



Environmental MAPS Program

Environmental Management Systems for the Meat Processing Industry

American Meat Institute
1150 Connecticut Ave, NW
12th Floor
Washington, D.C. 20036
202/587-4200
202/587-4300 (fax)
www.MeatAMI.com

ACKNOWLEDGEMENTS

Greg Appleton
Environmental Committee Chair

Sara Lee Foods

Stewardship Subcommittee

Dave Townsend
Stewardship Subcommittee Chair

Premium Standard Farms

Dennis Boik

Hormel Foods, Corp.

Kim Dirks

Tyson Foods, Inc.

Bill Gill

Smithfield Foods, Inc.

Larry Hill

Farmland Foods, Inc.

Jack Hughes

Kraft Foods, Inc.

Rob Sherman

Oscar Mayer Foods

Dennis Treacy

Smithfield Foods

Jonathan Zimmerman

Sara Lee Foods

Project Managers

Jennie Meeker

Capitolink, LLC

John Thorne

Capitolink, LLC

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WELCOME

Welcome to the Environmental MAPS Program, the American Meat Institute's four-tiered environmental management system. The American Meat Institute's Environmental Committee has a vision of increasing EMS development and implementation throughout the meat and poultry industry, thereby achieving continuous environmental improvement.

The primary goals of this program are to motivate member companies to improve their environmental performance through the establishment of environmental management systems (EMS) and to recognize those plants that have achieved environmental progress as part of a continuing effort to improve environmental performance.

The Environmental MAPS program provides a stepwise approach to EMS development. The program begins in Tier 1 with a basic package of environmental policy statement and environmental compliance criteria, advances through more comprehensive requirements in Tier 2, incorporates a complete EMS model developed in cooperation with EPA as Tier 3, and culminates with an ISO 14001 EMS as the final tier.

It is hoped that the program will be used to engage the meat and poultry industry in a proactive environmental approach; dramatically reducing expenses associated with environmental issues and generally enhance the meat and poultry industry's overall image regarding the environment.

INTRODUCTION

What is an EMS?

An Environmental Management System (EMS) is a systematic approach to achieve individualized, facility specific environmental and other organizational goals. It is a specialized program designed to minimize that facility's environmental "footprint." The tailored EMS creates a system or site-specific plan that converts company and facility policy into actions. An effective EMS can identify alternatives; incorporate effective corrective action measures and involves management in all aspects of the facility's environmental impact.

An EMS is first and foremost all about the way an individual facility identifies, approaches, and deals with environmental issues from an overall organizational perspective. This document is designed to be a guide for individual facilities to use in developing the EMS that best fits with the facility's unique characteristics, but not an all-encompassing document.

An effective EMS is built on Total Quality Management (TQM) and Quality Management System (QMS) concepts. To improve environmental management, a facility needs to focus not only on what things happen but also why those things happen. Over time, the systematic identification and correction of system deficiencies leads to better environmental (and overall organizational) performance.

What an EMS Can Do

An EMS provides a systematic and logic based approach to managing environmental issues. An EMS can help a facility improve its ability to comply with environmental laws and regulations; improve environmental performance; reduce environmental affairs liability; improve efficiency and clarify the relationship between the facility's environmental goals and other goals (NSF International, January 2001). In addition, by helping to identify the causes of environmental problems and then eliminate them, an EMS can help the facility save money.

One way to conceive of the benefits of an EMS is to approach the process from the philosophy that it is better to make a product (or provide a service) right the first time rather than to fix it later. It is cheaper to prevent a spill in the first place than to clean it up afterwards. And, it is more cost-effective to prevent pollution than to manage it after it has been generated.

In addition, an EMS can be an investment in the long-term viability of a facility. An EMS can help a facility to be more effective in achieving environmental goals. Also, utilizing an EMS will often help businesses keep existing customers and attract new ones, thereby adding value.

Why Have an EMS?

There are many reasons to develop and implement an EMS. Some of those may include:

- Improves efficiency and effectiveness
- Possible bottom line savings
- Could provide alternative to future additional regulation/enforcement
- Demonstrates responsibility throughout the organization
- Demonstrates continuous planning

Benefits of implementing an EMS

- Pollution prevention
- Regulatory Compliance
- Continuous environmental improvement
- Ability to adapt to changing circumstances
- More reliable and predictable outcome for environmental performance
- Reduce or limit the severity of incidents
- Increase in efficiency and benefits
- Places responsibility with those directly associated with environmental impacts and pollution prevention
- Increase community support for a facility
- Continual improvement
- Determine the appropriateness of pollution prevention strategies.
- Earlier problem identification
- Energy efficiency and other process gains

Even if you are convinced that an EMS is good for the facility you may need to convince others. Concerns some may have include:

- Cost of EMS development
- Labor concerns for development and implementation
- May reveal costly needed improvements
- Potential for failure if not committed
- Public awareness of efforts variable
- Could translate into requirements
- Third party certification (ISO14000)

In preparing to launch into an EMS program, facilities will often find that much of what they need for an EMS may already be in place. The management system framework described in this document includes many elements that are common to managing many organizational processes, such as quality, health and safety, finance, or human

resources. Existing management processes such as Hazard Analysis and Critical Control Point (HACCP) have similar elements as an EMS and therefore provide opportunities for efficiency. Many facilities have numerous EMS processes in place, even though they may have been designed for other purposes. Integrating environmental management with other key organizational processes can improve financial, quality, and environmental performance.

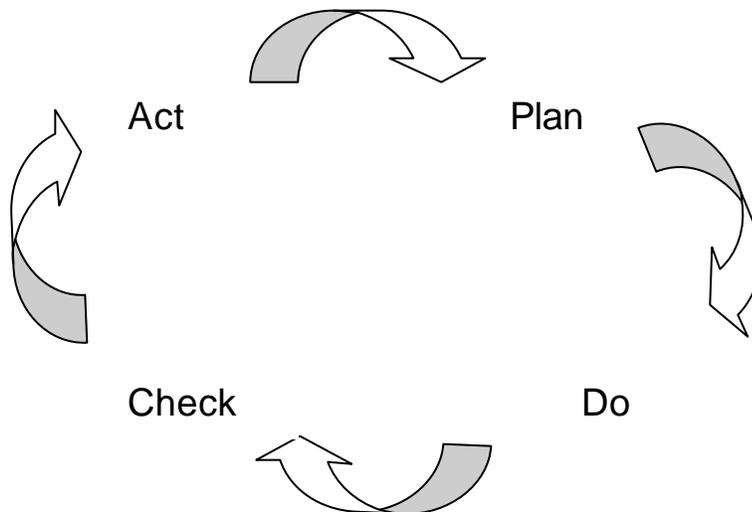
The key to effective environmental management is the use of a systematic approach to planning, controlling, measuring and improving an organization's environmental performance. Significant environmental improvements (and cost savings) can be achieved by assessing and improving a facility's management processes. Many environmental "problems" can be solved without installing expensive pollution control equipment.

Of course, there is some work involved in planning, implementing and maintaining an EMS. But many organizations have found that the development of an EMS can be a vehicle for positive change. In addition, many organizations have seen that the benefits of an EMS far outweigh the potential costs.

Key Elements of an EMS

Most EMS models are built on the "Plan, Do, Check, Act" model (See Figure 1) introduced by Shewart and Deming. This model endorses the concept of continual improvement.

Figure 1: "Plan, Do, Check, Act" Model



In the text box (Table 1) below key elements of an EMS can be found. The Environmental MAPS program incorporates all of these key elements throughout the four tiers. The text box here is provided as an overview.

Table 1: Key Elements of an EMS: A Snapshot

Environmental policy — Develop a statement of the facility’s commitment to the environment. Use this policy as a framework for planning and action. The policy is a direct reflection of the fundamental values of the organization.

Environmental aspects — Identify environmental attributes of products, activities and services. Determine those that could have significant impacts on the environment.

Legal and other requirements — Identify and ensure access to relevant laws and regulations, as well as other requirements to which the facility adheres.

Objectives and targets — Establish environmental goals for the facility, in line with the policy, environmental impacts, the views of interested parties and other factors.

Environmental management program — Plan actions necessary to achieve the set objectives and targets.

Structure and responsibility — Establish roles and responsibilities for environmental management and provide appropriate resources.

Training, awareness and competence — Ensure that the facility’s employees are trained and capable of carrying out their environmental responsibilities.

Communication — Establish processes for internal and external communications on environmental management issues.

EMS documentation — Maintain information on the facility’s EMS and related documents.

Document control — Ensure effective management of procedures and other system documents.

Operational control — Identify, plan and manage the facility’s operations and activities in line with the facility’s policy, objectives and targets.

Emergency preparedness and response — Identify potential emergencies and develop procedures for preventing and responding to them.

Monitoring and measurement — Monitor key activities and track performance. Conduct periodic assessments of compliance with legal requirements.

Nonconformance and corrective and preventive action — Identify and correct problems and prevent their recurrence.

Records — Maintain and manage records of EMS performance.

EMS audit — Periodically verify that the facility’s EMS is operating as intended.

Management review — Periodically review the facility’s EMS with an eye to continual improvement.

The Tiered Approach

The American Meat Institute developed this four-tiered EMS tool to help increase EMS development and implementation throughout the meat and poultry industry, a proven method to achieving continual environmental improvement. A complete EMS may be too overwhelming and complex for facilities that seek a simple EMS program or a simple step-wise approach to achieving a complete EMS. Still others may be seeking a more advanced program. In an effort to provide environmental assistance to all AMI members and increase EMS use in the meat and poultry industry, AMI's Environmental Committee has developed a 4-tiered EMS -- "Environmental MAPS" -- program, which begins in Tier 1 with a basic package of environmental policy statement and environmental compliance criteria, advances through more comprehensive requirements in Tier 2, incorporates a complete EMS model developed in cooperation with EPA as Tier 3, and culminates with an ISO 14001 EMS as the final tier. Each AMI member can choose the tier or degree of complexity that works best for their situation.

Basic elements in each tier are outlined below. The remainder of this guide will explain how each of the elements in the tiers can be achieved. Keep in mind that an EMS is specifically tailored for each facility according to its situation and that this document should be used only as an assistance tool to develop an individualized EMS. The tier "criteria" should be viewed not as requirements for facilities to utilize an EMS, but for those companies that wish to participate in the AMI Environmental MAPS awards program (see Appendix N).

Tier Criteria

Tier I: Environmental Master

- Commitment of upper management
- Develop Core EMS team
- Develop and adopt environmental policy
- Develop business case
- Adopt AMI model pollution prevention plan
- Adopt AMI model emergency response plan
- Adopt AMI model preventative maintenance plan
- Adopt AMI model internal communication plan
- Monitor and record water/utility use, wastewater discharge, air emissions, hazardous/solid waste generation rates

Tier II: Environmental Achiever

- Meet Tier I criteria
- Expand EMS Team
- Conduct a gap analysis
- Adopt 5-9 Environmental Practices
- Identify and prioritize environmental aspects and impacts
- Develop and implement external communication plan

Tier III: Environmental Pioneer

- Meet Tier I and II criteria
- Complete all 'Plan, Do, Check, Review/Adjust' components
- Establish Objectives and Targets
- Educate at least one additional facility about EMS program and encourage participation

Tier IV: Environmental Star

- ISO 14001

TIER I – ENVIRONMENTAL MASTER

Getting Started

Building an EMS might sound like an overwhelming task, but it need not be. Since time and other resources are limited in any organization, it is important that a facility use its resources wisely. One way to do this is by preparing and following a simple, effective plan. A facility may want to start by building on the experiences of other organizations that have already implemented an EMS. Also, strive to keep plans at a level that the facility is capable of executing during initial implementation and build an EMS that the facility has the resources to sustain over the long term. It is easier to add more detail to the facility's EMS as a part of continuous improvement than it is to remove detail once in place. The importance of careful planning cannot be overemphasized. Taking the time to figure out what needs to be done, how it will be done, and who must be involved will pay big dividends down the road.

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

A few hints to keep in mind in building the facility's EMS:

- Help is available - don't hesitate to use it. (See Appendix A for information on some available resources). There are many resources, tools, and templates available to help the facility develop its own customized EMS.
- Set a reasonable pace. Move quickly enough that employees stay interested and engaged, but not so fast that those involved are overloaded, or that the effort becomes superficial.
- Don't re-invent the wheel - existing management practices should help the facility to meet EMS requirements. In the Meat Processing Sector use and adapt whatever parts can be from existing Hazardous Analysis and Critical Control Point (HACCP) systems.
- Consultants and assistance providers can help evaluate the facility's existing EMS components and suggest approaches used successfully elsewhere.

Building a Business Case

A first step in EMS planning is to decide why to pursue the development of an EMS. Is it to improve the facility's environmental performance (for example, compliance with regulations or prevent pollution)? Developing a "business case" – a plan or rationalization as to why the facility should pursue an EMS - can help to frame the purposes for which the facility is developing the EMS. The following will assist in developing a business case for a facility.

Add Value Though EMS

The benefits a facility can gain by implementing an EMS - including improved business operations, enhanced customer confidence, and increased employee and community support - can far outweigh the initial start-up costs. By implementing an EMS, a facility will be seen as a leader in environmental compliance and pollution prevention, and the working relationship among the facility, federal and state regulators will be improved.

The overall benefit of an EMS is greater efficiency and effectiveness resulting from a system for environmental management. More specifically, these benefits may include: savings related to better use of energy, water, and materials; reduced occupational safety and health costs; facilitated compliance; and less waste to treat or dispose. Additionally, EMS's compatibility with HACCP systems ensures a valuable combination of environmental protection and food safety. In fact, a facility can expand EMS management to collectively address safety, quality, maintenance, public relations, and other facets of business into one consolidated plan.

Evidence exists from meat processors that have already implemented environmental management systems, that EMS benefits are quickly realized. For example after only a few months of EMS implementation the following benefits were achieved:

- Enhanced public image;
- Minimized labor turnover;
- Improved environmental performance such as;
 - Improved compliance with a diverse array of environmental regulations;
 - and
 - Reduced operating costs.

An EMS Will Deliver a Return on The Investment

An EMS will require some investment and continuing costs over time for its maintenance and documentation. But an EMS need not break the bank. And as already noted, EMS costs can be outweighed by a variety of savings and cost avoidance. For some facilities, an EMS will produce savings by reducing non-compliance costs. Moreover, major savings are likely from reduced quantities of waste to be managed and disposed, less use of hazardous materials, and savings from energy and water conservation.

An EMS can help to identify opportunities for upgrades and other environmental improvements within the business strategy and will weigh associated costs and benefits to provide the information needed to make a knowledgeable decision.

Boost Public Image

As communities expand and local zoning and development become more challenging, trust and credibility will become even more significant to the success of a business. Within the last few years the meat processing industry has received a great deal of negative press including several damaging articles in the national newspapers. An EMS can help in establishing a dialogue with the community, suppliers, financial

investors, and customers and will demonstrate the facility's commitment to the environment to those directly impacted by the facility's operations. By sharing environmental performance progress, the facility will build credibility and trust within the community.

Minimize Labor Turnover by Retaining Valuable, Trained Employees

In the long term, an EMS will enhance a facility's environmental, health, and safety performance while boosting employees' sense of security and connection to their workplace and community. An improved work environment can translate into increased morale, overall job satisfaction and into a facility's ability to retain current employees and attract new ones. Lowering labor turnover will reduce the costs associated with training new staff.

Improve Environmental Performance, Even With Limited Resources

An EMS will uncover the hidden costs of environmental practices and help in development of a plan to maximize performance by efficiently reallocating resources. Through an EMS, a company can improve environmental performance to levels, which may obviate the need to apply for permits in certain instances. This will save money in permit fees, monitoring, and reporting costs.

Meet The Legal Obligation to Comply with a Diverse Array of Environmental Regulations

The thousands of processing facility's nationwide are subject to many federal, state, and local environmental requirements. Multi-state, multi-facility companies are often challenged with the variability between state regulatory programs. By implementing an EMS, the facility will:

- Be better able to stay in compliance with the wide range of ever-changing regulations;
- Avoid violations and fines that can damage public image as well as corporate accounts;
- Manage environmental issues that vary by region;
- Make facility management aware of proactive measures that can improve the facility's position if new regulations take effect;

See Appendix B for a checklist of regulations from which to start.

EMS Scope

Building a business case is also a good time to define the Scope of the EMS. Much of an EMS is based on common sense and intuitive business decisions. Start by taking small, do-able steps and build momentum from there. To be effective, proactive involvement and approval from top management as well as input from line workers and supervisors throughout the facility is needed. Keep the big picture in mind, but define reasonable expectations, set goals and time frames in line with expectations, then monitor progress, making corrections where necessary. In fact, the facility probably

already has many elements of an EMS in place, but it may not be integrated into a management system. Capitalize on these existing elements in advancing to the next level in environmental management.

The scope of the EMS should be defined by:

- Identifying what it is the facility actually does (does it operate offices, a waste water treatment facility, are there trucks, shipping and receiving, how many buildings, and how much property is there to operate and maintain?);
- Drawing boundaries around the facility and its components; and
- Considering practical constraints and timing.

Defining the scope helps to set the tone for the entire EMS. When defining the scope, include those areas that the management can control and over which it can be expected to have an influence. This is often called management control and includes:

- Authority to determine how the environmental policy is implemented;
- Authority to allocate appropriate resources;
- Clearly defined boundaries for inputs to and outputs of the facility's activities;
- Interfaces with services not completely within the scope of the EMS (e.g. a common effluent treatment facility); and
- The scope of environmental licenses, permits or approvals.

As part of defining the scope of the EMS, the facility should draw boundary conditions defining what it controls. The boundary conditions can be simple and include the facility and associated activities, products and services or they can be more complex and include such things as:

- Transportation to and from the site;
- Post consumer disposal;
- Purchasing of resources; and
- The life cycle of the product.

Temporary sites such as construction sites should be covered in the EMS if the facility has management control over it. A facility should not omit from its scope activities that it has management control over.

Some facilities find that for the initial development of their EMS it is most effective to limit the scope to any activities that occur within their physical property limits or that occur as a direct result of those operations on adjacent sites. In subsequent EMS cycles facilities can consider expanding their scope to include their supply chain (e.g., contract farmers), product lifecycle, and other key associated organizations such as rendering facilities and the local POTW.

Get Top Management Commitment

With this in mind, it is essential for the facility to have top management support and endorsement of both development and implementation of the EMS. Applying TQM / QMS principles to the environmental area and providing adequate resources are the job of top management. In addition, the EMS approach and an organization's culture should be compatible. For some organizations, this involves a choice: 1) tailoring the EMS to the culture, or 2) changing the culture to be compatible with the EMS approach. Remember that changing an organization's culture can be a long-term process. Keeping this compatibility issue in mind will help ensure that the EMS meets the facility's needs.

To initiate and sustain the EMS effort, top management must communicate to all employees the importance of:

- Making the environment an organizational priority;
- Integrating environmental management throughout the organization; and
- Looking at problems as opportunities.

In gaining commitment from management, they must first understand the benefits of an EMS and what it will take to put an EMS in place. Explain to top management the strengths and limitations of the facility's current approach and how those limitations can affect the facility's financial and other performance. These items should have been outlined in the business case. Management also has a role in ensuring that the goals for the EMS are clear and consistent with other organizational goals. Management's commitment should be communicated across the organization.

