your corrective and preventive action process.
- Records: An EMS audit program has the potential to generate numerous records such as the audit report, audit plan, schedule, auditor training records, findings, and corrective action plans.
- Management review: You are required to include the results of your EMS audits as part of your management review.

4.3 EMS Management Review [ISO 4.6]

What the ISO Standard Requires

ISO 4.6 requires the organization to perform reviews of the EMS to be sure that it is effective, adequate, and continues to be suitable. The reviews are scheduled at the discretion of management, and must be documented. All information necessary for a review must be collected. During the review process, the organization must consider the need to make changes in the elements of the EMS, including the policy, objectives and targets, based on results from previous audits, changes in circumstances, and on the commitment to continual improvement.

Starting Points

None of the metal finishers had regularly scheduled reviews of their EMS. Occasionally, specific performance indicators (for example, compliance related issues, or utility usage and costs) were reported to top level management along with other management information.

Implementation Tips

- 1) The value of conducting management reviews is that management periodically asks, "Is our EMS still suitable to our operations? Is it adequate or are changes needed? Is the EMS doing what we hoped it would do?" The management review will also help keep your EMS in check. An EMS does not have to keep expanding in order to be effective.
- 2) During the management review, ask the following questions:
 - What organizational, process, or operational changes have occurred since the last management review? How may or have these changes effected our EMS?
 - Did we achieve our objectives and targets? If not, why?
 - Should our objectives and targets change? Is our system helping us to achieve our goals?
 - Are roles and responsibilities in our EMS clear? Are they understood by employees?
 - Are the resources allocated to the EMS adequate?

- Is our EMS part of our day-to-day operations or is it a “stand-alone” system?
- Is our EMS integrated throughout the organization and its functions (e.g., procurement, strategic planning, maintenance, and design)? If not, what steps should be take to further integration?

Examples

- 1) The standard allows the organization’s top management to determine how often management reviews should be conducted. Metal finishers chose to conduct the reviews two times a year.

The ISO Management Representative is responsible for scheduling and conducting a minimum of two Management Review meetings during each 12-month period.

- 2) Some organizations assume that a formal written report is required to document the results of the management review. The standard does require that the review is documented but allows you the flexibility in determining how to do this. One metal finisher chose the following approach.

- ❑ Minutes of the Management Review meeting will be documented. These meeting minutes will include at a minimum a list of attendees, summary of key issues discussed, and any action items arising from the meeting.
- ❑ A copy of the meeting minutes will be distributed to attendees and any individual assigned action items.
- ❑ A copy of the meeting minutes will also be retained on file.

The last point (retained on file) is important because the minutes are a required record in the EMS.

Conformance Check

Although the requirements under “Management Review” are fairly straightforward, organizations are sometimes confused as to the role of top management in the review. Is it acceptable for the EMS team to collect the data, conduct the review, and simply copy top management on the results of the review? While the standard does not specify who must collect data for the review, it is clear that top management (the same

management level that signed the environmental policy) must carry out the evaluation.

EMS Links

- Policy; Environmental aspects; Objectives and targets: The management review is top management's primary opportunity to review the foundations of the EMS and determine if changes are needed.
- Communication: Conducting the management review and reporting the results is part of your internal communication process.
- Nonconformance and corrective and preventive action: The performance of your system to correct and prevent nonconformances is a good indicator of your organization's commitment to continual improvement.
- Environmental management systems audit: Results of the EMS audit are a key data input to the management review.