Identify and Track Resource Requirements

The term "resource" is most often used to imply human or financial resources, but there are many types of resources, which may include equipment, materials, specialized skills, and facilities. Ensuring adequate resources for an EMS involves three general steps:

1. Identifying resource needs. To identify EMS resource requirements, assess the level of effort the facility's current environmental tasks require, the effect of other plans the facility may have on the EMS, and resources the new pieces resulting from implementation will require.
2. Preparing a budget that addresses the resource needs. Most companies formulate resource budgets covering a one- to five-year period. An EMS budget should include all labor, capital expenses, and other items (such as specialized consultants) required to implement the EMS.
3. Tracking EMS costs on an ongoing basis to ensure that resources continue to reflect current needs.

By evaluating such information, a clear understanding of the time and resources required for tasks within the EMS can be developed. Be sure to identify resource requirements and track resources using existing systems in the facility. Look at how other project resources get assigned and use the existing processes as a starting point. More detail may be needed in order to help management understand what resources are required or how they have been used.

Identifying an EMS Team

Core Team

An EMS is too large a system for any one individual to carry out on his or her own. The most effective approach is to identify a team of employees from a broad range of backgrounds throughout the company. Start putting together the core team. The number of individuals on this team will grow as the EMS grows. The core team should include representatives from key management functions, such as engineering, finance, human resources, production and/or service. As the EMS advances and becomes more developed, consider including contractors, suppliers or other external parties as part of the core team, where appropriate. Also consider those employees who have shown an interest in environmental performance and/or those employees who have time to learn and act. A cross-functional team can help to ensure that procedures are practical and effective, and can build commitment to and “ownership” of the EMS.

The team’s purpose is to define the scope of the EMS and ensure that all major internal interests are considered in the EMS development process. The core Team should also provide greater access to management in each functional area as the project progresses and act as a sounding board for ideas as the project progresses.

Environmental Policy Statement

An environmental policy is the declaration of commitment to the environment. This policy provides a unifying vision of environmental principles that will guide the actions of employees and management. Through it, top management should communicate goals such as preventing pollution and minimizing risk to workers and the environment. This policy statement serves as the framework for setting environmental objectives and targets, and will be brought to life in the plans and business activities. Major environmental concerns can be addressed in the facility’s environmental policy statement.

The policy statement should:

- Be a written statement of intent and values;
- Identify the main environmental issues and indicate how they will be managed;
- Present strategic objectives to attain the company’s long-term environmental position;

- Highlight how the facility will monitor and improve environmental performance;
- Reflect the scope of the EMS; and
- Be a commitment to:
 - Compliance with legal requirements and voluntary commitments,
 - Pollution prevention,
 - Continuous effort to improve environmental performance, and
 - Share information about environmental performance.

Draft the environmental policy statement in general terms. Address a list of specific issues in general terms in the policy statement. For example, if chemicals in water or air are a concern because they potentially impact the community, express a commitment to review and, where feasible, make changes in the chemicals used by the facility, or make sure the chemicals are being managed appropriately. Or, if solid waste in landfills is a concern, express a commitment to reduce the solid waste the facility produces.

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

The policy should relate the products and services, as well as supporting activities. Remember that the statement can be modified as the EMS is developed. In subsequent iterations, consider the results of the gap analysis (Tier II) and the analysis of the environmental aspects (Tier II) of the products, services and activities before finalizing the policy. These two steps can provide insight as to how the facility interacts with the environment and how well it is meeting its challenges. For example, information obtained from completing the gap analysis might help to define specific policy commitments.

The environmental policy should be explicit enough to be audited. If a phrase such as "We are committed to excellence and leadership in protecting the environment" is used, consider how to demonstrate that such a commitment is being met.

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

Make sure that the environmental policy statement is posted in the facility and that the employees understand the policy (See Communications Plan). Options for communicating the policy internally include posting it around work sites (e.g., in lunchrooms), using paycheck stuffers, incorporating the policy into training classes and

materials, and referring to the policy at staff meetings. Test awareness and understanding from time to time by asking employees what the policy means to them and how it affects their work.

The policy can also be communicated externally (Tier II). Some options for external communications include placing the policy on business cards, in newspaper advertisements and in annual reports, among other options. The policy may be communicated proactively, in response to external requests or both. This decision should be factored into the overall strategy for external communication (Tier II).

It is important to think through which commitments the facility will be capable of addressing. Do not include commitments in the policy that the facility will not be able to carry out. Make sure top management commits to the environmental policy statement. If possible, the company president or facility manager should sign and date it. The final environmental policy statement should be posted or distributed to employees and other interested parties.

Compliance

Every facility will find its own way to express its values. The key points are that the policy / principles / commitments are stated clearly and that management provides direction on how it envisions these statements being put into practice. Actions are important.

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

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

While the requirements noted above relate directly to a facility's management of legal requirements, each of the EMS elements can contribute to enhanced compliance

(including communication, documentation and document control, records management, EMS audits, and management review). An EMS that includes these elements will help the facility improve or maintain its compliance performance and facilitate the establishment of objectives and targets that go “beyond compliance.”

Document Management

One of the key types of EMS documentation that the facility will need to generate is procedures that are readily available and accessible. The facility does not have to make a final format selection for EMS documentation at this time unless the facility has a specific format it already uses to document standard practices. However, begin to consider what format would work best for the facility. As you proceed through EMS implementation you will, in some cases, be formalizing practices already in place or, in other cases, developing methods. Trying to write down exactly how a procedure will be accomplished before it is worked out is not always possible or desirable. Therefore, it is acceptable to do a “back of the envelope” or mental only “first cut” at many of the facility’s new or improved processes and then shortly thereafter write it down. The process of “writing it down” in plain language will help to remember what worked and what did not work, and will also guide others in the future.

Electronic or Paper Based Documentation

While a paper-based system for housing the documentation and records is acceptable, some companies find electronic systems more advantageous. Electronic systems vary from just using a common file directory for documents to commercial products that provide a framework to house all EMS documents, records and procedures while providing a structure to organize the elements of an EMS. The larger or more complex the company or facility the more likely an electronic documentation management system will prove to be useful.

Pollution Prevention Plan

EMS design and implementation also should take into account the need for a Pollution Prevention (P2) plan. The idea of pollution prevention (P2) is simple –reduce or eliminate the generation of pollutants or waste before they are created. So why undertake the effort to do this? There can be several benefits for the company:

- Reduction in operating costs
- Increased business efficiency
- Reduced risk of liability
- Reduces impact of the operations on the environment

There are three key things to do when getting started on P2.

- *Commitment* - The first and most important step to P2 is having a company-wide commitment to prevent waste generation. To accomplish this, top management

must back P2 policies to ensure successful implementation of the plan. This should be done through a written commitment from management to P2.

- *Form a Workgroup* - Form a pollution prevention workgroup. This workgroup may be the same group as the core team or may include others. The purpose of this group is to create and oversee the P2 plan and keep efforts focused and moving forward. When forming this workgroup, be sure to involve the individuals who will be most affected by operational changes, including maintenance staff, materials handling personnel and purchasing employees. Broad employee participation is critical to a successful plan. From the group, select a chairperson. The chairperson will coordinate P2 efforts and serve as the point of contact with top management. This group should meet on a regular basis to review the facility P2 status, identify new ways to eliminate waste, and develop new programs.
- *Resources* - Identify resources for assistance. There are several sources of P2 information and help available (Appendix A). These include US Environmental Protection Agency and state regulatory agencies, trade groups (e.g. AMI), and vendors. Don't forget the employees who are often the best source of practical ideas.

Developing A P2 Plan

To be effective at P2, remember the old adage "Plan your work and work your plan". For the workgroup to develop this plan, it should go through the steps discussed below.

Status Assessment - Determine the facility's current waste generation situation by conducting a waste stream assessment. This can include all solid wastes, hazardous wastes, wastewater, and air emissions at the site. Determine the source and volume for each waste stream. An important part of this step is to attempt a determination of disposal costs associated with the waste streams.

Strategy - The workgroup will need to develop the parts of its P2 strategy by:

- Identifying and prioritizing wastes to be targeted for P2; A P2 hierarchy (see Figure 3) can be helpful to consider.

Figure 3 – Pollution Prevention Hierarchy

Source: http://resourcesaver.com/file/sectorstar/project_314.pdf



- Brainstorming as a workgroup to generate P2 ideas;
- Considering adopting an incremental approach to reduction to keep the project manageable;
- Evaluate alternatives by considering cost, ease of implementation, payback and benefit to the environment; and
- Identifying in-house resources, such as equipment that might be necessary to implement a pollution prevention program.

Goal Setting - Once a P2 strategy has been established, identify some general P2 activities that apply to a variety of waste types and will go a long way towards meeting the P2 goals. Some things to consider when setting goals:

- Goals should be ambitious, but also realistic. They should allow success so people feel their efforts have paid off, which will provide encouragement to continue P2 efforts.
- Goals should be measurable. To judge the impact of meeting a P2 goal, you should be able to quantify the amount of waste reduced and also the reduction in financial expense that would normally be incurred to handle that waste stream.
- Goals should be set for both the short term (one year) and long term (five years).

P2 Activities - Begin by reducing or eliminating any waste stream that can be at its origin. This could include solid, toxic and hazardous wastes and releases of pollutants to air or water. This reduction or elimination may be accomplished through process modification, operation and management practices, and increasing machinery efficiency or any other process or practice that accomplishes the same end result.

If eliminating waste generation is not an option, recycling or reusing materials is an alternative. This could include using reusable containers or recovering valuable materials.

For many facilities, water use, and the associated amount of wastewater produced, represents an area that has the potential for significant reduction and cost savings. Water usage can be reduced by putting in reduced flow faucets and hose bibs, repairing leaks, shutting off water during breaks, and installing meters to monitor high water usage areas. There are many other P2 activities that you can easily undertake. Some additional areas to consider are:

- Replace disposable materials with reusable and recyclable materials.
- Segregate all waste streams to reduce contamination of recoverable materials.
- Investigate the use of returnable and/or recyclable containers and pallets.
- Investigate waste exchange programs for both solid and hazardous waste.
- Identify specific waste materials that could be recycled either on-site or off-site.
- Establish improved quality assurance/quality control procedures to reduce the generation of rejected products.
- Explore the use of recovery equipment for reducing hazardous, solid and liquid wastes in the form of sludge, solvents, acids, degreasers and other wastes.

- Identify potential production changes that would improve efficiency including process, equipment, piping and layout changes.
- Consider procedural measures, loss prevention, material handling improvements and production scheduling to reduce wastes.
- Investigate opportunities for product or ingredient substitution that would reduce the creation of waste.
- Purchase materials in bulk or larger containers, but purchase only what you need to avoid spoilage or obsolescence.
- Consider additional automation and changes in operational settings to reduce waste. Control inventory to reduce waste; rotate stock, using oldest purchases first.
- Invest in products and equipment that are durable, easily repaired, and/or recyclable.

Implementing And Monitoring The P2 Plan

Once the plan is complete, develop an implementation schedule and monitoring protocol that will meet the goals. An important part of demonstrating that P2 is worthwhile is showing how much money is saved through waste reduction. Develop a cost-benefit analysis that accounts for all costs for waste management. As waste streams are assessed for source reduction potential, develop accounting systems that calculate the true cost of disposal and recognize benefits of pollution prevention. This means going beyond handling, transportation, treatment and disposal costs. Lost revenue of materials that could have been sold as recyclables should be included in accounting systems, as well as the value of the wasted input material. Use a system that identifies waste handling, treatment and disposal expenses as direct costs of producing a product.

Finally, track progress being made. This can be done by developing a regular (at least monthly) report to monitor the success of the program. This report should provide employee feedback and identify problem areas. Share the report with the employees to show that their P2 efforts do make a difference.

P2 Employee Training And Incentives

In order for the pollution prevention plan to be successful, employee awareness and involvement is critical. Inform employees about the company's P2 goals and how those goals will impact daily operations. Be clear regarding what is expected from affected employees.

Employee education and participation is critical to program success. Provide employee training for source reduction and any other P2 activities that will require a change in behavior. Those who must change how they handle materials will appreciate the guidance and training. Provide for continuing education opportunities in the future to anticipate personnel turnover.

Employee involvement can be encouraged through the use of incentives. Establish an incentive program that encourages personnel to suggest changes that would reduce waste. Employees might be offered the opportunity to suggest changes that can result in company savings. A portion of these savings could be passed back to the employee or their department.

P2 Throughout The Supply Chain

In addition to preventing waste in the facility, encourage those companies the facility works with to do the same. This can include:

- Ask vendors to minimize unnecessary packaging, use recycled materials, or use returnable packaging.
- Determine if outdated stock can be returned to suppliers for regeneration.
- Don't accept product samples from sales people if those samples will later become waste.

Preventative Maintenance Plan

Operation and maintenance programs should exist or be developed for equipment and operations related to compliance or significant environmental aspects. This could include management and disposal of wastes, approval of new chemicals, storage and handling of raw materials and chemicals, equipment servicing, wastewater treatment, storm water control, and adherence to permit conditions.

Operation procedures and maintenance schedules of equipment and facilities are integral to organizations. Having those procedures and schedules documented is a critical step in addressing environmental activities. If the facility does not have an operation and maintenance plan or if the plan is in need of an update, the following discussion will guide you through the process of developing such a plan.

An effective operation and maintenance plan is important company wide. A written plan must be prepared, posted, implemented and have the full support of management. The first step in this plan is to get the commitment of top management to back operations and maintenance plan implementation.

Next, select an operations and maintenance plan workgroup. This group is the cornerstone of the plan and will oversee program development, recommend an implementation strategy and monitor the program. This group may be the same group as the core team or may include others. The group should meet on an ongoing basis to modify the plan when needed and identify new programs areas. It is important, when selecting this workgroup, to involve a broad group of employees from different areas of the facility so as not to overlook any process or procedure. A memo soliciting employee participation may be helpful. Select a chairperson from the workgroup participants to coordinate the operations and maintenance plan efforts and serve as a spokesperson to top management. Identify resources for technical assistance.

Developing the Plan

Once the workgroup has been established, development of the plan can proceed. Organize the plan in a way that will make it readily usable. Determine which operations should be covered by documented procedures. Operations related to significant impact and legal requirements should be included. Determine what operations are already documented. If the facility does not have any existing documented procedures, begin by examining the facility's process flow diagrams. Use other documents such as the pollution prevention plan, emergency response plan and HACCP plan to identify different aspects of the facility. Describe the operation to which the procedures pertain (e.g. greasing a piece of equipment; work floor clean up). Discuss what equipment and other materials are involved in the operation. Provide a schedule by which the operation should occur. Identify roles that individuals will need to fill and the individuals that will fill those roles. Make sure that such individuals are identified for each shift.

Implementing and Monitoring the Plan and Employee Training and Incentives

Provide ongoing training to personnel in how to appropriately implement plan. Provide information and procedures to enable the responsible person to fulfill the obligation. Conduct inspections and tests in accordance with written procedures that you have developed. Keep a copy of the emergency response plan posted in visible, accessible locations throughout the facility.

Included in Appendix C are several attachments Identifying possible procedures that food plants would want to develop as part of their EMS program, including a sample list of procedures identified as Basic, Administrative, and Plant that are by no means complete, but is to be used as a guide to get started. Also included are examples of Plant procedures developed to address storm water and air emission at a facility. As you develop your EMS program over time, the list of operational controls and procedures will change and grow, as you identify new opportunities to enhance environmental performance.

A sample operations and maintenance plan can be found in Appendix C.

Emergency Preparedness and Response Plan

Despite a facility's best efforts, the possibility of accidents and the potential for emergency situations still exists. Incidents related to releases of hazardous materials, releases of oil or chemicals, non-standard air emissions, utility loss, fires, and explosions can result in impacts to the environment. A process for identifying the potential for and responding to such incidents is a critical component of any EMS. Effective preparation and response can reduce injuries, prevent or minimize environmental impacts, protect employees and neighbors, reduce damage, and minimize downtime.

An emergency preparedness and response program should include provisions for:

- Assessing the potential for accidents and emergencies;

- Preventing incidents and the associated environmental impacts;
- Responding to incidents based on documented plans and procedures;
- Testing of emergency plans and procedures;
- Mitigating impacts associated with these incidents; and
- Reviewing performance after actual incidents to continuously improve plans and procedures.

The facility's EMS Team should first identify the potential accidents and emergency situations that might generate environmental impacts. A list of potential incidents and their causes should be developed similar to Appendix D.

The EMS Team should also review existing facility response plans that may already include or could be modified to include the provisions noted above. A list of environmental regulations and situations that often require response plans is included as Appendix E.

By comparing the list of potential incidents with existing response plans, the EMS Team can determine what plans may require modification or development. In many cases, existing plans and practices can be included or referenced as part of the emergency preparedness and response section of the EMS. This includes existing training, equipment, and drills as well the plan documents themselves.

For each type of incident to be addressed, the EMS Team should begin by developing preventative measures to be included in that plan. Preventative measures might include inspections (for leaks, pressures, condition of seals, liquid levels, etc.), best management practices (proper storage of materials, good housekeeping, preventative maintenance, etc.), and operator training. For each of the preventative measures, individuals should be identified that will address the measures. Consideration should be given for all shifts, as well as weekends and holidays.

Next, identify equipment that might be appropriate to respond to the various potential incidents and mitigate impact. Monitoring and detection equipment may be needed to first determine potential exposure levels. Containments such as berms or dikes may minimize discharge and impact. Absorbent materials, booms, and covers may be suitable. Shovels, scoops, and storage containers may be appropriate to collect spilled materials. Personal protective equipment such as gloves, goggles, protective suits, and even self-contained breathing apparatus (SCBA's) should be included. Be sure that maintenance and regular inspection of response equipment is addressed.

An internal and external communication procedure should be developed to insure that regulatory agencies and response personnel are notified in a timely manner. This would essentially be a list of numbers to call in response to a specific type of incident. Reports should be documented on a pre-prepared form and include as much information as possible including:

- Exact address/location of the facility;

- Date and time of emergency;
- Type and source of emergency;
- Affected areas;
- Potential cause;
- Any damages or injuries;
- Actions being taken to address the emergency; and
- Other agencies/individuals contacted.

A site plan marked to show evacuation routes and areas where evacuees can safely congregate should be provided for incidents that might require evacuation of various plant areas or the entire facility.

Each plan should also include a schedule or frequency for review and testing. Reviews should be utilized to determine if any facility changes have impacted plan requirements. Tests can be tabletop exercises or actual drills. Drills need not adversely impact operations. Partial simulations can be used if activities like a complete facility evacuation are impractical. Each plan should be reviewed and/or tested at least annually.

Reviews and drills should be documented on a form similar to the form found in Appendix F. Plans should always be reviewed subsequent to any actual emergency or incident.

Once the EMS Team has developed plans and requirements, training relative to particular roles and responsibilities is required. In some cases this will involve training in proper operation or maintenance of equipment and may already be part of an existing training program. In other cases, the reviews and testing may serve to meet training requirements. The training program should provide for the training of new hires and transfers as they enter any position included in the response plan. In all cases, the names of the individuals trained and the date training took place should be documented and included with the respective plan file.

Copies of response plans should be kept in areas that are readily accessible to potential responders in case of an accident or emergency.

Internal Communication Plan

This section is meant to be a guide that companies can use in their facilities to assist in communicating information about the facility's environmental policy and activities both within the facility and with the outside community.

In order to most effectively develop, implement and monitor environmental activities at a facility, employee awareness and participation must be accomplished. In addition, there may be parties with an interest in the environmental performance and management efforts outside the facility (Tier II). It is particularly important to communicate with the

community in which you operate. Effective environmental management requires effective communications, both internally and externally (Tier II).

Effective communications will help:

- Motivate the workforce;
- Gain acceptance for the plans and efforts;
- Explain the environmental policy and EMS and how they relate to the overall organizational vision;
- Ensure understanding of roles and expectations;
- Demonstrate management commitment;
- Improve the relationship with the community;
- Monitor and evaluate performance; and
- Identify potential system improvements.

An effective EMS should include procedures/ processes for:

- Communicating internally (between levels and functions within the organization);
- Soliciting, receiving, documenting and responding to external communications (Tier II); and
- Working with stakeholders.

In order to develop effective procedures for internal and external communication, it is useful to have an understanding of what is encompassed by the terms “internal communication” and “external communication” and what the ultimate goal is of such procedures. Internal Communication generally refers to written or electronic correspondence, telephone conversations and oral discussions, or meetings with anyone directly employed by the company. External Communication refers to written or electronic correspondence, complaints or regulatory inquiries about environmental practices. Telephone conversations and oral discussions or meetings (relating to facility environmental practices) with anyone not directly employed by the company (including regulatory agencies, environmental groups, and neighbors). Once there is an understanding of the differences between internal and external communication, begin to create a complete communications plan by developing an internal communications plan.

The first step is to select a communications workgroup. As with other groups discussed, the communications group can be the Core Team and can include others. This group should meet on an ongoing basis to ensure that all information is being communicated throughout the organization and to determine if new communication programs and materials need to be developed. This workgroup may be the already established communications department, however, this department is often charged with communicating information to groups outside the facility. Since it is essential each

department or group throughout the facility to get the information, facilities may want to consider setting up a new communications workgroup involving individuals across the facility specifically for internal communications. Next, select a chairperson from the workgroup participants to coordinate the communication efforts and serve as a spokesperson to top management.

The first task before the communications workgroup is to determine the communication objectives. Decide what is to be achieved in the communication. Setting this goal will help get the right message across without overwhelming people with too much information, spending too much time, or missing the mark. It is helpful to create an EMS communication policy for the facility. The policy should outline what kinds of information will be communicated to external stakeholders, and how the facility will document and respond to communications from these stakeholders. In addition, the procedure should discuss how the facility would report environmental incidents, such as spills, accidents and “near misses”. The procedure should include who reports what, to whom, and when. Small and medium-sized businesses may not need a written procedure for communication.

Communicate regularly and integrate EMS communication

To build support for the EMS, try to communicate on a regular basis. Some simple means of regular communication can usually be accomplished without straining resources – for example, a bulletin board posting, email messages, or articles in the organization newsletter. Don't forget to consider direct word-of-mouth communication, particularly in smaller organizations. Talking directly with key individuals at intervals may be the best mechanism for ensuring good communication. Use existing channels of communication to get the message out on the EMS activities. Examples of methods for communicating both internally and externally are given below.

Internal Methods:

- Newsletters
- Intranet
- Staff meetings
- Employee meetings
- Bulletin boards
- Brown bag lunches
- Training
- Signs

Monitoring and Recording

In Tier I monitor and record water/utility use, wastewater discharge, air emissions, and hazardous/solid waste generation. The purpose of this step is to simply begin the

process of monitoring and measuring activities that may later be identified as aspects. Start with a relatively simple monitoring and measurement process, and then build on it as experience with the EMS is gained.

Most effective environmental measurement systems use a combination of process and outcome measures. Outcome measures look at results of a process or activity, such as the amount of wastes generated or the number of spills that took place. Process measures look at “upstream” factors, such as the amount of packaging material used per unit of product or the number of employees trained on a topic. Select a combination of process and outcome measures that are right for the facility.

Monitoring and measurement will be necessary in order to later identify impacts and aspects (Tier II) and set objectives and targets (Tier III). In general, monitoring and measurement enables an organization to:

- Evaluate environmental performance;
- Analyze causes of problems;
- Assess compliance with legal requirements;
- Identify areas requiring corrective action; and
- Improve performance and increase efficiency.

A template to monitor and record water/utility use, wastewater discharge, air emissions, and hazardous/solid waste generation can be found in Appendix G.

This concludes Tier I – Environmental Master in the Environmental MAPS program. Facilities that have completed Tier I should now have a core EMS team, a commitment from upper management to continual environmental improvement and an environmental policy statement. Tier I facilities should also have working pollution prevention, emergency response, preventative maintenance and internal communications plans. The ongoing monitoring and measuring that Tier I facilities are carrying out will assist facilities in later Tiers. Once a facility is comfortable that they have understood all the components of Tier I, that facility is encouraged to begin work on Tier II – Environmental Achiever.

TIER II – ENVIRONMENTAL ACHIEVER

The groundwork for Tier II is laid out in Tier I. Many of the activities that are incorporated in Tier II are expansions of Tier I components. Refer back to Tier I as necessary.

Expanding the EMS Team

Core Team

In Tier I the core EMS team was developed. Now that the EMS is growing more complex and encompassing more work, the core EMS team should be expanded. In this Tier it is important that the core team include a broad array of representatives from each key management functions, such as engineering, finance, human resources, production and/or service. Also consider those employees who have shown an interest in environmental performance and/or those employees who have time to learn and act. A cross-functional team can help to ensure that procedures are practical and effective, and can build commitment to and “ownership” of the EMS.

Team Leader

With a larger team in place, it is time to choose a team leader. From the core team of employees, choose the EMS team leader. Choosing an EMS team leader is critical. The leader should have the necessary authority, an understanding of the facility, and project management skills. The leader should be a “systems thinker”, should have the time to commit to the EMS-building process, and must have top management support. The team leader serves as a leader for the EMS within the facility. Often in smaller organizations, this leader, among their many duties, is also the EMS management representative.

Management Representative

In addition, an effective management system needs an advocate. Thus, top management should appoint a management representative. This representative:

- Ensures that the EMS is established and implemented;
- Reports on its performance over time; and
- Works with others to modify the EMS as needed.

The management representative can be the same person who serves as the team leader, but this is not necessary. A business owner, facility or shop manager, or any number of other people might serve as an effective EMS management representative.

Once the team, team leader and management representative have been selected, hold a kick-off meeting to discuss the facility’s objectives in implementing the next phase of the EMS, the steps that need to be taken, and the roles of team members among other

topics. If possible, get top management to describe its commitment to the EMS at this meeting. The kick-off meeting also is a good opportunity to provide some EMS training for team members. The team will need to meet regularly, especially in the early stages of the project. Communicate progress of meetings to all employees.

Gap Analysis

Knowing what parts of the system the facility already has in place will help in understanding the building blocks that need to be added. The facility may have many parts of an EMS already in place. An EMS implementation program starts with identifying where the gaps are between the facility's existing approaches to dealing with environmental issues and a fully functional EMS. This process of assessing the state of the facility's existing environmental program(s) relative to a set of criteria is called a Gap Assessment. Once the gaps are identified, a plan and approach for filling in the gaps can be formulated.

A checklist is provided that can be used to gauge the current state of a facility's approach to environmental affairs (Appendix H). Use the checklist not only to identify gaps now, but also to gauge the facility's progress over time in implementing its EMS (Appendix H). Many of the terms in the checklist may be unfamiliar now, but will become clear through the EMS implementation process.

After conducting a gap analysis for the facility, develop an action plan to tackle the gaps that have been identified. Based on a review of the results of the gap assessment, the team should develop a plan and budget based on their understanding of the different business units of the facility. The plan should describe in detail what key actions are needed, who will be responsible, what resources are needed, and when the work will be completed. Keep the plan flexible, but set goals. Think about how to maintain project focus and momentum over time. Look for potential "early successes" that can help to build momentum and reinforce the benefits of the EMS.

The plan and budget should be reviewed and approved by top management. In some cases, there may be outside funding or other types of assistance that can be used (trade association, a state technical assistance office, etc.). Next, think about *how* to put commitments into action. For example, the commitment to reduce solid waste may be achieved through a pollution prevention program and/or a program to design products or services that result in minimal waste generated by the consumer. Also, these programs may be implemented one at a time over a several-year period, as part of the commitment to continual improvement.

Environmental Aspects and Impacts

To plan for and control its environmental impacts, an organization must know what these impacts are. But knowing what the impacts are is only part of the challenge - a facility must also know where these impacts come from.

Terminology

As an initial matter, it is important to understand the definition of *aspect* and *impact*. An environmental aspect refers to an element of a facility's activities, products or services that can have an impact with the environment. Interaction is often described as having a beneficial or adverse effect. These interactions and the resulting effects may be continuous in nature, or periodic or only be associated with special events such as emergencies.

An environmental impact refers to any change in the environment whether adverse or beneficial, wholly or partially resulting from a facility's activities, products or services. Therefore, the aspect is the cause and the impact is the effect.

For example, a curing operation at a facility is an activity. The air emissions that result from the burning of wood to cure or smoke the meat are the environmental aspect, since the air emissions interact with the environment. One of the environmental impacts associated with (or caused by) that operation is air pollution, e.g., the air pollution from emission of particulates (dust). In a sense, an environmental aspect lies between an activity, product, or service and an impact. A facility's "operations" drive the environmental aspects, which in turn drive the environmental impacts.

A generalized approach to environmental aspect identification and evaluation involves the following tasks:

- Define the scope within which the environmental aspects and impacts will be identified i.e., the scope of the EMS (Tier I);
- Identify all activities, products, and services within the scope;
- Identify the environmental aspects associated with the activities, products, and services;
- Affirm that the facility's management has control and influence over aspects and determine the significance of the aspects and prioritize them accordingly; and
- Group the aspects according to some criteria to ensure that the number of aspects is manageable.

It is important to not get overly detailed in the process of identifying the aspects and impacts. Do this to a level appropriate for the business. Periodically take a step back while proceeding through the aspect and impact identification process to determine if

what's been identified is at the level of detail that would be needed to make a decision now or in the future to change how that aspect is managed.

Activities, products, and services may have one or more environmental aspects associated with them. Each aspect, in turn, may result in one or more environmental impacts (actual changes in the environment).

In understanding environmental aspects and impacts, it helps to understand the processes by which the facility generates products and services. The use of process flow diagrams that have been developed specifically for the facility is encouraged. Appendix J provides sample templates, which may be used for the identification of environmental aspects and impacts.

The general steps involved in this procedure include the following:

- Establish the boundaries within which the environmental aspects and impacts will be identified.

This task should have been largely completed when the scope of the EMS was defined. The boundaries of the environmental aspect procedure must include all of the operations that are included within the EMS scope. This may be an important first step, especially for facilities which are engaged in multiple activities, like slaughtering, specialized meat processing, rendering or have their own water treatment and wastewater disposal operations.

- Identify the activities, products and services specific to the facility.
'Activities, Products and Services' is a catchall phrase that was developed to capture all of the 'things' done at a facility. When trying to identify activities, products or services there probably will be issues found that do not obviously fall into any of these three categories. It is fairly common for an organization to identify aspects that are not activities it carries out, nor products it manufactures, nor services that it conducts. The important thing is that it can be determined if there are any associated known or potential environmental impacts that require consideration for those that have been identified.

Knowing these common environmental aspects, determine which activities, products or services at the facility, have a specific aspect associated with them. For example, for the aspect of generation of wastewater, identify all activities/products/services that result in wastewater being generated and those which also contribute to contaminant levels in the wastewater stream.

Then for each aspect, identify all impacts and potential impacts. This means whether the impacts happen continuously, once in a while or only on special occasions (Example: there is a process upset).

Sources in which to identify aspects for the facility may include some of the following:

- Employees;
- HACCP;
- Process Flow Chart;
- Process Hazard Analysis;
- Emission Inventory / Risk Assessment;
- Safety and Hazard Reviews; and
- Compliance and Pollution Prevention Audits.

The following listing identifies a number of possible sources of useful information for identifying and evaluating environmental impacts:

- HACCP Hazard Analysis: The Hazard Analysis and Critical Control Point process for identification of hazards requires detailed understanding of the process through the generation of flow diagrams and the development of a detailed understanding of all associated materials flows. Also the process of identification of hazards can be adapted and expanded for the purpose of considering environmental aspects and impacts.
- Process Hazard Analyses: Used to identify and assess potential impacts associated with unplanned releases of hazardous materials. This methodology is commonly used in OSHA Process Safety Management regulations. It typically employs team approach to identify and rank hazards.
- Failure Mode and Effects Analyses: Commonly used in quality field to identify and prioritize potential equipment and process failures as well as to identify potential corrective actions. Often used as a precursor to formal root cause analyses.
- Process Mapping is a process of identification of the various processes that are the core functions of an organization. By mapping the processes in detail and in inflows and outflows of materials, products and byproducts and noted. The HACCP process maps will provide an excellent starting point from which to identify related aspects and impacts.
- Life Cycle Assessments: Used to assess full range of impacts from products, from raw material procurement through product disposal. These methodologies are somewhat subjective and can be resource intensive.
- Risk Assessments: Used to assess potential health and/or environment risks typically associated with chemical exposure. Varieties of qualitative and quantitative methodologies are commonly used.

- Project Safety / Hazard Reviews: Used to assess and mitigate potential safety hazards associated with new or modified projects. This methodology typically does not focus on environmental issues.
- Emission Inventories: Used to quantify emissions of pollutants to the air. Some data may already be available to the organization, based on EPCRA requirements and CAA Title V permitting program.
- Pollution Prevention or Waste Minimization Audits: Used to identify opportunities to reduce or eliminate pollution at the source and to identify recycling options. Requires fairly rigorous assessment of facility operations. Does not usually examine off-site impacts.
- Environmental Property Assessments: Used to assess potential environmental liabilities associated with facility or business acquisitions or divestitures. Scope and level of detail is variable. This does not assess impacts associated with products or services.

Identify and assess environmental aspects that the organization can control and over which it can have an influence. An organization is not expected to manage issues outside its sphere of influence or control.

To identify and assess aspects that the facility can control, first determine if it is within the 'scope' of the EMS implementation. Then determine if the facility has 'management control' over it. If the facility does not have management control over it, determine the level of 'influence' it does have over it. Determinations of 'control' and 'influence' will affect the objectives set in relation to a given aspect.

The process of identifying and setting priorities among environmental aspects is one of the key drivers of an EMS. Most organizations find the process of identifying aspects and impacts time consuming if they have not previously developed the methodologies and expertise needed to understand all of the environmental impacts associated with all facets of their operations.

Ensure that the number of aspects carried forward for further analysis is manageable. A grouping scheme is commonly used to accomplish this. Grouping of aspects is conducted before the determination of significance.

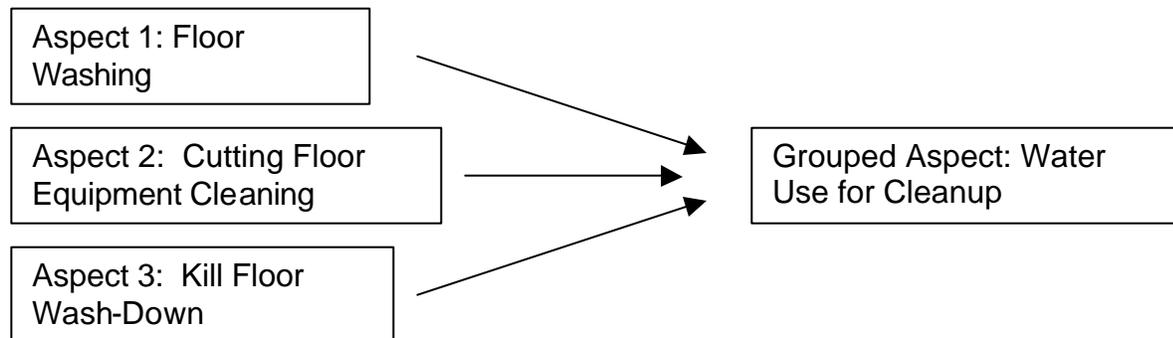
The first level of organization of aspects should be the categories defined on a practical level for the facility. Use categories that fit with the way the facility works. All aspects should be placed in one of these categories, which can accommodate any number of individual aspects. Match the categories with the way the facility is operated, and where possible, use terminology the majority of staff are familiar with.

Examples:

A facility that has different operating areas (kill floor, processing, and storage) might wish to first categorize aspects along these lines so that when it comes time for programs they are aligned with the operating areas, or where work is performed by various trades or job skill categories; aspects categorized by cleanup crew activities versus production may be appropriate.

Similar aspects arising from several distinct activities, products, or services should be grouped into one aspect. In cases in which one existing system is used to manage impacts arising from a number of aspects or functional areas yielding similar aspects, the aspects should be combined into one group (See Figure 4).

Figure 4: Grouping of Aspects



Be sure that when aspects are grouped, areas where impacts occur and the sources of the impacts are not lost. If, for example, all hazardous wastes at the facility are collected and disposed of the same way, then these aspects should be combined into one group. In this example, it is important to first identify all of the sources of hazardous waste generation, so that when it comes time to manage them, they are not missed. It is not advisable (or acceptable from an EMS perspective) to assume that just because such a program exists that it was designed to include all of the hazardous waste streams.

Energy use is a good candidate for aspect grouping. It might be effective in some circumstances to combine all the process steps having energy aspects, and develop a facility-wide strategy and program for achieving improvement. Understand, however, that the energy aspect should be ranked in each process step to determine its relative importance in that step. For example, energy use in office work might be a different priority than energy use in a manufacturing step. In addition, standards and procedures developed to reduce energy use would possibly be different for each process step. Consequently, although certain efficiencies might be achieved through a facility-wide effort, the actual environmental improvement will be attained through objectives set for each process step.

Once the facility's environmental aspects are fully identified and placed into manageable categories, the next step is to identify those that are significant and which therefore need to be managed. An aspect is considered significant if it has or may have a significant impact on the environment. Since the aspect is the cause and the impact is the effect, focus on reducing the effects by ranking and prioritizing which causes to focus efforts on. For example: If five separate processes were identified around the facility (aspects) with air pollution impacts and ten that have water pollution impacts, the facility needs a process to decide on which of the aspects that result in these impacts, will be focus of the efforts at prevention of pollution. The management will want to spend its limited resources in the most effective way.

Managing the environmental aspects consists of plans to achieve prevention of pollution, compliance and continual improvement, which will often be as unique as the operation. The ranking and prioritization process, which is called determination of significance, is intended to identify significant environmental aspects associated with activities, products, or services, and is not intended to require a detailed life-cycle assessment. Evaluating each product, component, or raw material input is not necessary. You may instead select categories of activities, products or services to identify those aspects most likely to have a significant impact.

Every facility is unique and therefore the rationale behind where to put the greatest emphasis in environmental management programs is also unique. Depending on how the facility has defined its process for identification of HACCP critical control points, may provide building blocks and ideas on approaches for determining the facility's significant aspects.

The following is an example of a procedure that can be used to identify significant environmental aspects. It is recommended that the EMS Team consider this procedure as a starting point to develop its own customized procedure.

Example Significance Procedure 1

The significance of environmental aspects is determined by subjecting each grouped aspect to a screening process (yes/no filters) in the sequence given below. When determining significance consider whether the impacts of concern happen continuously, once in a while or only on special occasions (Example: there is a process upset).

Screen 1: Regulatory Requirements

This screen identifies those environmental aspects that are subject to legislation and regulation (including permit requirements and regulatory agreements), but are not being met. [Not being met being defined in this case as the existence of a known non-compliance (continuous or intermittent) or the organization is currently unable to confirm

if it is or is not in compliance]. These aspects are considered significant. If the environmental aspect is not subject to any regulatory requirements, it may still be considered significant at Screen 2.

Many existing environmental programs keep the facility in compliance with regulatory requirements. This first screen is based on the state of the facility at the time of the assessment of significance. When determining significant aspects look for areas where a new program might be needed or additions to an existing one to ensure compliance.

Screen 2: Unique Value System of the Company

This screen identifies those environmental aspects deemed a priority based upon the value system of the company. The value system is unique to the facility and may include:

- Corporate commitments and requirements,
- Financial operational and business requirements,
- Aspirations and initiatives that are designed to move the organization towards a “triple bottom line” approach (economic prosperity + social well being + healthy environment); and
- Views of interested parties such as stockholders, community groups, regulatory agencies, environmental groups, etc.

Environmental aspects, which are considered a priority based upon the facility's value system, would be considered significant. If the aspect is not considered to be significant at this stage, it may still be at Screen 3.

This type of screen allows the determination that regardless of other factors the aspect is significant. For example, if recycling wooden pallets is important to the facility and they want an environmental management program for it, make it significant although the other screens (regulatory and risk) would not make it significant. However, it does not allow for over-riding a finding of significance indicated by the other screens.

Screen 3: Risk Ranking

Aspects that have not been identified as significant by Screens 1 or 2 undergo risk ranking to determine if they pose a risk unaccounted for in previous screens, and are significant aspects on this basis. In the risk ranking process, a single, numerical risk rating (between 1 and 25) is calculated for each aspect at this stage.

Based on this rating, an aspect is classified as either significant (equal to or more than N points) or non-significant (less than N points). Again, the value of N must be selected by the facility in advance of applying the risk ranking. For this ranking scheme consider a minimum value of 9 and a maximum value of 15. For the first analysis of significance

it is recommended that you start with a value 12 for N and evaluate all of the aspects with this level of screening.

Over time a facility can drive continuous improvement into its EMS by decreasing the risk ranking score (the value of N) at which it defines an aspect as significant.

The risk rating for the aspect is the product of the two variables Consequence and Relative Probability, where Consequence (assigned a value of 1 to 5) refers to the consequence of the aspect in terms of the magnitude of the associated impact, and Relative Probability (assigned a value of 1 to 5) refers to the likelihood of occurrence of the impact associated with the aspect. To add consistency into the risk ranking process, use a committee and keep records of the reasoning behind the consequence and probability rankings you assign.

Consequence Rating: Two impact attributes are considered for the assignment of Consequence values.

- Impact intensity, and
- Geographic extent and duration.

Impact intensity is considered the more important of these two and is assigned values of: 1 for low; 2 for moderate; 3 for high or 4 for very high. The intensity of the impact is a measure of the severity of the damage. Using air pollution as an example, a low intensity impact would be visible emissions with perceived public nuisance, moderate intensity would be some reduced visibility with air pollution, and high intensity would be excessive reduced visibility and/or public nuisance and very high intensity would be exceedance of regulatory and/or other standards.

Geographic extent and duration are considered together and are assigned values of: 0 if low or 1 if high. Low geographic extent and duration would be an impact in the immediate vicinity or neighborhood of the facility or one that does not have a lasting effect. For example: noise. A high extent might be water contamination that travels downstream in a river (e.g., an oil spill will leave the soil contaminated for years).

The intensity and geographic extent and duration values are added to obtain the overall Consequence rating as shown below:

- 1 - Negligible impact (Low intensity, Low extent and duration: $1 + 0 = 1$)
- 2 - Minor impact (Low intensity, High extent and/or duration: $1 + 1 = 2$), or (Moderate intensity, Low extent and duration: $2 + 0 = 2$)
- 3 - Moderate impact (Moderate intensity, High extent and/or duration: $2 + 1 = 3$), or (High intensity, Low extent and duration: $3 + 0 = 3$)

- 4 - Major impact (High intensity, High extent and/or duration: 3 + 1 = 4), or
(Very high intensity, Low extent and duration: 4 + 0 = 4)
- 5 - Massive impact (Very High intensity, High extent and/or duration: 4 + 1 = 5)

Relative Probability Rating

The Relative Probability rating of a specific aspect is based on the frequency of occurrence rather than on the duration of the associated impact. The rating is assigned using the scale shown below:

- 1 - Unheard of in the meat processing sector
- 2 - Suspected or known to occur in the sector
- 3 - Incident has occurred at the facility
- 4 - Occurs several times per year at the facility (For example: up to 3 times a year historically)
- 5 - Occurs regularly at the facility (For example: once a month or more)

The overall risk rating of an aspect is determined by multiplying the Consequence rating by the Relative Probability rating. Table 2 illustrates all possible risk ratings and, for illustrative purposes, highlights those that are greater than or equal to 12. In this example, aspects with a rating of 12 or more are considered significant, and aspects that have a rating of less than 12 are considered to be non-significant.

Table 2: Risk Rating Matrix

	Relative Probability				
	Unheard of in sector	Suspected or known to occur in sector	Has happened at facility	Occurs several times/ year at facility	Occurs regularly at facility
Consequence					
Negligible	1	2	3	4	5
Minor	2	4	6	8	10
Moderate	3	6	9	12	15
Major	4	8	12	16	20
Massive	5	10	15	20	25

Some organizations might decide to have additional screens before an aspect is considered to be non-significant. Organizations may have as many as 6 or 7 "triggers" where if any of the present conditions are met with respect to a particular aspect then it

is automatically considered significant. Adding more screens has the effect of potentially a greater number of aspects being considered as significant.

The consequence rating is derived based on subjective assessments of intensity and extent or duration of the impact (High, Moderate, etc. are terms that mean different things to different people). As a result, it is wise to consider a team approach to determining scores in risk ranking. In addition, retain records of how the analysis was conducted. If the scores determined for the aspects were recorded along with rationale/comments for choosing these scores, this process may be duplicated in the future with a greater degree of consistency.

A template form for significance determination can be found in Appendix K.

Legal and Other Requirements

Once the activities, products, and services and associated environmental aspects and impacts have been identified, consider legal and other requirements related to these aspects and impacts. It is recommended that a listing of activities, products, services and environmental aspects and impacts first be developed and then examine legal and other requirements related to these, rather than first assessing the legal/other requirements and then coming up with a listing of environmental aspects and impacts.

Legal requirements:

Do environmental rules of the legal jurisdiction(s) in which the facility operates apply to the facility's activities, products and services, aspects and impacts?

- Federal statutes and regulations;
- State and local regulations;
- Standards in locations where the company sells products/services; and
- Permit conditions.

Other requirements might include, for example:

- Company-specific codes, and
- Other industry codes or programs to which the facility voluntarily subscribes

The facility's EMS should include a procedure for identifying, having access to, and analyzing applicable legal and other requirements. Appendix B provides a good starting list of Federal requirements to consider.

The first step will be to obtain information about applicable laws and regulations, their interpretation, and how they impact the operations. These tasks however can be very time-consuming. Fortunately, there are many methods to obtain information, including:

- Information from corporate headquarters;
- Commercial services (with updates offered on-line, on CD-ROM or in paper form);
- Regulatory agencies (federal, state and local);
- Trade groups/associations;
- The Internet;
- Public libraries;
- Seminars and courses;
- Newsletters / magazines;
- Consultants and attorneys; and
- Customers, vendors and other companies.

In order to consult and analyze these requirements on a regular basis, either obtain a physical copy of the requirements or have an alternative method to access them. Alternative methods of access could include a subscription to an electronic service that sends you updated regulatory information on a regular basis, Internet access, or any other method that allows such consultation.

Once the requirements that apply to the facility have been established, the environmental programs should identify what tasks need to be performed to ensure compliance with those requirements. There is a practical reason for such programs—the knowledge that a requirement exists is of little use unless it is translated into a specific action that can be assigned to an individual to accomplish.

Once applicable requirements have been identified and analyzed for potential impacts, communicate these requirements (and plans for complying with them) to employees, on-site contractors and others, as needed. Communicating “other applicable requirements” (as well as their impacts on the facility) is an important but often overlooked step. Communications programs are discussed in other sections of the document. As with many EMS elements, this is not a “one time” activity. Since legal and other requirements change over time, the process should ensure that information is up-to-date.

9 Possible Environmental Practices

In an effort to help facilities begin to reduce their environmental impacts, a list of environmental practice categories has been developed. Facilities should consider adopting these environmental practices as part of their Tier II EMS development.

1. Adopt water conservation activities
2. Adopt energy conservation activities

3. Adopt activities to reduce wastewater discharges
4. Adopt activities to reduce air emissions
5. Adopt activities to reduce odor
6. Adopt activities to reduce hazardous waste generation
7. Adopt activities to reduce solid waste generation
8. Adopt toxic materials reduction goals
9. Adopt additional pollution reduction activities (e.g. noise, land use, transportation, dust)

External Communication

In Tier I an internal communication plan was developed. In this tier develop an external communications plan. It is particularly important to communicate with the community in which you operate. Effective environmental management requires effective communications externally.

To reiterate the definition used in Tier I, external communication consists of written or electronic correspondence, complaints or regulatory inquiries about environmental practices. Telephone conversations and oral discussions or meetings (relating to facility environmental practices) with anyone not directly employed by the company (including regulatory agencies, environmental groups, and neighbors). This includes, soliciting, receiving, documenting and responding to external communications; and working with stakeholders.

External stakeholders are anyone who has an interest in the company's environmental performance. External stakeholders can play an important role in helping the facility develop an EMS. Customers, suppliers, and neighbors can provide useful input. In addition, establishing partnerships with trade associations, suppliers, professional associations, and community colleges can be very helpful in developing parts of the EMS.

Almost every organization will have a wide array of internal and external groups that may be interested in and helpful partners to that organization. These groups will not be homogenous. Each will have its own priorities and perspectives, and each will have something different to contribute in support of the EMS. Start with those stakeholders who have expressed interest in the operations. Find additional input by contacting the following sources in the effort to locate suitable stakeholders. Ask the facility's own employees, including facility/site managers and public relations personnel or contact local officials for suggestions. Contact local schools, community colleges, or universities; or contact a national advocacy group to elicit suggestions as to which local or national groups may be interested/suitable.

Forming partnerships with customers and suppliers can help to identify shared concerns and ways to cooperate to resolve them. There may be ways that the company can help

the customers meet their environmental management needs. Forming partnerships with suppliers can help the company obtain important information and may help meet the EMS goals.

The following list provides types of external stakeholders:

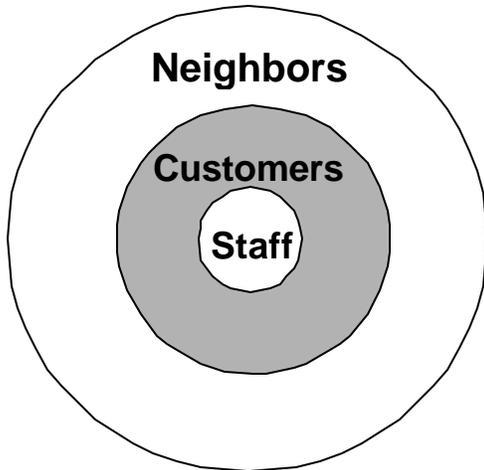
- Neighbors
- Community organizations
- Environmental Groups
- Larger Companies
- The Media
- Local government
- Regulator
- Shareholders
- Customers
- Suppliers
- Investors & Insurers
- Trading Partners
- Corporate HQ

The next stage of the process is to establish dialogue with stakeholders. This can be viewed as an opportunity to further refine the understanding of the various interests of the groups. Start by sharing the environmental policy statement with the public. Develop stakeholder participation in stages and learn along the way. Think about the different kinds of stakeholders as forming ever-broader circles around the business (Figure 5). Begin with the innermost circle and work outward.

Point of Contact

In dealing with and managing feedback from these external parties, each facility should also designate a point of contact who has direct access to facility management and who can effectively respond and react to an inquiry from the public. When any form of communication is received from the facility regarding environmental performance or management from an external party member, that communication should be immediately forwarded to the contact person. This individual will then consider the nature of the communication and make a decision on whether and how to respond to the communication.

Figure 5: Levels of Stakeholder Interest



Examples of methods for communicating externally are given below.

- Open houses
- Focus or advisory groups
- Web site or e-mail list
- Press releases
- Annual Reports
- Advertising
- Informal discussions
- Attending community meetings

This concludes Tier II – Environmental Achiever in the Environmental MAPS program. Facilities that have completed Tier II should now have an expanded EMS team, have conducted a gap analysis, identified and prioritized environmental aspects and impacts and developed an external communication plan. Tier II facilities should also have adopted five to nine of the recommended environmental practices from the provided list. Once a facility is comfortable that they have understood all the components of Tier II, that facility is encouraged to begin work on Tier III – Environmental Pioneer.

TIER III – ENVIRONMENTAL PIONEER

The groundwork for Tier III is laid out in Tiers I and II. Many of the activities that are incorporated in Tier III are built from components of Tiers I and II. Refer back to Tiers I and II as necessary. Since Tier III requires a complete “plan, do, check, act” model, it is suggested that the model environmental management system for meat and poultry processors developed in cooperation with USEPA be used as a reference. This model can be found on the Internet or contact the American Meat Institute for information on how to obtain a copy.

Setting Objectives and Targets

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

First the terms environmental objective and environment target will be defined. An environmental objective refers to an overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable. An environmental target refers to a detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives. Example of both objectives and targets is given in the Table 3 below.

Table 3: Comparing Objectives and Targets - Some Examples

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

In setting environmental objectives and targets, keep in mind not only the significant environmental aspects and the reduction of adverse impacts, (see Figure 6), but also:

- The environmental policy commitments;

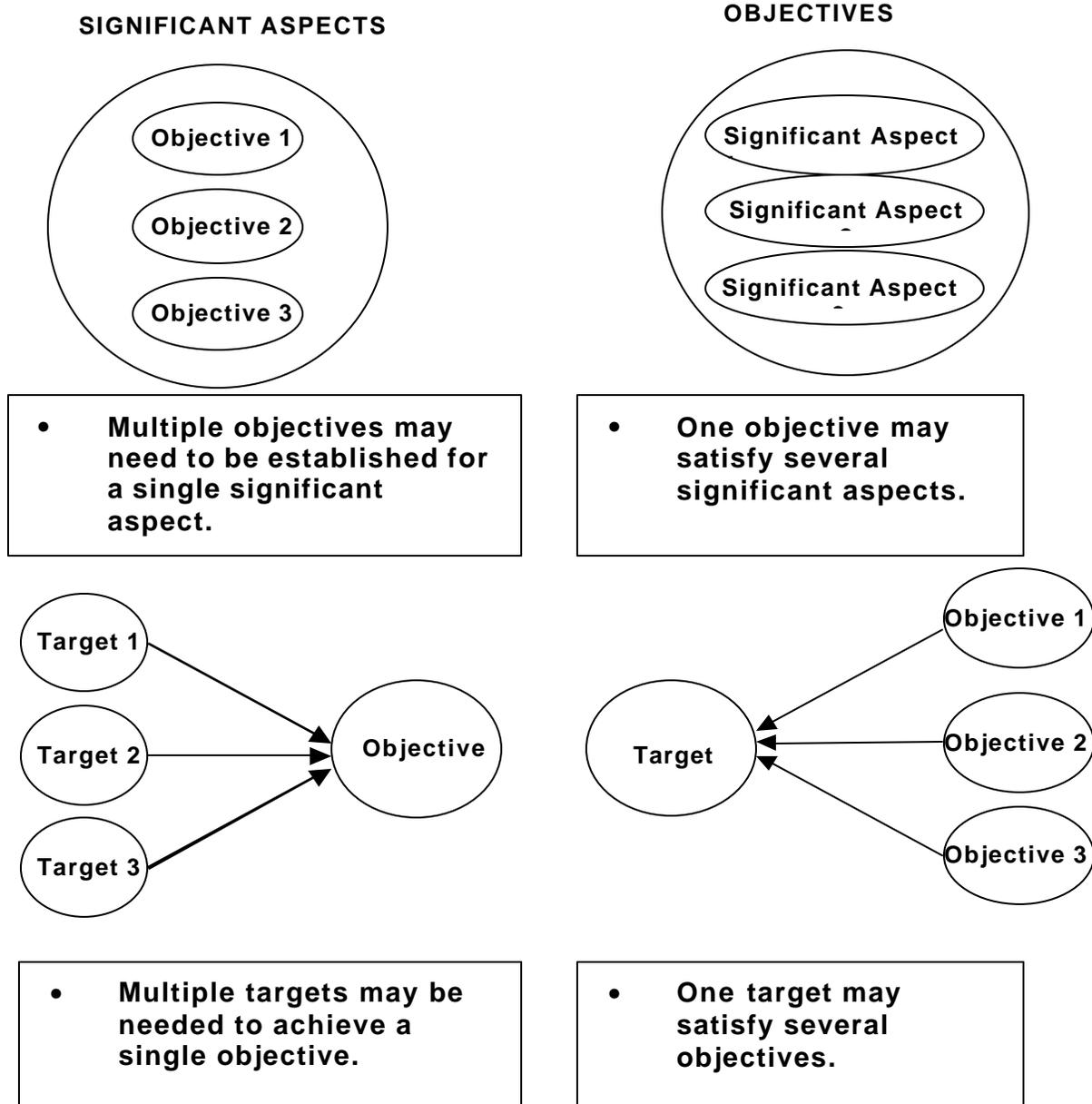
- Preventing non-compliance with applicable legal and other requirements;
- Performance commitments the facility has made and improving performance;
- Pollution prevention;
- Minimizing cross media pollutant transfers (for example reducing a waste-water impact only to increase a solid waste disposal issue);
- The views of interested parties;
- Technological options;
- Financial, operational; and other organizational considerations.

Not all of these factors will necessarily apply to a specific objective or target. Use judgment on a case-by-case basis. Begin by reviewing the facility's significant environmental aspects. In developing objectives and targets, it is important to gain an overview of the significant aspects at the facility, as these will be the main source for the objectives and targets.

The degree and complexity of objectives and targets developed for each of the significant aspects on the list will vary. Therefore, the next task is to establish a review process in which information is gathered and analyzed regarding the significant aspects in order to identify the ones for which more detailed objectives and targets will be developed. In reviewing the identified significant aspects for potential objective and target development, consider the feasibility of implementation. How feasible would it be to implement potential objectives and targets and management programs for the significant aspects? With consideration of the current operating procedures and their feasibility, determine the associated aspects for which objectives and targets will be developed and the associated aspects that will be monitored without creating formal objectives and targets.

Do not expect to develop one objective and target for each significant aspect. One aspect may have several objectives associated with it and likewise one objective may have a number of targets associated with it. (See Figure 6)

Figure 6: Significant Aspects and Objectives and Targets



As the objectives and targets become clearer, the next step is to decide what specific measurable indicators are to be used in gauging progress towards meeting them. For each target, identify a measurement for success (e.g., volume of waste produced or percent of water recycled, etc). These measurements should be:

- Simple and understandable;
- Objective;

- Verifiable;
- Linked to production; and
- Relevant to the objectives.

Targets should be sufficiently clear as to indicate if the objective was achieved. Objectives and targets should be documented and posted regularly. In addition, employees should be made aware of the objectives and targets that directly affect their work. It is recommended that this documentation be combined, with the corresponding management programs (See section on Management Programs) in a single document. It is important to keep in mind that the objectives and targets that have been determined only represent a first draft of the final objectives and targets. As a more thorough understanding of the resources that are needed for achieving the objectives and targets is determined, they objectives and targets may change. Keep in mind that the process of determining objectives and targets is an iterative one, and subject to change as progress in achieving improved environmental management is made.

Appendix K provides a template for linking aspects with objectives and targets.

Once the objectives and targets have been established and measurements towards progress set, the next task is to set up Management Programs (MPs) to implement these objectives and ensure achievement of the targets.

Management Programs (MPs)

The management program should be linked directly to the objectives and targets. The program should describe how the organization will translate its goals and policy commitments into concrete actions so that environmental objectives and targets are achieved. Operational controls and a plan for monitoring and measurement are also needed to ensure that the objectives and targets established are being met.

A Management Program (MP) translates goals of the organization into concrete actions that ensure objectives and targets are met. In addition, responsibilities are designated; the means and time for achieving goals is defined; progress is monitored and measured; and allows for adequate adjustment, changes, and acts based on reviews. The program brings the systems together.

To ensure its effectiveness, the management program should define:

- The responsibilities for achieving goals;
- The means for achieving goals; and
- The time frame for achieving those goals.

The management programs need not be detailed "how-to" manuals, but they should outline specific tasks and assignments of responsibility. It is not necessary that the programs be documented; however, it is recommended that written programs be prepared. Experience shows that it is difficult, if not impossible, to implement a management program consistently at a facility without a written program outline.

Keep in mind that the program should be a dynamic one. Consider modifying the program when, for example, objectives and targets are modified or added relevant legal requirements are introduced or changed; substantial progress in achieving the objectives and targets has been made (or has not been made); or the products, services, processes, or facilities change or other issues arise.

An outline for such a program might include:

- Objective;
- Target;
- Person(s) responsible;
- Budget;
- Date of expected completion;
- Date of actual completion; and
- Performance indicators for measurement.

The MP(s) need not be compiled into a single document. A "road map" to several action plans is an acceptable alternative, as long as the key responsibilities, tactical steps, resource needs, and schedules are defined adequately in these other documents. This program should not be developed in a vacuum — it should be coordinated or integrated with other organizational plans, strategies, and budgets. For example, if the facility is planning for a major expansion in one of the service operations, then it makes sense to look at the possible environmental issues associated with this operational expansion at the same time.

When preparing these plans, build on the plans and programs already in place for such issues as for compliance, health & safety, HACCP, or quality management. Involve the employees/colleagues early in establishing and carrying out the program. Clearly communicate the expectations and responsibilities defined in the program to those who need to know. In some cases, the management programs may encompass a number of existing operating procedures or work instructions for particular operations or activities. In other cases, new operating procedures or work instructions might be required to implement the program.

Re-evaluate the action plan when considering changes to the products, processes, facilities or materials. Make this re-evaluation part of the management process. Keep it

simple and focus on continual improvement of the program over time. A sample Management Program form can be found in Appendix L.

There may be more than one objective per target or vice versa, there may be several MPs for a single objective or a number of MPs may help to achieve a single objective or target. This is especially true in larger more complex organizations and those where management has decided to use a combination of enhancements to existing programs coupled with new programs to achieve the objectives and targets.

Organizations often do not have a formal procedure on how to develop MPs but rather use some subset of the guidance and hints noted in this section with a format for outlining the primary components of the MP. This allows the MPs to vary in level of detail as appropriate. Appendix L provides a simplified MP format.

Identify Environmental Tasks and Personnel

Before assigning roles, responsibilities, and authorities within the EMS, identify how each individual's job affects the environment. Conversely if it is determined that activities need to be performed which have not been assigned, the right people for the job will need to be assigned and possibly trained.

Take time to revisit and review the environmental aspects, legal requirements, objectives and targets, and management programs and identify required tasks and appropriate personnel for undertaking the tasks. The important point is that before assigning appropriate roles, responsibilities, and authorities for environmental activities, detailed understanding of these activities must first take place.

In fact, the process of the 3R's (roles, responsibilities, and resources) should be occurring at the same time as the objectives, targets, MPs, and operational controls are being developed. These functions cannot be conducted in isolation but typically occur in an iterative process as options are explored. Remember that when developing MPs consider responsibilities, means (resources) and time frame (which will depend on resources available).

Environmental Training Needs

Environmental performance among employees can be directly linked to environmental training. Training of employees about environmental management and the EMS is needed because every employee can have potential impacts on the environment; and any employee can have good ideas about how to improve environmental management efforts.

Each person and function within the facility can play a role in environmental management. For this reason, the training program should cast a wide net. Every

employee and manager should be aware of the environmental policy, the significant environmental impacts of their work activities, key EMS roles and responsibilities, procedures that apply to their work, and the importance of conformance with EMS requirements. Employees should also understand the potential consequences of not following EMS requirements (such as spills, releases, fines or other penalties).

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

Training Program

Effective training does not just happen - it must be planned and carried out consistently and correctly. Once the training requirements have been specified, the next step is to plan the training needed by employees at the facility. The first step in implementing the EMS training should be to develop a training plan. A training plan serves as a “procedure” that describes the way EMS training is managed at the facility.

Key Steps in Developing a Training Program

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

The first step in setting up a training program is to conduct a training/skills needs analysis. The goal of this needs analysis is to establish a clear understanding of who in the facility requires training, what type(s) of training they need, and the skill sets required. In assessing these needs, consider both general and specific needs (e.g., “What EMS procedures affect Joe’s daily work and what happens if they aren’t followed?” “What environmental impacts might Joe’s work cause?” “What broader understanding of environmental issues and our EMS does Joe need?”). The skill level can also be referred to as the competence level of the individual. See Appendix M for a sample training matrix.

Look at the training already being conducted for compliance with environmental, health, safety, and food safety regulations. Existing training efforts go a long way towards satisfying the requirements for the EMS. Competence might be established on the basis of regulatory-required training.

Establishing who requires EMS awareness training should be fairly simple, as everyone in the facility must have a very basic awareness of the EMS. Therefore, all personnel at the facility should receive EMS awareness training. The intensity and level of detail of awareness training may vary by type of position. The facility may wish to have a basic level of awareness training for all staff (perhaps as little as 15 to 30 minutes of general introductory training) to be followed by specific individual training, if appropriate.

To identify job-specific training needs, focus on identification of job titles or roles associated with:

- Any new procedures or needs related to significant environmental aspects;
- Those whose jobs and responsibilities involve activities directly related to achieving objectives and targets;
- Those whose jobs and responsibilities involve activities directly related to compliance with legal requirements;
- Ability to recognize new problems;
- Technical work needed to solve problems; and
- Assignments of responsibility within the EMS itself.

The following is a list of training resources to be considered:

- Internal trainers / experts;
- Consultants;
- Trade associations;
- Community colleges;
- Vendors / suppliers;
- EPA materials;
- State regulatory agencies;
- Customers;
- Technical associations;
- Self-study or study groups;
- Training consortia (teaming with other local companies); and
- Computer-based training.

Part of the EMS responsibility is to develop an approach to judge the competence of employees to accomplish their assigned tasks. For example, the required level of competency for the general workforce on the meat processing production line may be accomplished by ensuring they are capable of reading and understand the warning signs regarding waste diversion and wash down practices. Competency requirements for a line foreman might include an understanding of the need to limit wash down of debris into the sewer due to sewer use restrictions. This level of competency could be demonstrated as part of the training program and periodic training updates. Some firms use combined health, safety and environment meetings as an avenue to do 10-minute refresher talks on a variety of related topics. The greater the employee's level of responsibility for ensuring that the MPs are a success, the higher the level of training and competency that employee should have.

The overall goal for the training program is to produce knowledgeable, skilled, and aware employees who assist the facility in achieving its stated goals and objectives.

Structure and Responsibility

For an EMS to be effective, roles and responsibilities must be clearly defined and communicated. The commitment of all employees is needed for an EMS to live up to its full potential. This section discusses methods to consider in developing the structure of the EMS and how to define, document, and communicate roles, responsibilities, and authorities.

Roles are required for all personnel or departments who have an involvement with the EMS. Responsibility details what, when, and how the individual or department interacts with the EMS. These details provide the basis for auditing the "human" aspects of the EMS performance. Authority relates to who must and can (if permitted) make decisions. Authority includes general management and operational authority and includes corrective action and emergency authorities. All responsibilities should be linked to authorities and reporting structures.

Roles, responsibilities, and authority for tasks within the EMS need to be assigned. Document these in some way, and ensure that they are communicated to personnel. In this case, documented means written, but this does not necessarily mean a text description. There are a variety of ways in which roles, responsibilities, and authorities can be documented. Similarly, roles, responsibilities, and authorities can be communicated in a variety of ways.

Ways in which roles, responsibilities, and authorities in the EMS can be defined, documented, and communicated may include:

- Organizational charts
- Job descriptions and

- Procedures.

Organizational charts provide the best visual depiction of responsibility and roles. Job descriptions allow for the greatest level of details and procedures can be used to document them. It is helpful to define and describe environmental roles and responsibilities by integrating these with existing roles.

EMS Manual

An EMS Manual can be a very useful tool since it serves as a “road map” or description that summarizes how the pieces of the EMS fit together.

The size and complexity of the EMS documentation will depend on the particular facility. In general, summarizing the EMS elements will be an easier task at a small facility with very few significant environmental aspects than at a large facility or one with many significant aspects.

Other EMS Documentation

In addition to the EMS “Manual”, the facility should maintain other documentation of its EMS.

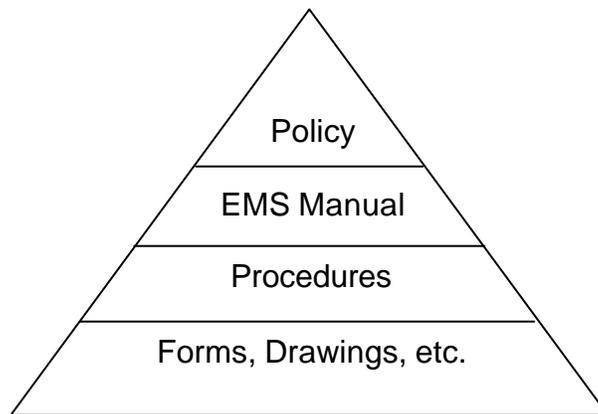
Document the processes used to meet the EMS criteria. (For example, “How do we identify environmental aspects?” “How do we implement corrective actions?”) This documentation generally takes the form of system procedures.

EMS procedures offer a place to document:

- Roles, responsibilities and required skills / training;
- Communication requirements; and
- Relationship with other elements (i.e. support, required input).
- In addition, you might maintain area or activity specific documentation (such as work instructions) that instructs employees on how to carry out certain operations or activities.

One way to think about the EMS documentation is to use Figure 7 below, which also can be applied to quality or other management system documents.

Figure 7: Hierarchy of EMS Documentation



In preparing EMS documentation determine how EMS documentation can be integrated into existing documents. Before you dive into the documentation, determine what documentation already exists, its purpose, and whether it works. The goal of this search is to locate materials that can be used to begin the EMS implementation and documentation. Many companies use the same format for all their documents. An example of existing documentation might be a quality plan or tracking reports.

Tailor the documentation to the facility's individual needs. You will probably have to compromise in producing documentation that meets the needs while also meeting the budget. Here are some questions to help you determine what fits the needs:

- Does the business operate in a single or multiple locations? This will affect who creates some of the documents and where they are located. It may also affect how many versions of a document might be necessary to cover different circumstances.
- What is the current computer capability? Many companies use an electronic system to maintain documents. This allows them to have only one "original" with all printed copies being dated when printed and also marked as a copy. This type of system can be customized to indicate to all users that any printed copy is either for immediate use or will expire within perhaps 14 days for the printed date.
- What security precautions do you need? As a computer system becomes larger and can be accessed by more people, electronic information can be edited and destroyed. Security, or at least restrictions on who can change data, may be a critical issue for many companies.

Determine a format for all documents. Before developing the EMS documents, plan the format (document and page appearance) for the documents to be created. If the

company has a standard, use it. If not, the need for EMS documentation provides an opportunity to create a standard company format. Consider margins, header, footer, typefaces, text, headings, etc. Include plans for bulleted and numbered lists, tables, and even paragraph spacing. Once you have a consistent format for documents, anyone who writes one will use the established electronic format and fill in the necessary text. All documents will look like part of an organized, integrated system. Most important, documents will be easier to read and understand.

Document Control

Document control means making sure that everyone who works with one of these tools has the right tools. People in the facility probably use various documents (procedures, work instructions, forms, drawings, etc.) as they perform their duties. To ensure that personnel are consistently performing their jobs in the right way, the facility must provide them with the proper tools. In the context of an EMS, the “tools” needed are correct and up-to-date procedures, instructions, and other documents. Without a mechanism to manage these EMS documents, the facility cannot be sure that people are working with the right tools.

Elements of document control include:

- Revision date/issue;
- Effective date;
- Approval (signature);
- Revision number;
- Document number;
- Copy number; and any
- Cross-references.

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

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

The procedure should designate responsibility and authority for preparing documents, making changes to them and keeping them up-to-date. In other words, make it clear who can actually generate and change documents and the process for doing so.

EMS Records

An EMS record is related to (but not the same as) an EMS document. An EMS document describes what the system consists of (i.e., what you do and how you do it), while EMS records demonstrate that you are doing what the documentation said you would do.

Records do not govern day-to-day operations. A wastewater discharge permit, for instance, would be considered a document because it describes the tasks (e.g., sampling, reporting, etc.) required for a facility to stay in compliance. However, the reports that a facility completes and sends to the regulatory agency, as required by the permit, are records because they are historical data that demonstrate that the facility is in compliance.

Typical records might include:

- Training records;
- Sampling and monitoring data;
- Calibration records;
- Permit and licenses;
- Job descriptions;
- Audit reports; and
- Management reviews.

Proper management of environmental records is important because such information demonstrates a facility's efforts to comply with environmental regulations and its actions to reduce its environmental impacts. Records also provide the necessary information required to track progress towards objectives and targets.

The identification and management of environmental records should include consideration of the following:

- To identify all appropriate EMS records at the facility, review the various elements of the EMS and determine what information is generated by each element, and what information represents critical parts of the design or performance of the EMS.
- For each element, ask the following key question - What environmental information do you need to manage effectively?

The EMS records should be properly identified so a determination can be made as to the kind of information that should be recorded, and the processes, functions, or procedures to which they relate. At a minimum, the records should include a name (or

title), the date the record was generated, and the name of the person generating the record. Other features might include a record identification number or a citation to a procedure or permit from which the records results.

A key factor in the collection of records is to have a responsible person or “owner” assigned to each record or type of record. In small facilities, one person may be responsible for all environmental records. At larger facilities, each type of EMS record may have a different owner for generation and collection. In developing an effective records maintenance system, incorporate procedures that cover proper record filing, storage, and access processes, and protect records from loss. The facility should also think about establishing retention times for the records and develop a disposition system (*i.e.*, procedures to manage the final fate of the records).

Examples of what organizations may find that, as a minimum they need to document and keep records of include the following:

- Environmental policy;
- The definition of the scope of the EMS;
- A record of who the members of the EMS core team /committee are, records of their skills and areas of expertise and training in EMS (if any) they have received;
- The current listing of activities, products and services,
- The entire list of identified associated aspects and impacts, and the method/procedure used for identification of these;
- Legal and other requirements;
- Permits, licenses and other approvals;
- Procedure for determination of significance and the basis upon which each aspect was deemed significant;
- The procedure by which objectives and targets were established and the current objectives and targets;
- Existing management programs including: method / means, responsibility, performance indicators, timeframe for the program and approval of the programs by senior management;
- Records of key communications;
- Management programs for the significant aspects (a brief outline description and notes on responsibilities, means and timeframes);
- Records of performance relative to specified monitoring and measurement requirements;
- Records of performance relative to objectives and targets;
- Brief summary descriptions of topics to be covered under required training programs;

- Training records of training courses given, successful completion and when reviews of training are next required;
- Defined processes for external communication and stakeholder involvement;
- Key EMS roles, responsibilities and resource assignments;
- Records of decisions that the core team has made;
- Records of key decisions made by the EMS representative / coordinator;
- A “roadmap” or summary description of how the core EMS documents are linked and interact with each other;
- Key contacts and processes to be followed in the event of an emergency;
- A record of the level of public access to the EMS the facility will be providing;
- Hazardous material spill / other incident reports;
- Monitoring of progress towards objectives and targets;
- How corrective and preventive action needs in general are identified and for those have been identified the means by which and confirmation that they have been resolved;
- Results of internal environmental compliance assessments and steps taken to resolve identified issues;
- Results of EMS assessments and steps taken to resolve identified issues; and
- Results of reviews of the EMS by senior management and resulting direction given for changes in the EMS.

This is not the “complete list” since the exact list and level of detail associated with many of the above items is something each facility will determine once its EMS is implemented and will modify as a part of continual improvement.

Monitoring and Measurement and Corrective and Preventive Action

Monitoring and Measurement

An organization should develop procedures for monitoring and measurement of its operations and activities that can have significant environmental impacts.

- Evaluate environmental performance;
- Analyze root causes of problems;
- Assess compliance with legal requirements;
- Identify areas requiring corrective action; and
- Improve performance and increase efficiency.

Monitoring helps manage the facility better. Monitoring and measuring can be a resource-intensive effort. One of the most important steps that can be taken is to

clearly define the needs. Start with a relatively simple monitoring and measurement process, then build on it as experience is gained with the EMS.

Most effective environmental measurement systems use a combination of process and outcome measures. Outcome measures look at results of a process or activity, such as the amount of waste generated or the number of spills that took place. Process measures look at “upstream” factors, such as the amount of paint used per unit of product or the number of employees trained on a topic. Select a combination of process and outcome measures that are right for the facility.

Measure progress on achieving objectives and targets on a regular basis and communicate the results of such measurement to top management and to staff. To measure progress in meeting objectives, select appropriate performance indicators. Performance indicators can help with understanding how well the EMS is working. Start by identifying a few performance indicators that are:

- Simple and understandable;
- Objective;
- Measurable; and
- Relevant to what the organization is trying to achieve (i.e., its objectives and targets).

Indicators of general environmental performance include some of the following:

- Number of spills per year;
- Amount of hazardous waste disposal;
- Amount of waste reduction;
- Number of legal non-compliance issues identified;
- Number of exceedances of regulatory standards;
- Number of incidents;
- Number of public complaints; and
- Number of fines and size.

See Appendix G for a monitoring and recording template.

Indicators for the management system include some of the following:

- Percentage of objectives and targets met on time;
- Number of closed corrective actions versus total number;
- Number of employee’s suggestions for improvement to environmental programs;
- Training recipients assessments of training delivered; and

- Number of non-conformances in internal EMS assessments.

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

An organization should also establish and maintain a documented procedure for periodically evaluating compliance with relevant environmental regulations. To achieve this, ensure that a documented environmental compliance audit procedure exists at the facility that at least describes the roles, responsibilities, authorities, and schedule for evaluating regulatory compliance at the facility. In some cases, corporate headquarters provides this service.

Internal EMS Assessment

Once the facility has established its EMS, verifying the implementation of the system will be critical. To identify and resolve EMS deficiencies you must actively seek them out. Periodic EMS assessments will help determine whether all of the requirements of the EMS are being carried out in the specified manner. See Appendix N for an internal assessment record template.

Assessment and review more often describes the status of item(s) being checked in general. Where they are done internally, the process can generate a statement of the status of programs. The term assessment is used here because at times either the determination of compliance status or EMS conformance will be typically done using internal resources that are often working in an advisory capacity at the same time.

An audit process is typically a more formal reporting process and is more often considered the appropriate term when a neutral third party conducts a review of the EMS for use as verification to enhance the transparency of the EMS for outside stakeholders (e.g. as part of a registration audit). When a neutral third party performs a check of environmental regulatory compliance then use of the term audit may also be appropriate.

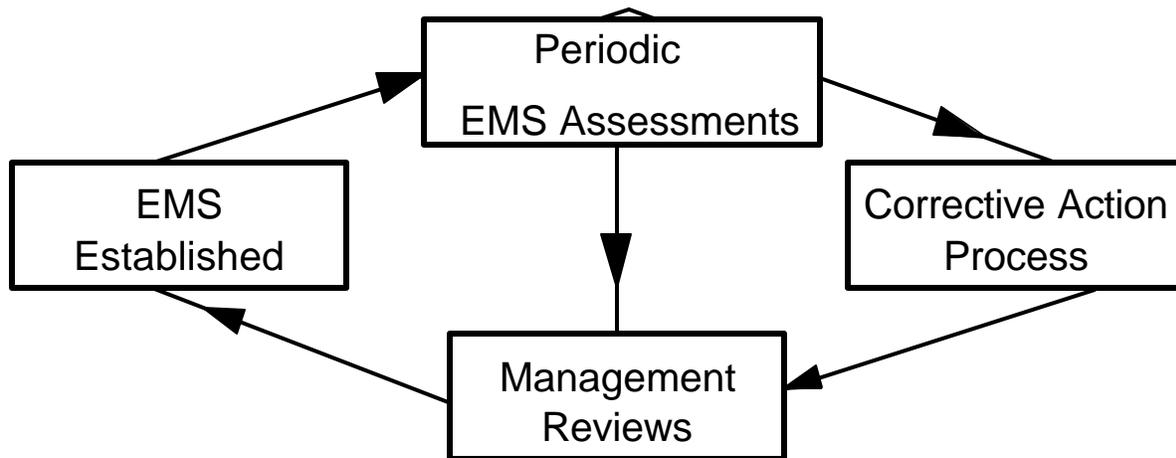
For the EMS assessment program to be effective, consider the following:

- Develop assessment procedures and protocols;
- Determine an appropriate assessment frequency;
- Select and train the auditors; and
- Maintain audit records.

An EMS assessment checks for conformance with the EMS as you have defined it. This may include the EMS model you aspire to (e.g. ISO 14001, Meat Processing EMS

Guide, Performance Track), the commitments (e.g. policy commitments), and/or the actual commitments you have made in the EMS procedures and documentation for environmental management (Note: ISO 14001 call these the 'planned arrangements').

Figure 8: Linkages Among EMS Audits, Corrective Action, and Management Review



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

- Maintain management focus on the environment;
- Improve the EMS and its performance; and
- Ensure the system's cost effectiveness.

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

A key part of the assessment is the specific protocol. It should be based on the "standard(s)" to which the facility subscribes. The checklist in Appendix B that was used for the Gap assessment of the facility at the start of the implementation could be used but may not provide enough useful information. This is because during the process of development of the EMS different or additional commitments may have been identified and whether those commitments were met will need to be determined. Feel free to add to the checklist to make it reflect the commitments and requirements set for the facility's EMS.

To determine an appropriate frequency of the EMS assessments, consider the following factors:

- The nature of the operations and activities;
- The significant environmental aspects / impacts;
- The results of the monitoring processes; and
- The results of previous assessments.

As a rule of thumb, all parts of the EMS should be assessed at least annually. The entire EMS can be assessed at one time or broken down into discrete elements for more frequent assessments.

EMS auditors/assessors should be selected and trained. Auditor training should be both initial and ongoing. Commercial EMS auditor training is available, but it might be more cost-effective to link up with businesses or other organizations in the area (perhaps through a trade association) to sponsor an auditor-training course. Some local community colleges also offer EMS auditor-training courses. Auditors should be trained in auditing techniques and management system concepts. Familiarity with environmental regulations, facility operations, and environmental science can be a big plus, and in some cases may be essential to adequately assess the EMS. Some auditor training can be obtained on-the-job. The facility's first few EMS audits can be considered part of auditor training, but make sure that an experienced auditor leads or takes part in those "training" audits.

The performance of an internal EMS assessment may serve to provide more than just an analysis of the state of the EMS. When conducted for internal purposes the auditors may be requested to suggest possible options for resolution of identified issues and overall improvement in the EMS.

Management can use EMS assessment results to identify trends or patterns in EMS deficiencies. The organization also should ensure that identified system gaps or deficiencies are corrected in a timely fashion and that corrective actions are documented. Keep in mind that an EMS assessment is a check on how well the system meets the own established EMS requirements. An EMS assessment does not normally include an analysis of how well employees do their jobs. Finally, assessments should be judged on the quality of findings, rather than on the number of findings.

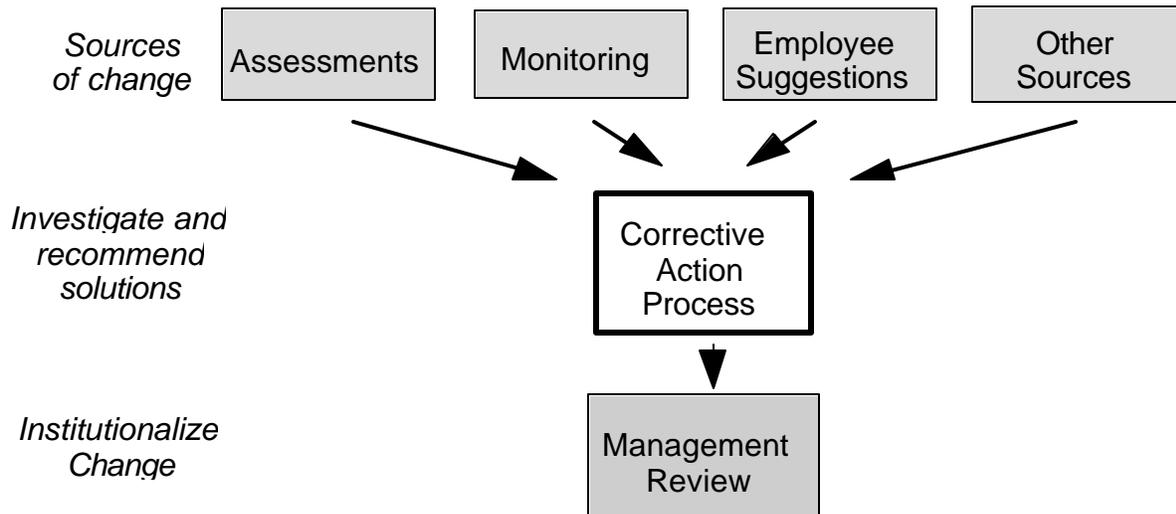
Appendix N provides a sample internal EMS assessment record.

Corrective and Preventive Action

In order for the audits, assessments and other inspections conducted as part of monitoring and measurement and the EMS assessments to have any value, the findings

of these audits and inspections must be addressed. Identified problems must be appropriately investigated and corrected.

Figure 9: Framework for Corrective Action Process



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

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

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

Key steps involved in taking corrective and preventive action are outlined below:

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

- Communicate solution; and
- Evaluate effectiveness of solution.

Corrective actions should:

- Resolve the immediate problem;
- Consider whether the same or similar problems exist elsewhere in the organization; and
- Prevent the problem from recurring.

The corrective action process also should define the responsibilities and schedules associated with these three steps. Appendix O provides a sample corrective action form.

Preventive Action

While corrective action is based on the results of internal feedback mechanisms, the scope of preventive action can go beyond internal sources. If the facility is affiliated with other similar firms via corporate ownership or industry affiliation, this is often a good source of lessons learned by others. When applied to the facility these can avoid undesirable consequences or improve efficiency. Some organizations conduct benchmarking exercises in general or if only in specific areas where they are aware they have a potential deficiency. The more proactive the preventative action component of the EMS the more likely the facility is to be or become a leader rather than a follower.

Continuous Improvement

The final steps in developing the EMS are to establish procedures for evaluation and assessment of the overall functioning of the EMS. Results of these evaluation processes are essential in beginning to plan for and modify the existing EMS structure in order to strive for continuous improvement.

Tools that can be used to evaluate the overall performance of the EMS include:

- Determining program measurement criteria;
- Setting up an internal assessment process; and
- Establishing a management review process.
- Measurement Criteria

Determining measurement criteria, also called environmental performance indicators, will help you evaluate the success of the overall EMS program. These performance indicators focus on how well the overall system for improving environmental management is functioning. Select performance indicators that will help you and the

facility's employees decide whether success has been achieved or whether improvement in procedures needs to be made.

Performance indicators for all of the various components of the EMS will be needed. The measurement criteria selected for each component of the EMS will probably be different. For example, measuring the success of communication, documentation, stakeholder outreach, or training programs will be different.

One approach is to measure the *activities*, for example, number of meetings held with stakeholders, number of documents created, number of employees trained, or number of hours of training. Activity, however, does not always mean results. Consider the objective of each EMS component and define a way to measure *results* so that you would feel satisfied that the objectives are achieved. Appendix P provides a sample template to help you organize evaluation of the EMS components using measurement criteria.

Some examples of EMS results measurement for various program components that can be tracked over time are:

- Number of environmental objectives and targets met;
- Percentage of employees completing environmental training;
- Average time for resolving corrective action;
- Number of non-conformances;
- Pounds of hazardous waste generated per unit of production; and
- Energy or water use per unit of production.

It is the results shown by these environmental performance indicators that will become the basis for the plans for next year and establishing continuous improvement.

Management Review

Management reviews are one key to continual improvement and for ensuring that the EMS will continue to meet the organization's needs over time. What is a management review? A management review is a strategic analysis of the EMS. The key question that a management review seeks to answer is: Do we have the *right* system—is this EMS appropriate for our particular organization with our specific activities, products, and services, and corresponding environmental aspects?

The specific goals of management review of an EMS will also vary based on the specific needs of an organization, but, in general, the overall goal is to determine if the EMS is functioning as intended. The facility's management review process should focus on answering the following questions:

- Are environmental risks being managed effectively?
- Are we complying with environmental regulations and will we continue to do so?
- Are we achieving improvement in environmental performance?

It is difficult to recommend a specific approach for EMS management review because the character of the management review process will be a function of the facility's organizational structure, management style, and overall culture.

Determine management review frequency that will work best for the facility. Some organizations combine these reviews with other meetings (such as director meetings). Other organizations hold "stand-alone" reviews. At a minimum, consider conducting management reviews at least once per year.

During management review meetings, make sure that someone records what issues were discussed, what decisions were made, and what action items were selected. Results of management reviews should be documented.

To facilitate the record-keeping process for management review meetings, consider the use of a form to help remember what to document for the review. The form should include the date of the meeting or discussion, attendees, items discussed and conclusions made, and action items assigned. See Appendix Q for a management review record template.

Management reviews should assess how changing circumstances might influence the suitability, effectiveness or adequacy of the EMS. Changing circumstances might be internal to the facility (such as new facilities, new raw materials, changes in products or services, new customers, etc.) or might be external factors (such as new laws, new scientific information or changes in adjacent land use). After documenting the action items arising from the management review, be sure that someone follows-up. Progress on action items should be tracked to completion.

As you assess potential changes to the EMS, consider other organizational plans and goals. In this way, environmental decision-making can be integrated into the overall management and strategy.

In conclusion, it is important to understand that management review is not something that is conducted once every six months or once a year during one meeting. It is an ongoing process by which top management is presented with data and other information about the progress and general condition of the EMS and decisions regarding future actions are made.

Educate a facility

A goal of the Environmental MAPS program is to increase EMS development and implementation throughout the meat and poultry industry, thereby achieving continual environmental improvement. The more information that can be disseminated about the Environmental MAPS program and the benefits of environmental management systems in general, the better off the meat and poultry industry and the environment will be. To that end, in Tier III each facility is asked (requirement for a Tier III award) to educate one other facility about the Environmental MAPS program.

This activity can be as simple as a memo with information on the MAPS program or can be as elaborate as a mentoring role in which a facility that has developed an EMS provides continuing support and advice to the other facility. Start this educational process by simply contacting a facility that has not yet begun to develop an EMS. Keep in mind companies that may not be members or companies that may not have the resources to attend informational meetings about environmental programs. It is not a requirement that the facility that is educated be outside the company, it can be another facility within the company.

This concludes Tier III – Environmental Pioneer in the Environmental MAPS program. Facilities that have completed Tier III should now have a complete working environmental management system. Should a facility desire to go that last extra mile, Tier IV is designed to make the facility an Environmental Star.

TIER IV- ENVIRONMENTAL STAR

The base for Tier IV is Tier III. The final goal of Tier IV is ISO 14001 certification. It is suggested that you review the materials on the ISO14000 Family of International Standards website (<http://www.iso.ch/iso/en/prods-services/otherpubs/iso14000/index.html>) then, go thru one to two cycles of external audits before attempting certification.

The International Standards Organization, a non-governmental organization, is a network of the national standards institutes of 147 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO 14001 Registration

Registration Accreditation Board (RAB) accredits registrars in the U.S. These registrars agree to codes of conduct and operate as commercial businesses. RAB certifies EMS auditors who have taken RAB Accredited Courses and have the required experience. Auditors working for Registrars audit EMS' and recommend registration to ISO 14001.

If you wish to pursue ISO 14001 registration, hire a registrar that understands the business and that you can work with. The auditor will review the EMS documentation and make two site visits to audit the EMS. If the auditor is satisfied with the conformance, they will recommend registration and a certificate will be issued by registrar. Every 6 or 12 months after that, the registrar will visit to re-audit the EMS or parts of it and once every three years the entire EMS must be audited.

This is the final tier in the Environmental MAPS program. Remember that environmental management systems are specialized programs designed to minimize the facility's environmental "footprint." Each facility is encouraged to continue to work toward continuous improvement, identifying alternatives, incorporating effective corrective action measures and managing all aspects of the facility's environmental impact.

APPENDICES

Appendix A: Additional Sources of Information and Contacts

(189)

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

Note: As ISO 14001 is a popular EMS standard there are a number of resources, which have based their assistance offerings on this standard. Also, this list is not intended to be comprehensive. Appearance on this list should not be construed as an endorsement of any products/service.

FEDERAL AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
<i>US Environmental Protection Agency</i>	Sustainable Industries Partnership Program	http://www.epa.gov/sustainableindustry/	Website contains information on the Sustainable Industries Partnership Program and Sector based EMS.
	Small Business Compliance Assistance Centers:	1-202-564-7066 (General information)	Centers are Internet Web Sites with comprehensive environmental compliance, technical assistance, & pollution prevention information for various industry sectors.

FEDERAL AGENCIES

Design for Environment Guide, Fact Sheets and DFE EMS Template	http://www.epa.gov/opptintr/dfe/tools/ems/ems.htm	Website contains information on EMS and how to incorporate DFE into an EMS. Provides a how-to manual for implementing a DFE-based EMS and a set of integration tools for companies that already have an EMS.
Small Business Compliance Policy	1-202-564-7072 http://www.epa.gov/oeca/smbusi.html	Effective May 11, 2000, this policy supercedes the June 1996 version. Published in the Federal Register on April 11, 2000 (65FR19630).
Compliance-Focused EMS – Enforcement Agreement Guidance	http://es.epa.gov/oeca/oceft/neic/12elemnr.pdf	Presents the key elements of a compliance focused EMS model.
Environmental Compliance Auditing Protocols	EPA National Service Center 1-800-490-9198 http://www.epa.gov/oeca/ccsmd/profile.html	These protocols are intended to guide regulated entities in the conduct of compliance audits and to ensure that audits are conducted in a thorough manner.
Code of Environmental Management Principles	http://www.epa.gov/oeca/cemp/cemptoc.html	Collection of five broad principles and performance

FEDERAL AGENCIES

		objectives that provide a basis for environmental management among Federal agencies.
Pollution Prevention Clearinghouse	1-202-260-1023	Technical Information on materials and processes, including publications related to waste minimization and pollution prevention.
Office of Wastewater	http://www.epa.gov/owm/iso2/htm	Provides information on
Public Information Center	1-202-260-7751	General information about EPA programs.
RCRA / Superfund Hotline	1-800-424-9346 1-202-382-3000	Provides information about hazardous waste regulations and handles requests for federal documents and laws.
Small Business and Asbestos Ombudsman	1-800-368-5888 1-202-557-1938	Information and advice on compliance issues for small quantity generators of hazardous waste.
Technology Transfer and	1-513-569-7562	Access to the ORD research

FEDERAL AGENCIES

	Support Division		information and publications.
	TSCA Hotline	1-202-554-1404	Assistance and guidance on TSCA regulations.
	Enviro\$en\$e	http://es.inel.gov	Solvent alternatives, international, federal and state programs, other research and development. Also, environmental profiles of various industrial categories.
	US EPA Home Page	http://www.epa.gov	Information about EPA regulations, initiatives, and links to the home pages of other agencies and EPA regional offices.
	US EPA EMS Home Page	http://www.epa.gov/ems/	Information about EPA's efforts to develop policies and related materials about environmental management systems (EMS). Note: this site plans to list state programs for EMS and nonprofit TAPS.
U.S. Small Business	SBA Answer Desk	1-800-8-ASK-SBA	Information about SBA programs, and telephone

FEDERAL AGENCIES

Administration

numbers for local offices.

SBA Home Page

<http://www.sbaonline.sba.gov>

Information about business services available to the organization, with links to other related sites.

Government Printing Office

GPO Superintendent of Documents

1-202-512-1800

Information about available documents and instructions on ordering GPO publications.

US Department of Energy

Pollution Prevention Information Clearinghouse

<http://epic.er.doe.gov/epic/>

Pollution prevention and environmental design information.

STATE AGENCIES

Organization

Resource

Telephone Number / Internet Address

Description

STATE AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
<i>State Environmental Protection Agencies</i>	Environmental Assistance Programs	Contact the state's Environmental Protection Agency	Many state environmental protection agencies provide publications, technical assistance, and information on pollution prevention technologies, waste reduction, and regulatory compliance, at little or no charge.
	Small Business Assistance Programs (Mandated under Title V of the Federal Clean Air Act).	Call the EPA Small Business Ombudsman (1-800-368-5888) for the phone number and address of the Small Business Assistance Program in the state.	Provides information and technical assistance to small businesses regulated under the Clean Air Act. Several states, including Texas and Virginia have established "EnviroMentor" programs with their Small Business Assistance offices, to help small companies comply with regulations.

STATE AGENCIES

Organization	Resource	Telephone Number / Internet Address	Description
	State and Local Pollution Prevention Programs	Contact the National Pollution Prevention Roundtable (1-202-466-7272) for the phone number and address of the pollution prevention program in the state. http://www.epa.gov/opptintr/p2home/resources/statep2.htm	Provides information and technical assistance on pollution prevention. Provides state-by-state information on agencies and organizations offering pollution prevention assistance.
Iowa Waste Reduction Assistance Program	Iowa Department of Natural Resources	502 E. 9 th Street Des Moines, IA 50319-0034 Phone: 1-515-281-6275 Fax: 1-515-281-8895	The WRAP is a non-regulatory, voluntary initiative designed to assist in source reduction and recycling for Iowa businesses and public institutions.

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

NON-PROFIT ORGANIZATIONS

Organization	Address	Phone Number	Description
Industrial Technology Institute (ITI)	2901 Hubbard Road P.O. Box 1485 Ann Arbor, Michigan 48106-1485	1-800-292-4484 Fax:1-313-769-4064	Technical assistance to small and mid-sized manufacturers. Energy, environment, and manufacturing assessments, as well as performance benchmarking, and QS 9000 and ISO 14000 implementation assistance.
Manufacturing Extension Partnership (MEP)	Building 301, Room C121 National Institute of Standards and Technology Gaithersburg, Maryland 20899-0001	1-301-975-5020 1-800-MEP-4MFG Fax:1-301-963-6556	Assists manufacturers with assessing technological needs, and works to help small manufacturers solve environmental problems with cost-effective solutions.
Iowa Waste Reduction Center	University of Northern Iowa 1005 Technology Parkway Cedar Falls, IA 50613-6951	1-319-273-8905 1-800-422-3109	Helps small businesses comply with federal and state environmental regulations, by incorporating on site reviews, applied research, and hands-on training into is free, confidential assistance program.

INTERNET RESOURCES

Resource	Internet Address	Description
ANSI Online	http://www.ansi.org	Contains information related to the American National Standards
Canadian Standards Association	http://www.csa.ca/isotcs	A center for information and services related to ISO 9000 and ISO 14000,
Clean Technologies Center (UCLA)	http://cct.seas.ucla.edu	Innovative technologies
Consortium on Green Design and Manufacturing (UIC)- Industrial Technology Institute Home Page	http://euler.berkeley.edu/green/cgd http://www.iti.org	Environmental design and Information about ITI, how to find environmental information on the Internet, and links to other organizations.
International Network for Environmental Management	http://www.inem.org/	Case studies, publications and how-to information on environmental management. Interactive
ISO 14000 Information Center	http://www.iso14000.com	Answers to questions on ISO 14000 standards.
ISO 14000 Integrated Solutions (ANSI/GETF)	http://www.gnet.org	Will provide training, conferencing, on-line information, seminars, and

INTERNET RESOURCES

Resource	Internet Address	Description
Multi-State Working Group	http://www.mswg.org/	information services and publications on a fee basis. Describes the activities of this group regarding EMS and ISO 14001.

Appendix B: Environmental Requirements Checklist

The Checklist is given to help facilities identify the major federal, state, tribal, and local environmental requirements applicable at their facilities. The Checklist is not intended to be an exhaustive list of all environmental requirements that may be applicable at an individual facility.

Air Pollution Regulations

Check All
That Apply

- | | |
|---|---|
| 1. National Emission Standards for Hazardous Air Pollutants (40 CFR 61) | ? |
| 2. Permits and Registration of Air Pollution Sources | ? |
| 3. General Emission Standards, Prohibitions and Restrictions | ? |
| 4. Control of Incinerators | ? |
| 5. Process Industry Emission Standards | ? |
| 6. Control of Fuel Burning Equipment | ? |
| 7. Control of VOCs | ? |
| 8. Sampling, Testing and Reporting | ? |
| 9. Visible Emissions Standards | ? |
| 10. Control of Fugitive Dust | ? |
| 11. Toxic Air Pollutants Control | ? |
| 12. Vehicle Emissions Inspections and Testing | ? |

Other Federal, State, Tribal or Local Air Pollution Regulations Not Listed Above (identify)

- | | |
|-----------|---|
| 13. _____ | ? |
| 14. _____ | ? |

Hazardous Waste Management Regulations

- | | |
|---|---|
| 1. Identification and Listing of Hazardous Waste (40 CFR 261) | |
| - Characteristic Waste | ? |
| - Listed Waste | ? |

- 2. Standards Applicable to Generators of Hazardous Waste (40 CFR 262)
 - Generator Status Identification ?
 - Manifesting
 - Pre-transport requirements ?
 - Record keeping/reporting ?
- 3. Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)
 - Transfer facility requirements ?
 - Manifest system and record-keeping ?
 - Hazardous waste discharges ?
- 4. Standards for Owners and Operators of TSD Facilities (40 CFR 264)
 - General facility standards ?
 - Preparedness and prevention ?
 - Contingency plan and emergency procedures ?
 - Manifest system, Record keeping and reporting ?
 - Groundwater protection ?
 - Financial requirements ?
 - Use and management of containers ?
 - Tanks ?
 - Waste piles ?
 - Land treatment ?
 - Incinerators ?
- 5. Interim Status Standards for TSD Owners and Operators (40 CFR 265) ?
- 6. Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities (40 CFR 267) ?
- 7. Administered Permit Program (Part B) (40 CFR 270) ?

Other Federal, State, Tribal or Local Hazardous Waste Management Regulations Not Listed Above (identify)

- 8. _____ ?

9. _____ ?

Hazardous Materials Management

- 1. Control of Pollution by Oil and Hazardous Substances (33 CFR 153) ?
- 2. Designation of Reportable Quantities and Notification of Hazardous Materials Spill (40 CFR 302) ?
- 3. Hazardous Materials Transportation Regulations (49 CFR 172-173) ?
- 4. Worker Right-to-Know Regulations (29 CFR 1910.1200) ?
- 5. Community Right-to-Know Regulations (40 CFR 350-372) ?

Other Federal, State, Tribal or Local Hazardous Materials Management Regulations Not Listed Above (identify)

- 6. _____ ?
- 7. _____ ?

Solid Waste Management

- 1. Criteria for Classification of Solid Waste Disposal Facilities and Practices (40 CFR 257) ?
- 2. Permit Requirements for Solid Waste Disposal Facilities ?
- 3. Installation of Systems of Refuse Disposal ?
- 4. Solid Waste Storage and Removal Requirements ?
- 5. Disposal Requirements for Special Wastes ?

Other Federal, State, Tribal or Local Solid Waste Management Regulations Not Listed Above (identify)

- 6. _____ ?
- 7. _____ ?

Water Pollution Control Requirements

1. Oil Spill Prevention Control and Countermeasures (SPCC) (40 CFR 112) ?
2. Designation of Hazardous Substances (40 CFR 116) ?
3. Determination of Reportable Quantities for Hazardous Substances (40 CFR 117) ?
4. NPDES Permit Requirements (40 CFR 122) ?
5. Toxic Pollutant Effluent Standards (40 CFR 129) ?
6. General Pretreatment Regulations for Existing and New Sources (40 CFR 403) ?
7. Meat Products Point Source Category Effluent Guidelines and Standards (40 CFR 432) ?
8. Water Quality Standards ?
9. Effluent Limitations for Direct Dischargers ?
10. Permit Monitoring/Reporting Requirements ?
11. Classifications and Certifications of Operators and Superintendents of Industrial Wastewater Facility ?
12. Collection, Handling, Processing of Sewage Sludge ?
13. Oil Discharge Containment, Control and Cleanup ?
14. Standards Applicable to Indirect Discharges (Pretreatment) ?

Other Federal, State, Tribal or Local Water Pollution Control Regulations Not Listed Above (identify)

15. _____ ?
16. _____ ?

Drinking Water Regulations

1. Underground Injection and Control Regulations, Criteria and Standards (40 CFR 144, 146) ?
2. National Primary Drinking Water Standards (40 CFR 141) ?
3. Community Water Systems, Monitoring and Reporting Requirements (40 CFR 141) ?
4. Permit Requirements for Appropriation/Use of Water from Surface or Subsurface Sources ?
5. Underground Injection Control Requirements ?

6. Monitoring, Reporting and Record keeping Requirements for Community Water Systems ?

Other Federal, State, Tribal or Local Drinking Water Regulations Not Listed Above (identify)

7. _____ ?
8. _____ ?

Toxic Substances

1. Manufacture and Import of Chemicals, Record keeping and Reporting Requirements (40 CFR 704) ?
2. Import and Export of Chemicals (40 CFR 707) ?
3. Chemical Substances Inventory Reporting Requirements (40 CFR 710) ?
4. Chemical Information Rules (40 CFR 712) ?
5. Health and Safety Data Reporting (40 CFR 716) ?
6. Pre-Manufacture Notifications (40 CFR 720) ?
7. PCB Distribution Use, Storage and Disposal (40 CFR 761) ?
8. Asbestos (40 CFR 61 and 29 CFR 1910) ?
9. Lead (40 CFR 141 and 29 CFR 1910) ?
10. Regulations on Use of Fully Halogenated Chlorofluoroalkanes (40 CFR 762) ?
11. Storage and Disposal of Waste Material Containing TCDD (40 CFR 775) ?

Other Federal, State, Tribal or Local Toxic Substances Regulations Not Listed Above (identify)

12. _____ ?
13. _____ ?

Pesticide Regulations

1. FIFRA Pesticide Use Classification (40 CFR 162) ?

- 2. Procedures for Disposal and Storage of Pesticides and Containers (40 CFR 165) ?
- 3. Certification of Pesticide Applications (40 CFR 171) ?
- 4. Pesticide Licensing Requirements ?
- 5. Labeling of Pesticides (40 CFR 156) ?
- 6. Pesticide Sales, Permits, Records, Application and Disposal Requirements ?
- 7. Disposal of Pesticide Containers ?
- 8. Restricted Use and Prohibited Pesticides ?

Other Federal, State, Tribal or Local Pesticides Regulations Not Listed Above (identify)

- 9. _____ ?
- 10. _____ ?

Environmental Clean-Up, Restoration, Corrective Action

- 1. Comprehensive Environmental Response, Compensation and Liability Act (Superfund) (identify section)
 - _____ ?
 - _____ ?
- 2. RCRA Corrective Action (identify section)
 - _____ ?
 - _____ ?

Other Federal, State, Tribal or Local Environmental Clean-Up, Restoration, Corrective Action Regulations Not Listed Above (identify)

- 3. _____ ?
- 4. _____ ?

Appendix C: Sample operations and maintenance plan

Environmental Standard Operating Procedures Manual Incomplete List (Must Adapt to Your Facility)

Table of Contents

Basic Environmental Procedures (Incomplete)

- SOP - Role and Responsibility of Facility Environmental Coordinators & Plant Managers
- SOP - Identification of Legal and Other Environmental Requirements
- SOP - Environmental Permits and Licenses
- SOP - Training Responsibility for SOPs

Administrative Procedures (Incomplete)

- SOP – Checklist for Internal Auditing
- SOP – Required Environmental Review of AFEs and Construction or Maintenance Projects
- SOP - How to Respond to Governmental Inspections, Warrants, and Information Requests
- SOP - Required Filing Procedures for Environmental Documents
- SOP - Satisfying Environmental Permit Requirements Associated with Plant Equipment Changes
- SOP - Reporting Releases from Ammonia Refrigeration Systems
- SOP - Facility Response to Audit Report Findings

Plant Operational Procedures (Incomplete)

- SOP - Operation of Wastewater Treatment Systems
- SOP - Collection and Reporting of Wastewater Operations and Effluent Data
- SOP - Management of Wastewater Byproducts and Sludge
- SOP - Compliance with Permit Limits on Plant Stack Emissions
- SOP - Satisfying Environmental Regulatory Requirements Associated with Refrigeration Systems
- SOP - Maintaining Compliance with Drinking Water Requirements
- SOP - Water Conservation and Wastewater Plumbing for Plant Operations
- SOP - Grounds Maintenance and Stormwater Runoff Control
- SOP - Handling Spills to Soil or Water
- SOP - Refrigerator Truck Trailer Refueling and Inspection
- SOP - Management of Used Oil
- SOP - Management of Hazardous Wastes
- SOP - Management of Paints and Associated Supplies
- SOP - Cleaning and Recycling of Drums

SOP 1 Grounds Maintenance and Stormwater Runoff Control

Introduction: Each rain or snow event produces stormwater that flows across plant property. The stormwater tends to wash away animal waste, blood, spilled oil, and spilled ingredients from the roadways, grounds, and roof tops of the plant. The stormwater becomes polluted water and typically drains to streams and rivers in the community.

ABC Foods facilities operate under government rules. The plants have stormwater permits which require us to keep our stormwater as clean as possible. By keeping our plant grounds, roadways, and rooftops as clean as possible we will be keeping our stormwater as clean as possible.

Responsible Personnel: grounds staff and supervisors; maintenance staff and supervisors; hog receiving staff and supervisors; rendering staff and supervisors; area supervisors and staff with outdoor responsibilities; the plant environmental coordinator; and the plant manager/assistant manager - All share the daily duties of keeping the property clean and keeping the stormwater runoff as clean as possible.

The plant manager is responsible for maintaining plant grounds and property in an orderly and clean manner.

The plant Environmental coordinator assists the plant manager with monitoring compliance with stormwater management issues and compliance with the plant's stormwater pollution prevention plan.

The plant manager and environmental coordinator assign and oversee a group of facility staff ("the grounds team") who work with or manage the various outdoors plant activities. The team maintains orderly and clean plant grounds as part of their daily duties.

Identify members of the grounds team

Provide training on grounds maintenance issues

The grounds team is aware of the sources of stormwater runoff and works as a team to keep these sources clean and under control.

Items outside of the plant building that can pollute stormwater include all of the following:

Accumulated trash and leaking dumpsters;

Drips/spills/leaks of blood, fats and oils, fuel, ingredient, and supplies from any container, tank, piping, storage pile, or truck;

Animal wastes;

Soil tracks and other materials tracked into the plant from trucks and other vehicles;

Erosion of soil;

Grass cuttings/lawn waste/lawn chemicals;

Stored materials and supplies;

Parked or stored equipment and vehicles;

Consider also exhaust dust, vent sprays, or other materials on the roofs of buildings; oil or blood dripping from parked trailers; items that can drop or spill from trucks from loading or unloading operations; trash or drips from cars on plant and employee parking lots; and materials washed from neighbor's property.

The grounds team maintains protective storage of outdoor materials

a. The plant has certain protections in place to keep materials stored outdoors from polluting storm water. Use good housekeeping practices to maintain these items:

Close lids

Place covers/roofs over items stored outside

Maintain catch basins/curbs/secondary containment around tanks

Drain stormwater from secondary containment as soon as practical after a rain event

Use curbs to protect storm drains from process wastewater

The grounds team protect stormwater runoff from process wastewater

a. Certain outdoor areas of the plant (such as animal receiving areas) may have separate drains that route potentially polluted stormwater directly to plant wastewater drains for flow to the waste water treatment system. Work with the plant environmental coordinator to identify these drains and keep them isolated from other plant stormwater runoff that flows directly to rivers and streams.

The grounds team prevents spill or leaks in all loading and unloading operations.

a. Use the following good work practices.

A plant staff member must observe or participate in any outdoor loading/unloading activity at the plant

Catch any drips and clean up any spills

Use dry cleanup methods (such as use of shovels or brooms) as a first cleanup step.

Only use a water hose as an optional final step after completing a thorough dry cleanup.

Block storm drains when unloading liquids/materials in the flow area of a storm drain

The grounds team inspects the facility, fixes problems, and is prepared to clean up outdoor spills.

a. The plant manager and environmental coordinator develop a schedule and assignments to inspect all outdoor areas on at least a daily basis.

Inspect all outdoor areas including potential leak and spill sites.

Look for potential problems and fix them.

b. With a constant high level of activity around the plant, constant awareness is needed to maintain clean grounds. Be aware when:

Trucks are moved

Materials are unloaded

Team awareness is essential to keep the grounds clean at all times.

- c. Maintain in convenient locations adequate supplies of clean-up equipment and materials so that any spill can be promptly cleaned.
Prompt cleanup is the rule !

The grounds team maintains compliance with facility Stormwater Pollution Prevention Plan (SWP3) which is administered by the facility environmental coordinator.

- a. The program specifically requires:

A formal plan of stormwater management actions

Training of appropriate staff

Inspections and records of inspections

- b. Read the stormwater plan and work with the plant environmental coordinator to meet all requirements of the plan.

SOP 2 Compliance with Permit Limits on Plant Stack Emissions

Introduction: State and Federal regulations require permits for the operation and construction of equipment with emissions to the atmosphere. Within the permits are emission limits, operating limits, monitoring, record keeping, and reporting requirements. This procedure establishes the protocol to develop a system to demonstrate compliance with the permit requirements.

Responsible Personnel: maintenance supervisors, environmental coordinators, plant engineers, and plant managers

The plant environmental coordinator will identify all operating and construction permit conditions for each covered emission unit.

The plant environmental coordinator will develop a compliance demonstration plan for each emission limit. See the example in Attachment 2.

Develop a monitoring procedure.

Develop a record keeping and reporting procedure.

The plant environmental coordinator will identify responsible persons for implementing each aspect of each compliance demonstration plan.

Twice each year, the plant environmental coordinator will review each compliance demonstration plan and documentation.

EXAMPLE

Compliance Demonstration Plan

Person Responsible: _____

Boiler XX:

SO₂ limit of 0.1 lb/hr

Monitoring Procedure:

Use a parametric monitoring procedure to demonstrate the SO₂ emissions are less than the limit.

Obtain distillate fuel sulfur content for each delivery of fuel.

Obtain natural gas sulfur content from the natural gas company.

Calculate the emission rate for each change in sulfur content.

Record keeping:

Maintain on file for a period of 5 years:

Record the time of operation on natural gas and on distillate fuel.

Maintain a record of the sulfur content and emission calculations.

Reporting:

Use the monitoring data to complete the annual emission inventory, annual compliance certification, and any other items required by the regulatory agency.

Appendix D: Sample List of Potential Incidents

Sample List of Potential Incidents

Situation	Potential for Occurrence
Adjacent Facility	Chemical release could occur at a nearby chemical plant. Several hazardous gases are processed there. A release occurred in 2001.
Railroad Incident	An incident could be generated by materials being transported by the plant on railroad tracks at the plant's property boundary.
Release of Ammonia	Over 30,000 lbs. of ammonia are utilized as part of the facility's refrigeration system throughout the plant. Two releases have occurred in the last 5 years.
Release of Chlorine	Up to 4000 lbs. of chlorine are used for water and wastewater treatment at the site.
Asbestos Release	No known asbestos at the site.
Bomb Threat	There has been one bomb threat in the last 5 years. The ammonia system and fuel storage tanks at the site are potential concerns.
Earthquake	There is no history of earthquakes for this area.
Fire/Explosion	Chemicals stored on site are potentially flammable or explosive.
Flooding	The facility is located near a river and has been subject to flooding twice in the last 20 years.
Fuel Oil Spill	Over 25,000 gallons are stored on site in several tanks.
Hurricane	Plant is located in a coastal area. A hurricane passed through the area in 1996.
Natural Gas Leak	Natural gas is used for boiler fuel and for equipment within the plant with gas lines throughout the facility.
PCB Release	Utility owned transformer at the site contains PCB's.
Off-Site Transportation Incident	Rendered grease is transported off-site to customers north of the facility.
Snow Storm/Blizzard	Plant is in a southern location not subject to snow.
Tornado	Possible - some have been reported in the vicinity in the past.
Power Loss	Electricity supply could be lost, shutting down equipment without notice. There is no back up system at the plant.

Attachment A

Appendix E: Environmental Regulations and Situations Requiring Response Plans

- OSHA – Emergency Action Plan – 29 CFR 1910.38(a)
- OSHA – Fire Prevention Plan – 29 CFR 1919.38(b)
- OSHA – Hazardous Waste Operations and Emergency Response (HAZWOPER) – 29 CFR 1910.120
- Emergency Planning and Community Right-to-Know Act (EPCRA) – 40 CFR 355.30; 355.40
- RCRA – Hazardous Waste Contingency Plan – 40 CFR 265.50
- RCRA Preparedness and Prevention Requirements – 40 CFR 265.30
- RCRA General Facility Standards – 40 CFR 262; 265
- Clean Water Act (CWA) – Spill Prevention, Control, and Countermeasures (SPCC) Plan – 40 CFR 112
- Superfund Amendments and Reauthorization Act of 1986 (SARA) Hazardous Chemical Inventory Reporting – 40 CFR 370
- CWA Spill Reporting – 40 CFR 110; 117
- CERCLA Spill Reporting – 40 CFR 302
- CWA Best Management Practices (BMP's) – 40 CFR 125
- Hurricanes/Tornadoes/Severe Weather – Local or Internal Requirements
- Floods – Local or Internal Requirements
- Loss of Utility(s) – Local or Internal Requirements

Appendix F: Emergency Preparedness and Response Review and Test Report

Emergency Preparedness and Response Review and Test Report

Complete This Section for Reviews

1. Plan Reviewed:	_____
2. Individual(s) Providing Review:	_____ _____
3. Date of Review:	_____
4. Section(s) of Plan Requiring Revision (attach comments on a separate sheet):	_____
5. Date(s) Revisions Were Completed for Each Section:	
Section	_____
Date Completed	_____

Complete This Section for Tests/Drills

1. Test Coordinated By:	_____
2. Date and Time:	_____
3. Plan and Sections Tested:	_____
4. Description of Test (attach additional sheet as necessary):	_____
5. Results of Test (attach additional sheet as necessary):	_____

6. Were Revisions to the Plan Necessary? _____ YES ___ NO

7. Describe Revisions (attach additional sheet as necessary): _____

Form Completed By: _____ Name _____ Signature

_____ Date

Attachment C

Appendix G: Monitoring and Recording Template

<i>Time Period</i>	Q1	Q2	Q3	Q4	<i>TOTAL</i>
PLANT ENVIRONMENTAL METRICS					YTD
A. Environmental Training (% of employees)					
1. Executive Staff					
2. Plant Management					
3. Supervision					
4. Hourly employees					
5. New hires					
6. Number of employees					
B. TRI release data					
1. Ammonia purchases (lbs. NH ₃)					
a. Ammonia projects (lbs. NH ₃)					
b. Ammonia inventory (lbs. NH ₃)					
c. Ammonia losses (due to refrig. system)					
C. Energy usage (MMBTUs)					
1. Electricity (Kwhr)					
2. Natural gas usage (MMBTUs)					
3. Propane (gallons)					
4. Fuel oil/ Diesel (gallons)					
D. Water usage (Million Gallons discharged)					
1. Water usage (Million Gallons discharged @ this time last year)					
2. % change from last year					
E. Hazardous waste generation (lbs.)					

Appendix H: EMS Gap Analysis and Checklist

These questions are designed to allow you to identify specific gaps between where the current system is and a fully implemented EMS. The questions in the checklist include statements that, if satisfied, meet the requirements for a functional EMS. The checklist also includes questions that indicate a well developed and sustainable EMS. An EMS that satisfies the requirements of standards such as ISO 14001 will typically satisfy most if not all of the requirements of this checklist. However, this checklist is not designed to determine if an EMS meets the requirements of any one particular standard, but rather provide a comprehensive list of EMS criteria against which to gauge the facility's EMS as implementation progresses. In order to satisfy all the criteria in this checklist a facility will need to have a robust, fully developed, implemented and continuously improved (has gone through at least one full plan-do-check-act cycle) EMS in place. Think of the content of this checklist as the high bar against which you can gauge the facility's EMS.

This checklist satisfies the standard EMS requirements of EPA's National Environmental Performance Track Program (PT). It does not examine performance and other related reporting requirements of PT. For more information on PT go to: <http://www.epa.gov/performancetrack>. There are two suggested evaluation approaches to use with this checklist.

Method A: Simplified

A checkmark ✓ in a box signifies that the evidence of conformance with the associated requirement has been observed and verified. An X in a box signifies that the associated requirement does not appear to be satisfied or that evidence of the requirement having been satisfied was not present or available.

Method B: Scored level of Completeness

A numerical score is placed in each box to signify the degree to which the EMS is completed. Suggested scoring is as follows:

- 0 - not initiated
- 1 - under development
- 2 - developed/documented
- 3 - deployed
- 4 - assessed/verified/improved

Only a score of 4 signifies that that requirement of the EMS is complete and that evidence of the requirement having been satisfied is present or available. You may

find that placing these questions in an electronic spreadsheet program allows for greater ease in adding up scores and tracking of progress over time.

It is the responsibility of the user of this checklist to utilize due care and good judgement as an auditor to ensure that each requirement has been met or not met and where prudent retain evidence.

Environmental Management System (EMS) Requirements

(a) Policy

The facility has a written environmental policy, defined by top management, and committing to,

Compliance with both:

? legal requirements and

? voluntary commitments.

? Pollution prevention (based on a pollution prevention hierarchy where source reduction is the first choice).

? Continuous improvement in environmental performance, including areas not subject to regulations.

? Sharing information on performance of the EMS with the community.

(b) Planning

? The facility has a process for identifying its aspects and determining their significance.

? The facility has identified its significant aspects.

? The facility has identified all EPA permits and ID numbers.

? The facility has a process for identifying its legal requirements.

? The facility has identified its legal requirements. i.e. The facility has identified its environmental requirements in accordance with the attached application checklist (see Appendix B).

? The facility has procedures for integrating anticipated changes to the facility's requirements or commitments into the EMS.

The facility has established measurable objectives and targets to;

meet

? policy commitments and

? legal requirements,

? to reduce its impacts associated with its significant environmental aspects, and

? to meet performance commitments made by the facility.

The facility has active, documented programs to achieve the objectives, targets and commitments in the EMS, including the following to ensure completion;

? the means, and

? the timeframes.

(c) Implementation and Operation

? The facility has identified a top management representative with authority and responsibility for the EMS.

? The facility has established roles, responsibilities, and dedicated the required resources for meeting its objectives and targets of the overall EMS.

? The facility has established roles and responsibilities for compliance with legal requirements.

The facility has defined procedures for:

? achieving and maintaining compliance,

? meeting performance objectives,

? communicating relevant information regarding the EMS, including the facility's environmental performance, throughout the organization,

? providing appropriate incentives for personnel to meet the EMS requirements, and

? document control, including where documents related to the EMS will be located and who will maintain them.

? The facility has established a public outreach program.

? The facility has a designated point of contact with direct access to facility management.

The facility has described its activities / plans / procedures in the following areas:

- ? identifying and responding to questions or concerns of local residents.
- ? informing community members of important matters that affect them.

The facility is able to:

- ? list any current or ongoing citizen concerns with the facility.

The facility has defined its training needs and has environmental training programs for:

- ? all employees,
- ? specific training for those whose jobs and responsibilities involve activities directly related to achieving objectives and targets, and
- ? specific training for those whose jobs and responsibilities involve activities directly related to compliance with legal requirements.

The facility has documented key EMS elements including:

- ? the environmental policy,
- ? significant environmental aspects,
- ? objectives and targets,
- ? identification of a top management representative,
- ? an EMS audit program, and
- ? overall EMS authority.

? The facility retains EMS documentation.

? The facility has operation and maintenance programs for equipment and for other operations that are related to legal compliance.

? The facility has operation and maintenance programs for equipment and for other operations that are related to other significant environmental aspects.

? The facility has an emergency preparedness program.

(d) Checking and Corrective Action

The facility has active program(s) for:

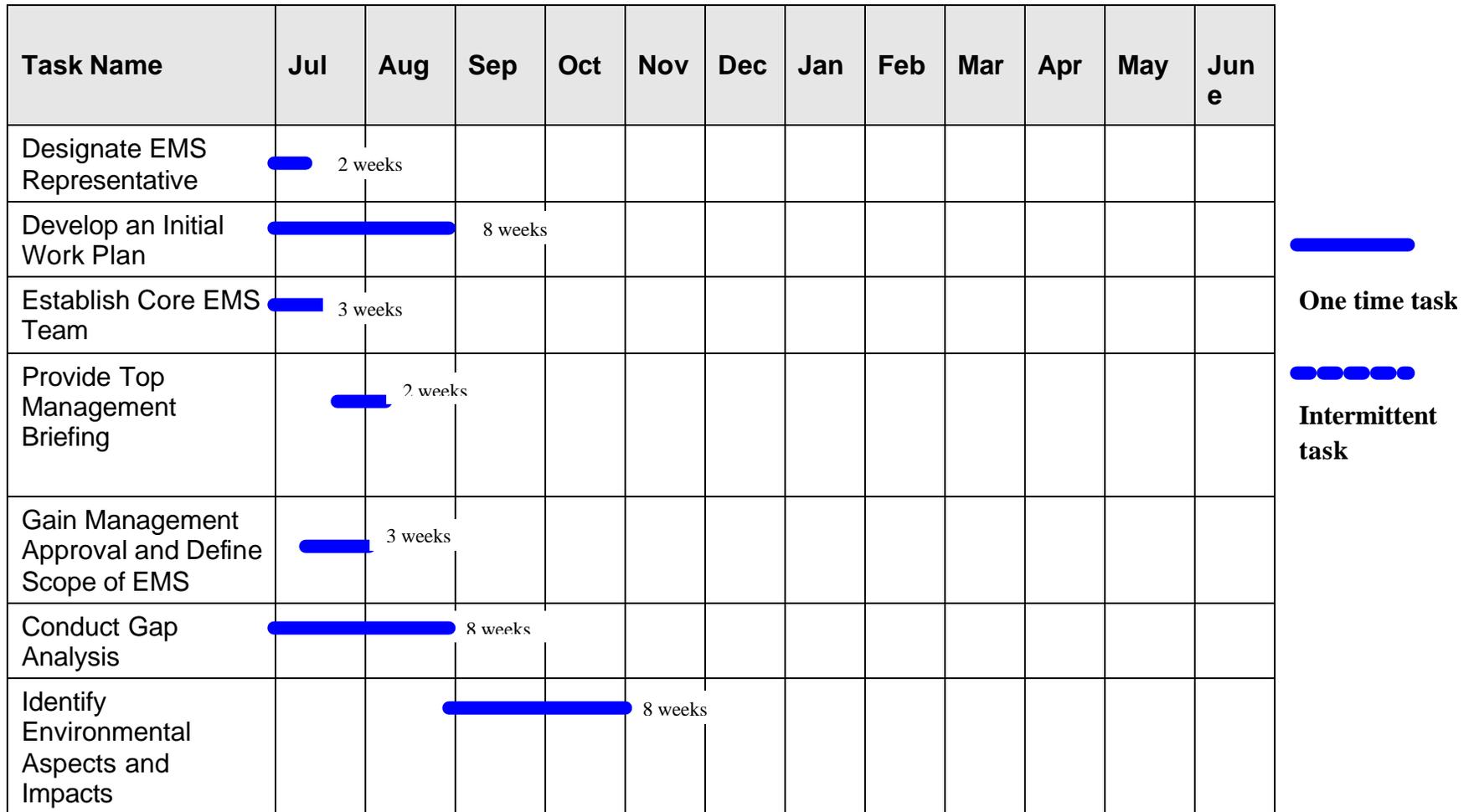
- ? assessing performance,
- ? detecting non-conformance with legal and other requirements of the EMS,
- ? preventing non-conformance with legal and other requirements of the EMS,
- ? prompt corrective action of any non-conformance with legal and other requirements of the EMS, and
- ? conducting EMS audits.

(e) Management Review

The facility has a process for, conducts, and documents management reviews covering:

- ? performance with regard to the objectives and targets,
- ? the effectiveness of the EMS in meeting policy commitments.

Appendix I: Gantt Chart for EMS Implementation



Review Environmental Legislation and other requirements					8 weeks							
Define Significant Aspects					5 weeks							
Get Approval for Implementation						2 weeks						
Provide Management and Leadership Training												
Establish Procedures Format												
Task Name	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Develop Environmental Objectives and Targets							4 weeks					
Develop Environmental Management Programs							4 weeks					

Provide Employee Implementation Training													22 weeks
Verification Test of Emergency Response Plans													5 weeks
Task Name	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	
Compliance Audit													4 weeks
Review and Take Corrective Action													20 weeks
Conduct Internal EMS Audit													2 weeks
Review and Take Corrective Action after Internal Audit													3 weeks
Perform First Management Review of EMS													6 weeks

Appendix J: Sample Aspect Identification Form

Activity, Product or Service	Input / Output	Environmental Aspect	Grouped Aspect	Environmental Impact

Contact Person:

Date Complete:

Appendix K: Sample Form for Identification and Significance Determination of Environmental Aspects and Linking Objectives and Targets

(see also Appendix R)

Person Completing Form:

Area/Process:

Date:

ASPECT IDENTIFICATION			SIGNIFICANCE DETERMINATION							OBJECTIVES AND TARGETS	
Category/ Aspect	Mode SD=shutdown, ST=startup, NM=normal, E=emergency	Quantity or Volume (e.g. lbs/month)	Legal Requirements	Company goal or policy	Community Concern	Potential Release to the Environment	Pollution Prevention Potential	I or S	Rationale for Significance (S) or Insignificance (I)	Objective & Type C=control or maintain S=study or investigate I=improve	Target
Supplies:											
Chemicals:											
Energy Use:											

Water Use:											
Products:											
Air Emissions:											
Noise/Odor/Radiation:											

Appendix L: Sample Management Program Form

(See also Appendix P)

(Note: Use one form per MP)

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

What resources will be required to achieve this objective? (attach additional pages as necessary)

Appendix M: Sample Training Matrix

TRAINING TITLE	Training Type	Frequency 1	Administration	Clinic	Dispatch	Electricians	Engineering	HAZMAT Team	Maintenance	Operations	Purchasing	Receiving	Refrigeration	Rendering	Sanitation	Security	Supervision	Transportation	Wastewater
STORMWATER P2	ENV																		
UNIVERSAL WASTES	ENV																		
ISO 14001 AWARENESS TRAINING	ENV																		
RCRA	ENV																		
DOT	ENV																		
SPOCO PLAN	ENV																		
EMERGENCY RESPONSE	ENV																		
EMS AUDITOR	ENV																		
LEAD EMS AUDITOR	ENV																		
PROCEDURE 1: ENVIRONMENTAL ASPECTS, OBJECTIVES AND TARGETS, AND MANAGEMENT PROGRAMS	ENV																		
PROCEDURE 2: LEGAL AND OTHER REQUIREMENTS	ENV																		
STRUCTURE AND RESPONSIBILITY	ENV																		
PROCEDURE 3: TRAINING, AWARENESS AND COMPETENCE	ENV																		
PROCEDURE 4: COMMUNICATION	ENV																		
PROCEDURE 5: DOCUMENT CONTROL	ENV																		
OPERATIONAL CONTROLS	ENV																		
PROCEDURE 6: EMERGENCY PREPAREDNESS AND RESPONSE	ENV																		
PROCEDURE 7: MONITORING AND MEASUREMENT	ENV																		
PROCEDURE 8: NON-CONFORMANCE AND CORRECTIVE AND PREVENTIVE ACTION	ENV																		
PROCEDURE 8: RECORDS MANAGEMENT	ENV																		
PROCEDURE 10: INTERNAL EMS AUDITS	ENV																		

Appendix N: Internal Assessment Record

Internal Assessment Team	
Date of Internal Assessment	
Signed	
<i>Major Non-Conformities Observed</i>	
1.	
2.	
3.	
<i>Minor Non-Conformities Observed</i>	
1.	
2.	
3.	
Is the facility making progress in meeting its EMS objectives?	
Is the facility adhering to the commitments in its environmental policy?	
Suggestions for Improving the EMS	

Contact Person:
Completed:

Date

Appendix O: Corrective Action Form

<i>Statement of the Problem</i>
Date
Description of non-conformance or actual or potential compliance issue
Description of potential solution
Person responsible for corrective action
Deadline for completion of corrective action
<i>Completion of Corrective Action</i>
Actions taken
Results
Date

Signed: _____
Management Representative

Person Responsible

Appendix P: EMS Program Measurement Criteria Form

EMS Program Measurement Criteria				
Company Name _____			Date _____	

Measurement Elements EMS Components	Objectives of Component	Activity Measures	Results Indicators	Review Period
Environmental Policy				
Communication Plan				
Stakeholders Input				
Environmental or EMS Training				
Review of Aspects				
Operational Controls				
Environmental Review of New Processes and Activities				
Setting Objectives & Targets				
Documentation				
Regulatory Compliance				
Pollution Prevention				

Other				
Contact person for form:			Date Completed:	

Appendix Q: Management Review Record

Date of review meeting:		
Persons present at meeting:		
Name:		Position:
Conclusions:		
Actions to be taken:		Person(s) responsible:

Signed: _____
 Management Representative Facility Manager

Appendix R: Environmental Objectives

Objective	Related Significant Environmental Aspect	Related Environmental Policy Provision	Target(s)

Contact Person:

Date Completed: