

US EPA ARCHIVE DOCUMENT

Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry

Introduction

INTRODUCTION

Welcome to the Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry. This Guide has been specifically designed to assist meat processing facilities with a 10 module, step-by-step EMS implementation process. This Guide should be used in sequence, as each module was designed to be a stepping-stone towards a fully implemented EMS.

Each module of the Guide is designed to stand alone, having its own attachments and a workshop presentation. A number of tools, including sample procedures, templates, and forms, are included in each module in order to facilitate implementation. It is intended that these tools be utilized and adapted to your specific facility.

This Guide was developed specifically for the meat processing sector with its content relying heavily on EPA's Design for Environment Program for Integrated Environmental Management Systems and NSF International's Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations. The content of the Guide was created as a collaborative effort by EPA's Sector Strategies Program, ICF Consulting Inc. and Abt Associates Inc., the Iowa Waste Reduction Center, Iowa Department of Natural Resources Waste Reduction Assistance Program, the American Meat Institute, and the American Association of Meat Processors.

Included in Appendix A is a series of workshop/training presentations to be used in conjunction with the Guide to assist with implementation of the EMS. These presentations are designed for each of the modules presented in the Guide and include content related activities. It is suggested that the workshops/training be held in accordance with the work being completed on each of the modules. The workshops/training provide an opportunity to ask direct questions, obtain feedback, and share experiences related to EMS implementation with other facilities.

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Module 1: Getting Started

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Module 1: Getting Started

INTRODUCTION

An EMS is how your plant manages its environmental responsibilities. This Guide provides overall building blocks for your plant to use in developing the EMS that best fits with your plant's unique characteristics.

Module 1 of this Guide is about setting the cornerstones for successful EMS implementation.

The titles of the 10 modules of this Guide are:

- **Module 1: Getting Started**
- **Module 2: Get Ready**
- **Module 3: Identifying Environmental Aspects and Impacts**
- **Module 4: Determining Significant Environmental Aspects and Setting Objectives and Targets**
- **Module 5: Environmental Management Programs (EMPs)**
- **Module 6: Supporting EMS Elements**
- **Module 7: EMS Documentation and Records**
- **Module 8: Monitoring and Measurement and Corrective and Preventive Action**
- **Module 9: Continuous Improvement**
- **Module 10: Lessons Learned**

Attachment 1-F provides a glossary of terms used in the modules.

WHY HAVE AN EMS?

Even if you are convinced that an EMS is good for your plant you may need to convince others. The following points are designed to give you ammunition to accomplish that purpose.

An EMS is a systematic approach to achieve your environmental and other organizational goals.

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

- Would you like to improve your ability to comply with **environmental laws and regulations**?
- Are you looking for ways to improve your **environmental performance**?
- Is the state of your plant's environmental affairs a significant **liability**?
- Does a **lack of time or resources** prevent your plant from managing its environmental obligations effectively?
- Is the relationship between your plant's **environmental goals** and other goals unclear?¹

If you answered YES to one or more of the above questions, an EMS can help your plant.

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 4. Subsequent references to this document will be given in parentheses in text.

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First, an effective EMS makes good sense. By helping to identify the causes of environmental problems and then eliminate them, an EMS can help your plant save money.

Think of it this way:

- Is it better to **make a product (or provide a service) right the first time** or to fix it later?
- Is it cheaper to **prevent a spill in the first place** or to clean it up afterwards?
- Is it more cost-effective to **prevent pollution** or to manage it after it has been generated? (4)

Key EMS Benefits

- improved environmental performance
- reduced liability
- competitive advantage
- improved compliance
- reduced costs
- fewer accidents
- employee involvement
- improved public image
- enhanced customer trust
- more favorable credit terms
- meet customer requirements (4)

Second, an EMS can be an **investment in the long-term viability** of your plant. An EMS can help your plant to be more effective in achieving environmental goals. And, by helping businesses keep existing customers and attract new ones, an EMS **adds value**. (5)

Here's some good news. Much of what your plant needs for an EMS may **already be in place!** The management system framework described in this Guide includes many elements that are common to **managing many organizational processes**, such as quality, health & safety, finance, or human resources. (5) Existing management processes such as **Hazard Analysis and Critical Control Point (HACCP)** have similar elements as an EMS and therefore provide opportunities for efficiency. As you review this Guide, you will probably find that your plant has many EMS processes in place, even though they may have been designed for other purposes. Integrating environmental management with other key organizational processes can improve financial, quality, **and** environmental performance. (5)

The key to effective environmental management is the use of a **systematic approach** to planning, controlling, measuring and improving your plant's environmental performance. Significant environmental improvements (and cost savings) can be achieved by assessing and improving your plant's **management processes**. Many environmental "problems" can be solved without installing expensive pollution control equipment. (5)

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. (5)

In Total Quality Management (TQM) and Quality Management System (QMS) systems thinking, it is said that "quality is free" — as long as you are willing to make the investments that will let you reap the rewards. The same holds true for environmental management. (5)

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Module 1: Getting Started

Frequently Asked Questions About EMS

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

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

2. How detailed do we need to be in creating our plant's EMS?

When working your way through the process of creating your plant's EMS, strive for simplicity. There is no point in creating an overly burdensome management system that your plant cannot sustain.

Hint: Start simple and if you find over time as a part of your continuous improvement process that your plant needs to add more detail your plant will be adding value where it makes sense. In general it is much easier and more cost effective to add detail than to remove it.

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

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

4. Will an EMS help us prevent pollution?

A commitment to preventing pollution is a cornerstone of an effective EMS and should be reflected in your plant's policy, objectives and other EMS elements.

5. Do we have to start from scratch to implement an EMS?

Much of what your plant has in place now for environmental management and other programs such as health and safety should be incorporated into the EMS. There is no need to "start over".

6. How will an EMS affect my existing compliance obligations?

An EMS will not result in more or less stringent legal compliance obligations. However an EMS should improve your plant's ability to comply with legal obligations, and, in some cases, may lead to more flexible compliance requirements.

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

No. The concept of continual improvement assumes that no organization is perfect. While an EMS should help your plant improve compliance and other measures of performance, this does not mean that problems will never occur. However, an effective EMS should help your plant find and fix these problems and prevent their recurrence. (6)

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Module 1: Getting Started

Attachment 1-E is an example slide presentation that reviews benefits of an EMS and why and EMS may be good for your plant. These are provided as working materials for your use in preparing internal presentations for your plant staff and management.

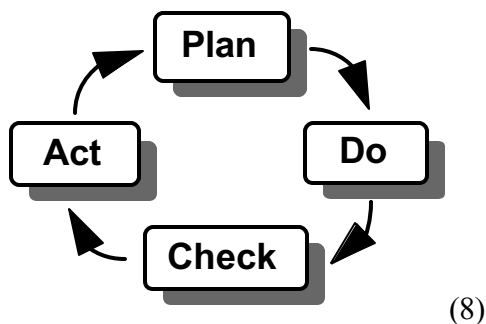
If you are charged with “selling” the EMS at your plant focus on the benefits as they relate to the audience. Typically senior management is concerned with business rationale points, while mid-level management are concerned with efficiency and making sure that day to day operations run a smoothly as possible. Be sure to explain why an EMS will improve your plant’s operations.

What is an EMS?

An effective EMS is built on TQM and QMS concepts. To improve environmental management, your plant needs to focus not only on **what** things happen but also **why** they happen. Over time, the systematic identification and correction of system deficiencies leads to better environmental (and overall organizational) performance. (8)

Most EMS models are built on the “Plan, Do, Check, Act” model introduced by Shewart and Deming; see Figure 1-1. This model endorses the concept of **continual improvement**.

Figure 1-1: The “Plan, Do, Check, Act” Model



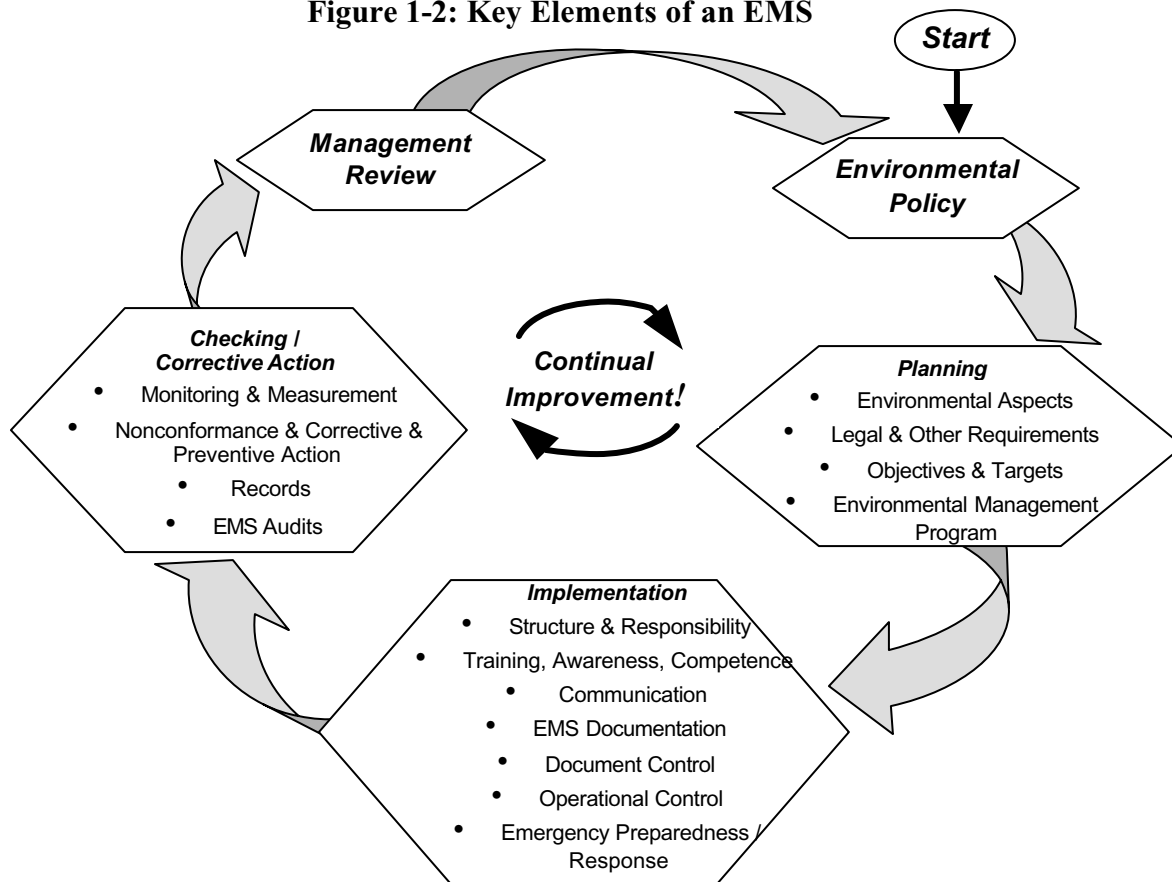
In the EMS model described in this Guide, the “Plan, Do, Check, Act” steps have been expanded into 17 elements that are **linked together**. (8) These 17 elements are the basis of most EMS standards, including ISO 14001, the EMS standard created by the International Organization for Standardization.

KEY ELEMENTS OF AN EMS

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

This section describes 17 EMS elements that are common to most EMS models. This section also notes the **key linkages** among these elements; see Figure 1-2. (14) While there are several good EMS models available, they are all based on the general “Plan, Do, Check, Act” cycle.

Figure 1-2: Key Elements of an EMS



Key Elements of an EMS: A Snapshot

Environmental policy — Develop a statement of your plant’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 your organization.

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

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

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

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

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

Training, awareness and competence — Ensure that your plant'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 your plant's EMS and related documents.

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

Operational control — Identify, plan and manage your plant's operations and activities in line with your plant'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 your plant's EMS is operating as intended.

Management review — Periodically review your plant's EMS with an eye to continual improvement. (15)

HOW MANY PARTS OF AN EMS DO WE ALREADY HAVE?

Knowing what parts of the system your plant already has in place will help you to understand the building blocks you will need to add.

Your plant may have many parts of an EMS already in place. An EMS implementation program starts with identifying where the gaps are between your plant's existing approaches to dealing with environmental issues and a fully functional EMS. This process of assessing the state of your plant'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.

At the end of this module a checklist is provided that can be used to gauge the current state of your plant's approach to environmental affairs. The checklist is based on the series of Key EMS

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Implementation Activities described later in this module. Use the checklist not only to identify gaps now, but also to gauge your plant's progress over time in implementing its EMS (see Attachment 1-A). Many of the terms in the checklist may be unfamiliar to you now, but you will understand them better as you go through the EMS implementation process.

One way to answer the questions in the checklist is to answer yes or no. If you want a more detailed assessment of how well you are doing apply a score to each question.

If scores are used and added up for each EMS element, a more accurate indication of your status can be developed. To do this you may find using an electronic spreadsheet an easy way to track how you are doing and to re-calculate the score over time.

After you have conducted a Gap Assessment for your plant, develop an Action Plan to tackle the Gaps you have identified.

An Action Plan should identify:

- The people and other resources you estimate will be required;
- The time lines for the various steps of the plan; and
- Responsibilities for the various steps.

Hint: Remember, simple is good. The outline in this 10 module Guide is designed to provide you with detail on how any firm (large or small, and from a simple or singular process to a complex series of operations) in the meat processing sector can build a robust and sustainable EMS. It is important to have a practical approach to filling the gaps identified by the checklist. Make sure to customize the EMS for your plant.

IMPLEMENTATION PLANNING

Attachment 1-C provides an example of a step-by-step project plan for an EMS implementation. In this module we introduce EMS planning. Modules 2 to 5 of this Guide provide detail on the Plan part of EMS within the "Plan, Do, Check, Act" context.

The series of implementation tasks (see Attachment 1-C), once finalized, will have resource requirements and time lines assigned. This should be a collaborative effort between the EMS project team, external assistance, (if any is being used) and senior plant management. Consider using commercial tools to organize your plan. For example, if your plant already uses a project management tool, then examine if it will work for this project. Once the schedule has been set, using either project tracking software or in a paper-based format, lay out the various tasks that should be conducted by the project team(s) with guidance, periodic checking, and input from senior management.

Focus the implementation plan on improving the ways in which your plant manages its effects on the environment. Do this by working within the existing management system(s). Trying to change your overall management structure should not be the goal of the EMS.

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Sample Key Implementation Activities are noted in the table below. In addition, the development of an EMS can also be described in general by the series of tasks provided in Attachment 1-C. The exact series of activities depends on your plant. When defining the series of steps for your plant do not expect to follow the exact series of steps in these examples. Rather it is recommended that you follow the Plan-Do-Check-Act sequence and customize the details to fit your situation.

Key EMS Implementation Activities, A Possible Sequence

Action
1. Define and approve implementation plan and schedule
2. Appoint implementation representatives
3. Formally establish and identify members of implementation team(s)
4. Define appropriate scope of EMS
5. Develop matrix of significant aspects and impacts
6. Identify legal and other requirements for all activities
7. Establish environmental objectives and targets and develop management programs
8. Develop documented operational control procedures
9. Develop monitoring and measurement procedures
10. Establish internal and external communications procedures
11. Develop emergency preparedness and response procedures
12. Implement corrective and preventative action program
13. Perform EMS audit and conduct management review

WHO SHOULD DO THE IMPLEMENTATION?

In order for your plant to implement an EMS you need to be able to “talk-the-talk” and “walk-the-walk”. In other words do more than just read an EMS manual or guidance. The first step is a get acquainted process. If you or your plant staff have no formal training in EMS then consider:

- Getting some formal training on what an EMS is and is not; or
- Obtaining outside help to guide your plant through the process. The best outside help would be from a sister firm or your trade association. Of course they should also have actual experience in implementing an EMS.

Consultants and assistance providers can certainly help you, but implementing an EMS is going to be something that requires a real commitment from one or more key staff, and a smaller commitment from many staff in your plant. The amount of help you get with implementing your EMS is a function of how familiar you are with EMS and how much staff time your plant can allocate to implementation. A word of caution, an EMS is first and foremost a systematic approach that involves many parts of your plant. An EMS is not something one staff member can do, nor can you just hire a consultant to come and build your plant an EMS and then hand it over.

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GET TOP MANAGEMENT COMMITMENT

It is essential for your plant to have top management support and endorsement of the EMS. Applying TQM / QMS principles to the environmental area and providing adequate resources are the job of **top management**.

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

- ***Making the environment an organizational priority*** (think of effective environmental management as fundamental to the plant's survival);
- ***Integrating environmental management throughout the organization*** (think about the environment as part of product/service and process development and delivery, among other activities); and
- ***Looking at problems as opportunities*** (identify problems, determining root causes, and preventing problem recurrence).

Note: It is virtually impossible to underestimate the value of an open and “public” display of top management support for an EMS.

OTHER ISSUES TO KEEP IN MIND

Focus on Continual Improvement

No plant is perfect. The concept of continual improvement recognizes that problems will occur. A committed plant **learns from its mistakes** and **prevents** similar problems from recurring. (9)

Flexibility

An effective EMS must be **dynamic** to allow your plant to adapt to a quickly changing environment. For this reason, you should keep your plant's EMS flexible and simple. This also helps make your plant's EMS **understandable for the people who must implement it** — your plant's managers and other employees. (9)

Compatibility with Organizational Culture

The EMS approach and an organization's culture should be compatible. For some organizations, this involves a choice: 1) tailoring the EMS to the culture, or 2) changing the culture to be compatible with the EMS approach. Bear in mind that changing an organization's culture can be a long-term process. Keeping this compatibility issue in mind will help you ensure that the EMS meets your plant's needs. (9)

Employee Awareness and Involvement

As you design and implement an EMS, roadblocks may be encountered. Some people may view an EMS as bureaucracy or extra expense. There also may be resistance to change or fear of new responsibilities. To overcome potential roadblocks, make sure that everyone understands **why**

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the plant needs an effective EMS, **what** their role is and **how** an EMS will help to control environmental impacts in a cost-effective manner. Employee involvement helps to demonstrate the plant's commitment to the environment **and** helps to ensure that the EMS is realistic, practical and adds value. (9)

Building an EMS (with the help of this Guide) provides an opportunity to assess how your plant manages environmental obligations and to find better (and more cost-effective) solutions. While you will probably identify some areas where you can improve, this does **not** mean that you should change things that are working well! By reviewing what your plant does and how well it works, you can ensure that your EMS will be viable and effective, both now and in the future. (9)

DOCUMENTATION

Module 7 of this guide includes a detailed discussion on effective EMS documentation. One of the key types of EMS documentation that your plant will need to generate is procedures. Attachment 1-D provides some general notes about organization of procedural documents for you to consider. Your plant does not have to make a final format selection for EMS documentation at this time unless your plant has a specific format it already uses to document standard practices. However, you should begin to consider what format would work best for your plant. 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 you will do something before you do it 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 your plant’s new or improved processes and then shortly thereafter write it down. The process of “writing it down” in plain language will not only help you to remember what worked and what did not work, but will also guide others in the future.

ELECTRONIC OR PAPER BASED DOCUMENTATION

While a paper-based system for housing your 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 plant the more likely an electronic documentation management system will prove to be useful.

HOMEWORK

Conduct a Gap Assessment using the Checklist in Attachment 1-A and then develop a draft action plan (it will be a living document) for implementing an EMS at your plant. Confirm that you have top management endorsement of the EMS and get their buy in to the general implementation process. Find out if your plant has an Environmental Policy, Guiding Principles or Mission Statement and if so: who wrote it; when was it last reviewed; and does your plant actually use it in its business decision making processes.

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ATTACHMENT 1-A: EMS CHECKLIST

These questions are designed to allow you to identify specific gaps between where your 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 your plant's EMS as implementation progresses. In order to satisfy all the criteria in this checklist a plant 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 your plant'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/documentated
- 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.

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Module 1: Getting Started

Environmental Management System (EMS) Requirements

(a) Policy

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

Compliance with both:

- 9 legal requirements and
- 9 voluntary commitments.

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

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

- 9 Sharing information on performance of the EMS with the community.

(b) Planning

- 9 The plant has a process for identifying its aspects and determining their significance.
- 9 The plant has identified its significant aspects.
- 9 The plant has identified all EPA permits and ID numbers.
- 9 The plant has a process for identifying its legal requirements.
- 9 The plant has identified its legal requirements, i.e., the plant has identified its environmental requirements in accordance with the attached application checklist (see Attachment 1-B).
- 9 The plant has procedures for integrating anticipated changes to the plant's requirements or commitments into the EMS.

The plant has established measurable objectives and targets:

To meet:

- 9 policy commitments and
- 9 legal requirements,
- 9 To reduce its impacts associated with its significant environmental aspects, and
- 9 To meet performance commitments made by the plant.

EMS Implementation Guide for the Meat Processing Industry

Module 1: Getting Started

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

- 9 The means, and
- 9 The timeframes.

(c) Implementation and Operation

- 9 The plant has identified a top management representative with authority and responsibility for the EMS.
- 9 The plant has established roles, responsibilities, and dedicated the required resources for meeting its objectives and targets of the overall EMS.
- 9 The plant has established roles and responsibilities for compliance with legal requirements.

The plant has defined procedures for:

- 9 Achieving and maintaining compliance,
 - 9 Meeting performance objectives,
 - 9 Communicating relevant information regarding the EMS, including the plant's environmental performance, throughout the organization,
 - 9 Providing appropriate incentives for personnel to meet the EMS requirements, and
 - 9 Document control, including where documents related to the EMS will be located and who will maintain them.
- 9 The plant has established a public outreach program.
 - 9 The plant has a designated point of contact with direct access to plant management.

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

- 9 Identifying and responding to questions or concerns of local residents.
- 9 Informing community members of important matters that affect them.

The plant is able to:

- 9 List any current or ongoing citizen concerns with the plant.

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

- 9 All employees,
- 9 Specific training for those whose jobs and responsibilities involve activities directly related to achieving objectives and targets, and
- 9 Specific training for those whose jobs and responsibilities involve activities directly related to compliance with legal requirements.

The plant has documented key EMS elements including:

- 9 The environmental policy,
 - 9 Significant environmental aspects,
 - 9 Objectives and targets,
 - 9 Identification of a top management representative,
 - 9 An EMS audit program, and
 - 9 Overall EMS authority.
- 9 The plant retains EMS documentation.
- 9 The plant has operation and maintenance programs for equipment and for other operations that are related to legal compliance.
- 9 The plant has operation and maintenance programs for equipment and for other operations that are related to other significant environmental aspects.
- 9 The plant has an emergency preparedness program.

(d) Checking and Corrective Action

The plant has active program(s) for:

- 9 Assessing performance,
- 9 Detecting non-conformance with legal and other requirements of the EMS,
- 9 Preventing non-conformance with legal and other requirements of the EMS,
- 9 Prompt corrective action of any non-conformance with legal and other requirements of the EMS, and
- 9 Conducting EMS audits.

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(e) Management Review

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

- 9 Performance with regard to the objectives and targets,
- 9 The effectiveness of the EMS in meeting policy commitments.

**EMS Implementation Guide for the Meat Processing Industry
Module 1: Getting Started**

ATTACHMENT 1-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 plant.

Air Pollution Regulations

Check All
That Apply

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

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

- | | |
|-----------|---|
| 13. _____ | 9 |
| 14. _____ | 9 |

Hazardous Waste Management Regulations

- | | |
|---|---|
| 1. Identification and Listing of Hazardous Waste (40 CFR 261) | |
| - Characteristic Waste | 9 |
| - Listed Waste | 9 |
| 2. Standards Applicable to Generators of Hazardous Waste (40 CFR 262) | |
| - Generator status identification | 9 |
| - Manifesting | |
| - Pre-transport requirements | 9 |
| - Record keeping/reporting | 9 |
| 3. Standards Applicable to Transporters of Hazardous Waste (40 CFR 263) | |
| - Transfer plant requirements | 9 |
| - Manifest system and record-keeping | 9 |

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- Hazardous waste discharges	9
4. Standards for Owners and Operators of TSD Facilities (40 CFR 264)	
- General facility standards	9
- Preparedness and prevention	9
- Contingency plan and emergency procedures	9
- Manifest system, record keeping and reporting	9
- Groundwater protection	9
- Financial requirements	9
- Use and management of containers	9
- Tanks	9
- Waste piles	9
- Land treatment	9
- Incinerators	9
5. Interim Status Standards for TSD Owners and Operators (40 CFR 265)	9
6. Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities (40 CFR 267)	9
7. Administered Permit Program (Part B) (40 CFR 270)	9

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

8. _____	9
9. _____	9

Hazardous Materials Management

1. Control of Pollution by Oil and Hazardous Substances (33 CFR 153)	9
2. Designation of Reportable Quantities and Notification of Hazardous Materials Spill (40 CFR 302)	9
3. Hazardous Materials Transportation Regulations (49 CFR 172-173)	9
4. Worker Right-to-Know Regulations (29 CFR 1910.1200)	9
5. Community Right-to-Know Regulations (40 CFR 350-372)	9

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

6. _____	9
7. _____	9

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Solid Waste Management

1. Criteria for Classification of Solid Waste Disposal Facilities and Practices (40 CFR 257) 9
2. Permit Requirements for Solid Waste Disposal Facilities 9
3. Installation of Systems of Refuse Disposal 9
4. Solid Waste Storage and Removal Requirements 9
5. Disposal Requirements for Special Wastes 9

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

6. _____ 9
7. _____ 9

Water Pollution Control Requirements

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

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

15. _____ 9
16. _____ 9

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Drinking Water Regulations

- | | | |
|----|---|---|
| 1. | Underground Injection and Control Regulations, Criteria and Standards (40 CFR 144, 146) | 9 |
| 2. | National Primary Drinking Water Standards (40 CFR 141) | 9 |
| 3. | Community Water Systems, Monitoring and Reporting Requirements (40 CFR 141) | 9 |
| 4. | Permit Requirements for Appropriation/Use of Water from Surface or Subsurface Sources | 9 |
| 5. | Underground Injection Control Requirements | 9 |
| 6. | Monitoring, Reporting and Record keeping Requirements for Community Water Systems | 9 |

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

- | | | |
|----|-------|---|
| 7. | _____ | 9 |
| 8. | _____ | 9 |

Toxic Substances

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

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

- | | | |
|-----|-------|---|
| 12. | _____ | 9 |
| 13. | _____ | 9 |

EMS Implementation Guide for the Meat Processing Industry
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Pesticide Regulations

- | | | |
|----|---|---|
| 1. | FIFRA Pesticide Use Classification (40 CFR 162) | 9 |
| 2. | Procedures for Disposal and Storage of Pesticides and Containers (40 CFR 165) | 9 |
| 3. | Certification of Pesticide Applications (40 CFR 171) | 9 |
| 4. | Pesticide Licensing Requirements | 9 |
| 5. | Labeling of Pesticides (40 CFR 156) | 9 |
| 6. | Pesticide Sales, Permits, Records, Application and Disposal Requirements | 9 |
| 7. | Disposal of Pesticide Containers | 9 |
| 8. | Restricted Use and Prohibited Pesticides | 9 |

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

- | | | |
|-----|-------|---|
| 9. | _____ | 9 |
| 10. | _____ | 9 |

Environmental Clean-Up, Restoration, Corrective Action

- | | | |
|----|---|---|
| 1. | Comprehensive Environmental Response, Compensation and Liability Act (Superfund) (identify section) | |
| | _____ | 9 |
| | _____ | 9 |
| 2. | RCRA Corrective Action (identify section) | 9 |
| | _____ | 9 |
| | _____ | 9 |

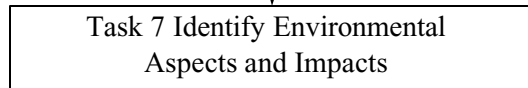
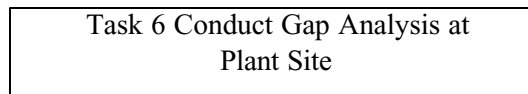
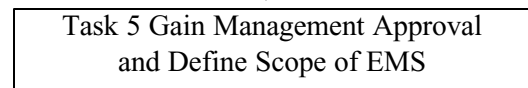
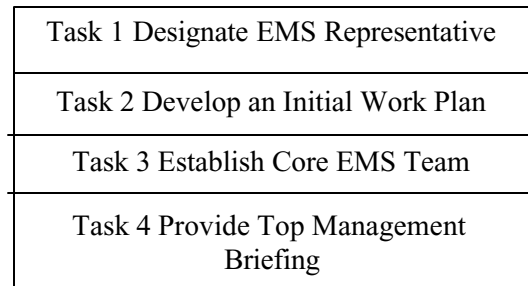
Other Federal, State, Tribal or Local Environmental Clean-Up, Restoration, Corrective Action Regulations Not Listed Above (identify)

- | | | |
|----|-------|---|
| 3. | _____ | 9 |
| 4. | _____ | 9 |

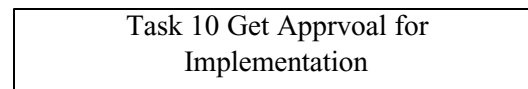
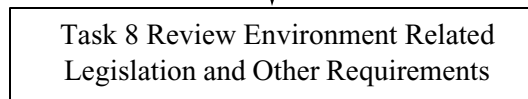
ATTACHMENT 1-C: SAMPLE ACTION PLAN FOR EMS IMPLEMENTATION

Implementation Tasks

Project Initiation

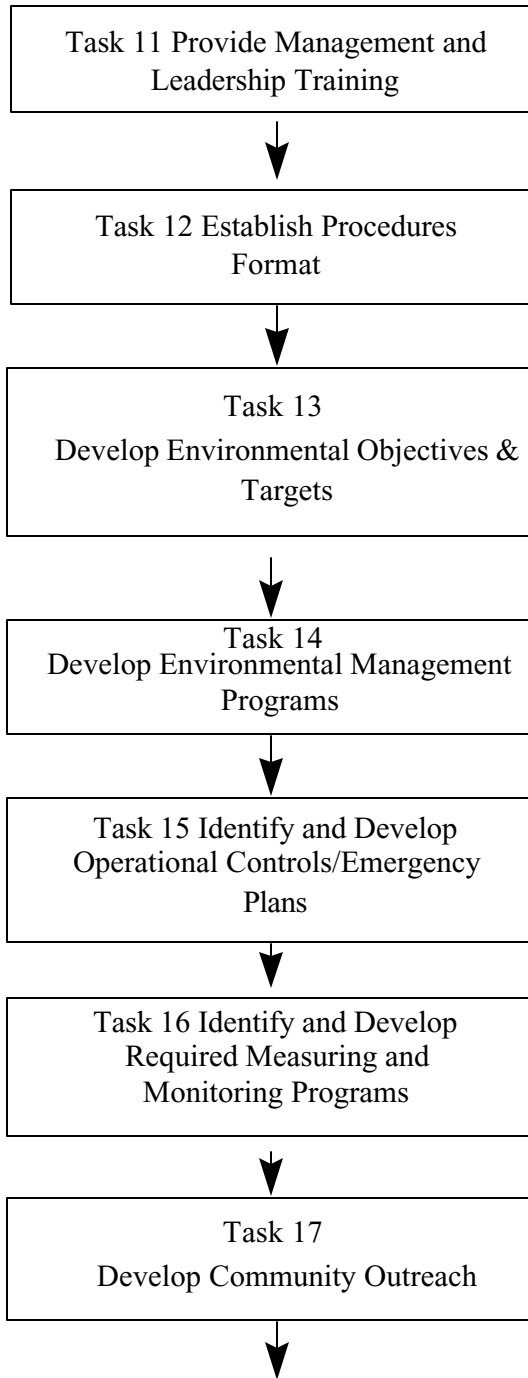


Review



Implementation Tasks

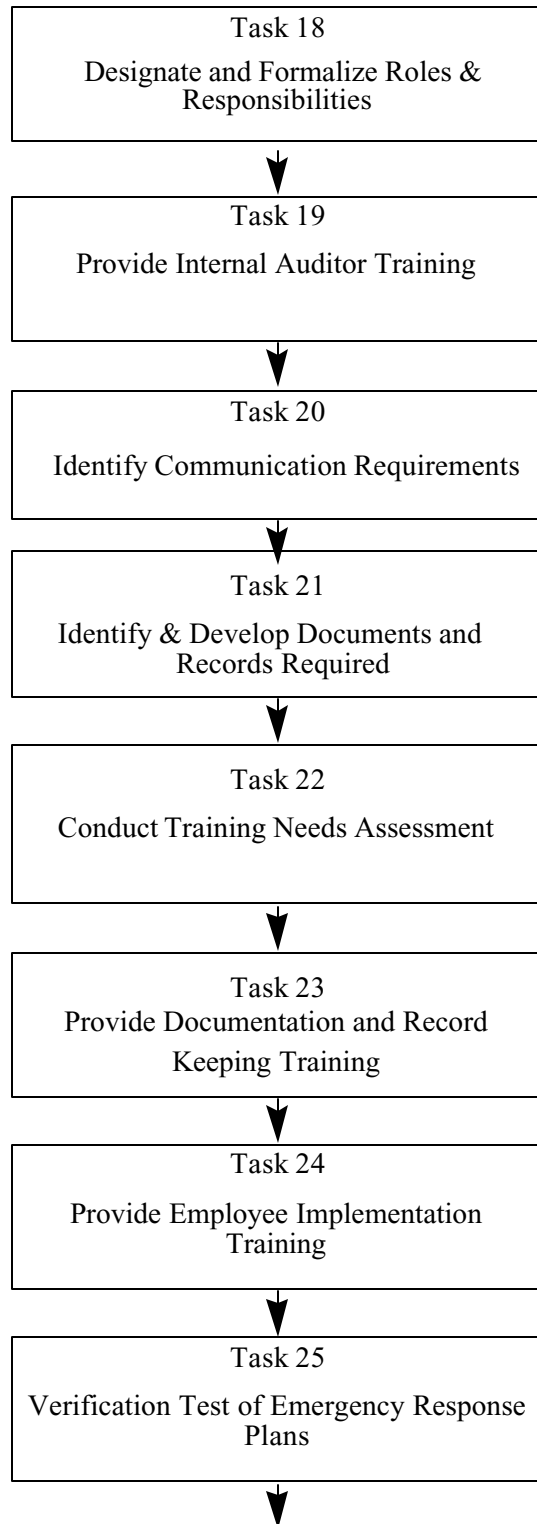
EMS Planning



EMS Implementation

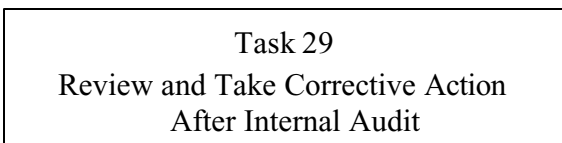
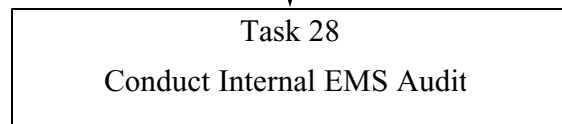
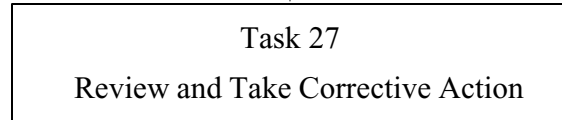
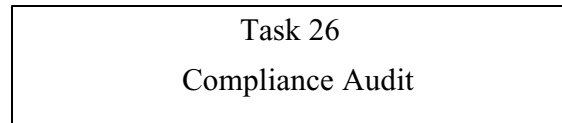
Implementation Tasks

EMS Implementation
(Continued)

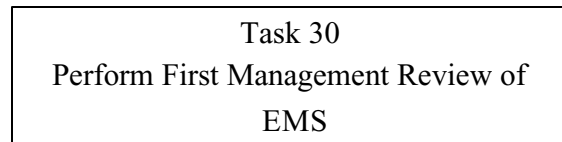


Implementation Tasks

Checking and
Corrective Action



Management
Review



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ATTACHMENT 1-D: LAYOUT NOTES FOR EMS PROCEDURES

When writing EMS procedures it is often a good idea to have a standardized format. The result of having a standardized format is that there is a certain level of recognition associated with the procedures. The suggested layout below should first serve as content guide. When developing your plant's procedural format, use one that will cause a minimum of disruption in your plant. Format is entirely at the user's discretion.

Each plant should decide where it needs to have documented and formalized procedures and where it does not. As a general rule of thumb, if your plant has determined that without a written procedure there is an unacceptable risk of the activities being conducted incorrectly then a written procedure is a good idea. The procedure examples provided in the sections and appendices of this document provide a detailed level of documentation. Some plants may find that a less in depth level of documentation is sufficient.

This example includes building blocks for an Environmental Aspects Procedure.

ABC Meat Processing ENVIRONMENTAL MANAGEMENT SYSTEM MANUAL

Title: Environmental Aspects

Section: # 0.0

Version 1.1

Ref. ISO 14001:96 4.3.1

Issue Date: 00-00-00 Revise by 00-00-00

Note: Using dates for revision and version numbers helps in the process of document control and ensuring that users have the correct procedure in hand.

ABC Meat Processing Environmental Policy

Reference to the section (s) of the Policy that are most relevant to this section

Environmental Aspects

Note: Since ABC Meat Processing is using ISO 14001 as the model for its EMS, it is using the content of the standard as a reference against which it can cross-reference specific procedures.

The organization shall establish and maintain (a) procedures(s) to identify the environmental aspects of its activities, products or services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects relate to these significant impacts are considered in setting its environmental objectives.

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I. Purpose

Needed here is a short description of the purpose for this section and what is to be included in this section. This description may serve as a quick reference to describe the contents of the section.

II. Scope

The scope briefly describes to what areas of the business does this procedure apply. Any exceptions may be noted here.

III. Definitions

Any terms which require explanation, would be defined here. It is important to define any necessary terms near the start of the section so that the reader is introduced to these terms and is made aware of their meaning. A reference is usually provided for any given definition.

IV. Responsibility

This section is needed to identify specific personnel within the organization which have some responsibility in developing, executing the related procedure and making sure it is kept up-to-date. Those personnel responsible are normally listed in a “top-down” format beginning with those positions of “upper management” down to those at an operational level. If certain environmental programs assume some responsibility for tasks related to the procedure, they would also be listed and described here. This listing is necessary to clarify any discrepancies regarding responsibilities but may also serve as a reference for any personnel requiring additional assistance related to the procedure. Noting responsibilities in procedures is one way to ensure that responsibility and authority are understood and this serves as a building block for an overall summary of responsibilities associated with the EMS.

V. Core Content

This section would commonly be broken down into a series of logical steps. Where applicable, the use of charts and flow diagrams would be used to represent a step of the procedure. A sequential listing of activities to be completed as part of this procedure can serve to simplify the process by breaking down a rather complex topic into manageable units.

For the Aspects Procedure the following series of steps might be used

Step 1 - Identify Activities, Products and Services

Step 2 - Identify Environmental Aspects

Step 3 - Identify Associated Environmental Impacts

Step 4 - Grouping of Aspects

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Module 1: Getting Started

VI. Review and Updating

This section sets out the need for periodic review of the procedure. Included in this section will be a general schedule for the review of certain tasks and will include in some cases the personnel responsible. Review and updating of procedures is necessary in order to comply with changing activities, products, and services of the organization.

VII. References

A list of references is needed for the appropriate documentation of information used in the section. References also serve as a resource that the reader may use if they require any additional information.

The reference section is also a place to identify other EMS procedures that affect the activities within this procedure and other areas of the EMS that are linked to this procedure.

Example References for Aspects:

Legal and Other Requirements (needed for determining significance)

Objectives and Targets (uses results of aspect identification and significance process)

Emergency Preparedness and Response (potential emergencies lead to impacts)

Structure and Responsibility (who executes this procedure and provides input)

ATTACHMENT 1-E: EMS BENEFITS

What an EMS Can Do

- Instead of the government setting the environmental management agenda through compliance, the company sets the agenda.
- Provides a systematic and logic based approach to managing environmental issues.
- Provides assurance that policies, objectives, and targets are being managed.
- Provides a structure to recognize what compliance requirements are and the process to ensure they are met.

What an EMS Can Do

- Contributes to improved environmental and business performance. A systematic approach to identifying and responding to environmental issues allows an organization to better understand and integrate environmental issues with existing business practice.
- Lessens the enforcement burden. Demonstrating a proactive approach to understanding and managing environmental issues helps to understand what is needed and to lessen the level of concern.
- Helps to qualify a company for EPA's Performance Track.

WHY EMS

- Looking at the overall problem can help.
- Some companies have found that it costs more to run a compliance centered system than an EMS.
- Reduce incidents of pollution and associated expense of recovery.
 - One spill costs more than a lot of prevention.
 - Proper design of a lagoon costs less than cleanup of a less expensive lagoon.

WHY EMS

- Recycling manufacturing waste and unused inputs could increase revenues.
 - Think of everything that leaves the main process. For example, how to use water more than once?
- Employee health and safety can be improved, thereby improving productivity, decreasing sick days, and reducing insurable risk.
- Insurance claims may be reduced, thus reducing the costs of coverage and settlements.

WHY EMS

- The environmental staff can help employees and management understand and use environmental systems to improve organizational performance.
- A management system can lead to a more reliable and predictable outcome for environmental performance, which can reduce or limit the severity of incidents.

WHY EMS

- An EMS provides feedback on the operations of the organization that can be used for daily action and to determine the appropriateness of pollution prevention strategies.
- Problems that could be expensive to resolve and damaging to the environment can be identified earlier. Management awareness of problems would offer the best opportunity for efficient resolution.

WHY EMS

- A unified approach to environmental management provides the opportunity for sharing ideas among facilities and a potential increase in efficiency and benefits.
- Spreading environmental responsibility throughout the organization places responsibility with those directly associated with environmental impacts and pollution prevention. This improves the effectiveness and efficiency of environmental programs.
- Community support for a facility could be increased by demonstrating concern for the local environment through an EMS.

WHY EMS

- Workers may be attracted to a company with a plan to protect the work environment and the surrounding community.
- When environmental issues are prioritized based on a rational process, the organization can focus where “the best bang for the buck” exists.
- Energy efficiency and other process gains can go hand in hand with environmental improvement when planned and executed in a systematic way.

Summary

- An EMS is an extension of general good proactive business management to the environmental arena.
- An EMS assists your organization in understanding how it influences the environment.
- Having an EMS makes good business sense.
 - Drive performance and set your priorities rather than react.
 - Finding savings opportunities and avoiding costs.

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ATTACHMENT 1-F: GLOSSARY OF TERMS

alternatives evaluation - A systematic evaluation of alternative ways to accomplish a task that reviews the cost, performance, and environmental impact of each alternative under consideration. Ideally, the range of evaluation would include alternative chemicals, products, processes, technology, work procedures, and disposal methods.

aspect, environmental - Element of an organization's activities, products, and services that can interact with the environment.

assessment - An estimate or determination of the significance, importance, or value of something.

certification - Procedure by which a third party gives written assurance that a product, process, or service conforms to specified requirements.

compliance - An affirmative indication or judgment that the supplier of a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements.

continual improvement - Process of enhancing the environmental management system to achieve improvements in overall environmental performance, in line with the organization's environmental policy. Note - The process need not take place in all areas of activity simultaneously.

corrective action - An action taken to eliminate the causes of an existing nonconformity, defect, or other undesirable situation in order to prevent recurrence.

critical control point (CCP)- A point, step or procedure in a food process at which control can be applied and, as a result, a food safety hazard can be prevented, eliminated, or reduced to acceptable levels.

critical limit - The maximum or minimum value to which a physical, biological, or chemical hazard must be controlled at a critical point to prevent, eliminate, or reduce to an acceptable level the occurrence of the identified food safety hazard.

effects - Refers to changes, actual or potential, caused by a chemical, activity, or process as it comes into contact with humans or the environment.

environment - Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation.

environmental assessment - A systematic, documented, periodic and objective review by company management of plant operations and practices related to meeting environmental requirements. The assessment is a systematic, documented verification process of objectively obtaining and evaluating evidence to determine whether specified environmental activities,

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events, conditions, management systems, or information about these matters conform with selected criteria, and communicating the results of this process to management.

environmental management system (EMS) - The part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

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

environmental performance - The measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives, and targets.

environmental performance evaluation - Process to measure, analyze, assess, report, and communicate an organization's environmental performance against criteria set by management.

environmental performance indicator - A specific datum selected, such as volume of a chemical used, which will provide measurable information regarding progress toward meeting a specific environmental goal.

environmental policy - Statement by the organization of its intentions and principles in relation to its overall environmental performance, which provides a framework for action and for the setting of its environmental objectives and targets.

environmental target - Detailed performance requirement, quantified wherever 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.

function - Performance characteristic.

HACCP (Hazard Analysis and Critical Control Point) System - Is a scientific system for process control that has long been used in food production to prevent problems by applying controls at points in a food production process where hazards could be controlled, reduced or eliminated.

hazard - The ability to cause damage.

impact, environmental - Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services.

inputs and outputs - Material or energy that crosses a unit process boundary. Example — Materials may include raw materials, products, emissions, and waste.

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interested party - Individual or group concerned with or affected by the environmental performance of an organization.

life cycle - Consecutive and inter-linked stages of a product system, from raw material acquisition or generation of natural resources to the final disposal.

life-cycle assessment (LCA) - Compilation and evaluation, according to a systematic set of procedures, of the inputs and outputs of materials and energy and the potential environmental impacts of a product system throughout its life cycle.

life-cycle characterization - Element of the life-cycle impact assessment phase in which the potential impacts associated with the inventory data in each of the selected categories are analyzed.

media - The means or substance through which something is transmitted, e.g., air, water, or soil.

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

prevention of pollution - Use of processes, practices, materials, or products that avoid, reduce, or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources, and materials substitutions.

procedure - A specified way to perform an activity.

process - A set of interrelated resources and activities that transform inputs into outputs.

product - Any good or service.

risk - This is the probability that something undesirable will happen from exposure to a hazard.

risk assessment - Risk assessment is the process of gathering data and making assumptions to estimate short- and long-term harmful effects on human health or the environment from exposure to hazards associated with the use of a particular product or technology.

root cause - A fundamental deficiency that results in a nonconformance and must be corrected to prevent recurrence of the same or similar nonconformance.

stakeholders - Those groups and organizations having an interest or stake in a plant's EMS program (e.g., regulators, shareholders, customers, suppliers, special interest groups, residents, competitors, investors, bankers, media, lawyers, insurance companies, trade groups, unions, ecosystems, cultural heritage, and geology).

substitutes - A chemical, product, process, or technology, which may be substituted for another to perform the same function or achieve the same end result.

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target, environmental - Detailed performance requirement, quantified wherever 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.

total quality management (TQM) - A structured system of organizational change that aims to satisfy internal customers, external customers, and suppliers by integrating business, environment, maintenance, and continuous improvement considerations.

volatile - Ability to evaporate easily.

waste - Any output from the product system that is disposed of.

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INTRODUCTION

Building an EMS might sound like an overwhelming task for an organization, but it need not be. Since time and other resources are limited in any organization, it is important that your plant use its resources wisely. One way to do this is by preparing and following a **simple, effective plan**.

Fortunately, your plant can build on the experiences of other organizations that have already implemented an EMS. Another thing to keep in mind is to strive for simplicity. This means keep plans at a level that your plant is capable of executing during your initial implementation and build an EMS that your plant has the resources to sustain over the long term. **It is easier to add more detail to your plant's EMS as a part of continuous improvement than is to remove detail once it is in place.**

Figure 2-1 illustrates the initial steps in the EMS planning process. The importance of careful planning cannot be overemphasized. Taking the time to figure out **what** you need to do, **how** you will do it, and **who** must be involved will pay big dividends down the road.

Experience shows that using a **team approach** to planning and building an EMS is an excellent way to promote commitment and ensure that your objectives, procedures, and other system elements are realistic, achievable, and cost-effective. Ideas for using a team and involving employees are discussed in this section.¹

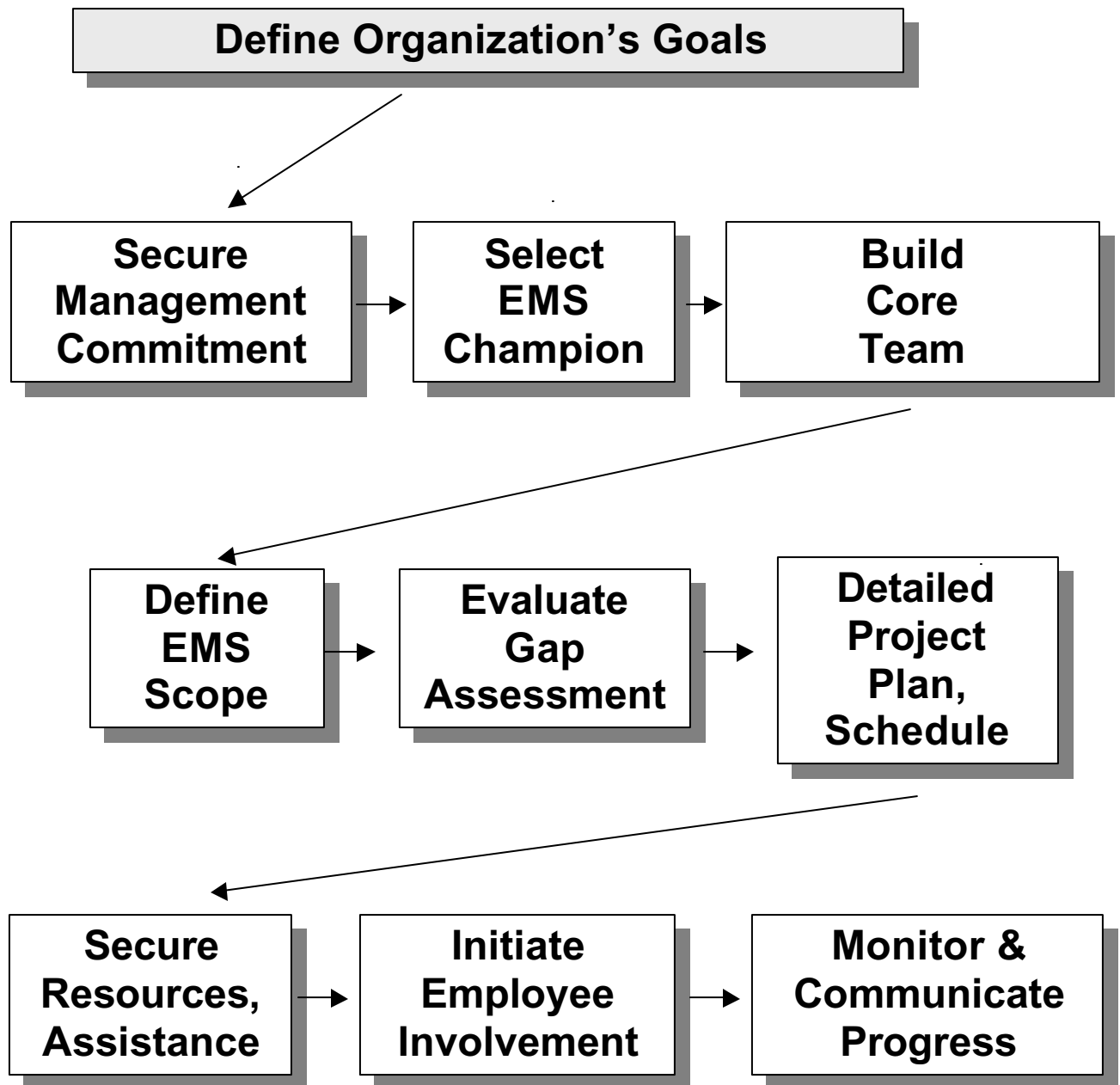
Hints: Keep these points in mind as you build your plant's EMS:

- Help is available — don't hesitate to use it. (See Attachment 2-A for information on resources).
- Pace yourself. Move quickly enough that employees stay interested and engaged, but not so fast that those involved are overloaded, or that the effort becomes superficial.
- Don't re-invent the wheel -- existing management practices should help your plant to meet EMS requirements. (10) In the Meat Processing Sector use and adapt parts you feel work for your plant from existing Hazardous Analysis and Critical Control Point (HACCP) systems.
- Consultants and assistance providers can help you evaluate your plant's existing EMS components and suggest approaches used successfully elsewhere. Explore ways to hold consulting costs down. You may be able to join forces with other plants to hire a consultant or sponsor a training course. (10)

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 10. Subsequent references to this document will be given in parentheses in text.

Figure 2-1: Initial EMS Planning Steps

Note: While displayed as a linear set of events, often many of these events affect each other and happen simultaneously.



(11)

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A first step in EMS planning is to **decide why you are pursuing the development of an EMS**. Are you trying to improve your environmental performance (for example, compliance with regulations or prevent pollution)? Are you trying to promote involvement throughout the plant? Write your goals down and refer back to them frequently as you move forward. As you design and implement the EMS, ask: “How is this task going to help us achieve our goals?” This also is a good time to define the scope of the EMS. (12)

EMS SCOPE

You will need to define the scope of the EMS.

The scope should be defined by:

- Identifying what it is that your plant 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 plant 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.

Management control 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 plant’s activities;
- Interfaces with services not completely within the scope of the EMS (e.g., a common effluent treatment plant); and
- The scope of environmental licenses, permits or approvals.

As part of defining the scope of the EMS, the plant should draw boundary conditions defining what it controls. The boundary conditions can be simple and include the plant 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 if the EMS of the plant has management control over them. A plant should not omit from its scope activities that it has management control over.

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Hint: Some organizations 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 they 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.

COMMITMENT

As shown in Figure 2-1, one of the most critical steps in the planning process is **gaining top management's commitment** to support EMS development and implementation. As discussed in Module 1, management 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 your plant's current approach and how those limitations can affect the plant's financial and other performance. 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. (12)

PROJECT CHAMPION

Not all organizations have the luxury of choosing among multiple candidates, but your choice of **project champion** is critical. The champion should have the necessary authority, an understanding of the plant, and project management skills. The champion should be a "systems thinker" (ISO 9000 or HACCP experience can be a plus, but is not necessary), should have the time to commit to the EMS-building process, and must have top management support. (12) The project champion serves as a leader for the EMS within your plant. Often in smaller organizations, this champion, among their many duties, is also the EMS representative.

CORE TEAM

Consider developing an EMS Core Team to provide guidance for the implementation project. Your Core Team should include representatives from key management functions, such as engineering, finance, human resources, production and/or service. 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. (12)

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.

Once the team has been selected, **hold a kick-off meeting** to discuss the plant's objectives in implementing an EMS, the steps that need to be taken initially, and the roles of team members among other topics. If possible, get top management to describe its commitment to the EMS at this meeting. The kick-off meeting also is a good opportunity to provide some EMS training for

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team members. The team will need to meet regularly, especially in the early stages of the project. Communicate progress of meetings to all employees. (12-13)

Continue to Define and Refine Your Project Plan and Schedule

Based on a review of the results of the gap assessment and using the initial draft action plan conducted in Module 1, prepare a detailed **project plan and budget**. The team should develop this detailed plan based on their understanding of the different business units of your plant. 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 some stretch 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. (13)

The plan and budget should be reviewed and **approved by top management**. In some cases, there may be **outside funding or other types of assistance** that you can use (trade association, a state technical assistance office, etc.). (13) Attachment 1-C provides a simplified example of a project plan and Attachment 2-B provides a graphic illustration of the sequence of events involved in implementation. A detailed plan should include timelines, anticipated staffing and funding requirements for each task. Expect the plan to evolve as the project proceeds.

Employee Involvement

An EMS is all about people and personal involvement in managing how an organization effects the environment. Look for ways at all levels and throughout all stages of the EMS implementation process to involve your staff. Employees are a great source of knowledge on environmental, health and safety issues related to their work areas as well as on the effectiveness of current processes and procedures. They can help the core team in drafting procedures. **Ownership** of the EMS will be greatly enhanced by meaningful employee involvement in the EMS development process. (13)

As you build the EMS, be sure to regularly **monitor your progress** against the project plan and **communicate** this progress within the plant. Be sure to communicate the **accomplishments** that have been made and describe what happens next. Build on small successes. Be sure to keep top management informed and engaged, especially if additional resources might be required. (13)

Environmental Policy

An environmental policy is your 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 your plans and business activities. Major environmental concerns can be addressed in your plant’s environmental policy statement.

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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 your facility will monitor and improve environmental performance; and
- Reflect the scope.

Consider the Scope of Your EMS

A policy should be appropriate for the nature and scale of your plant and should reflect your plant's core values both on ethical level as well as a business performance level.

Draft Your Environmental Policy Statement In General Terms

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

Next, think about *how* to put commitments into action. For example, your 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 your commitment to continual improvement.

Going From Policy to Procedures

Written procedures are necessary when an unacceptable risk of the activity being done incorrectly exists. When developing procedures, it is important to use a procedural format that your facility is familiar with. Attachment 1-D provides layout notes for EMS procedures.

Procedures should:

- Reference the section of the policy that is most relevant;
- Use dates and/or version numbers to help with document control and ensure all have most current versions;
- Clearly and concisely communicate who, what, when, where, and how;
- Provide continuity;
- Help identify areas for improvement; and
- Make transition easier.

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

The policy should relate to your products and services, as well as supporting activities. Consider the results of your **EMS checklist (see Module 1)** and your analysis of the **environmental aspects (Modules 3 and 4)** of your products, services and activities before finalizing the policy. These two steps can provide insight as to how your plant interacts with the environment and how well it is meeting its challenges. For example, information obtained from completing the checklist might help you define specific policy commitments.

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

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

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

Consider who should be involved in **developing the policy** and the best process for writing it. Input from a range of people within your plant should increase commitment and ownership.

Make sure that your plant's employees **understand** the policy. Options for communicating your policy internally include posting it around work sites (e.g., in lunchrooms), using paycheck stuffers, incorporating the policy into training classes and materials, and referring to the policy at staff 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**. Some options for external communications include placing the policy on business cards, in newspaper advertisements and in annual reports, among other options. You might choose to communicate the policy proactively, in response to external requests (or both). This decision should be factored into your overall strategy for external communication (see later discussion under “Communications”).

Consider how you would **demonstrate** that you are living by the commitments laid out in the policy. This is a good test of whether or not the policy is a “living document”. (16-17)

It is important to think through which commitments your plant will be capable of addressing. Do not include commitments in your policy that the plant will not be able to carry out. The following is a checklist of commitments or principles that you may wish to consider including in your plant's policy statement:

Key Policy Commitments:

- Continual improvement
- Pollution prevention
- Compliance with relevant laws and regulations (16)

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- Comply with applicable environmental laws and regulations;
- Work to achieve pollution prevention;
- Prevent accidents;
- Identify opportunities for risk reduction associated with the processes and chemicals used in your plant, the supplies procured, the products produced, and the disposal of waste products;
- Consider the life cycle (from raw materials extraction and processing to use and eventual disposal) of products produced, including packaging, so as to affect how suppliers and end users impact the environment through your products;
- Continue improvement in your use of cleaner technologies and processes, and in the safer use of chemicals;
- Practice wise resource management, including conservation of limited resources and reuse and recycling of materials; and
- Consider which goals of industry or your trade association could be adopted for your environmental policy statement.

Make sure top management commits to the environmental policy statement. If possible, the company president or plant manager should sign and date it. The final environmental policy statement should be posted or distributed to employees and other interested parties.

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

- Compliance with legal requirements and voluntary commitments;
- Pollution prevention;
- Continuous improvement in environmental performance, including areas not subject to regulation; and
- Sharing information on environmental performance and their operation of the EMS with the community. (17)

Sample Policy Commitments

ConAgra's Sustainable Development Commitment includes a commitment to pollution prevention.

Our Environmental Commitment

At ConAgra Foods, sustainable development requires reductions in the generation of wastes and pollutants, protection of clean air and water, sustainable protection of the land and the wise use of energy....

Kraft Foods International's environmental principles include commitments to compliance and continual improvement.

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Kraft Foods International is committed to these Environmental Principles.

To conduct operations in accordance with all applicable laws and regulations...

...To continually reevaluate these principles to ensure that they remain consistent with our policy of minimizing the environmental impact of our activities and promoting the sustainability of the natural resources upon which we depend.

Every plant 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. Deeds, not words, are what speak.

Compliance

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

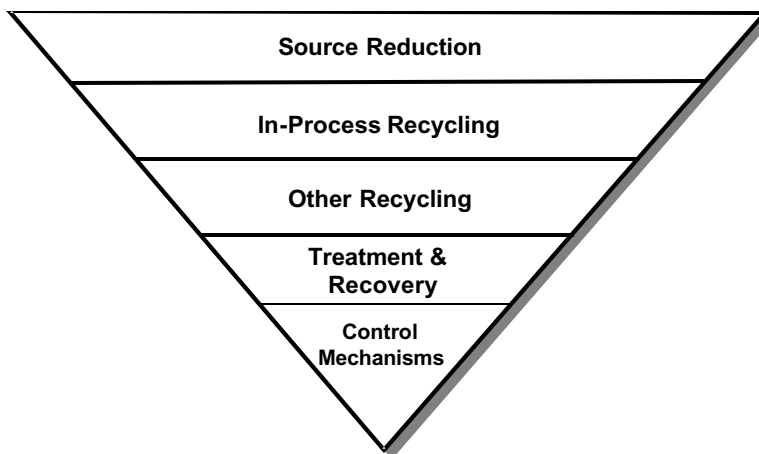
- Develop and communicate an environmental **policy** that includes a commitment to compliance;
 - Develop and implement a procedure to identify, analyze and have **access to environmental laws and regulations**;
 - Set **objectives and targets** in line with its environmental policy, which includes 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**.
- (18)

While the requirements noted above relate directly to a plant's management of legal requirements, each of the EMS elements described in this Guide can contribute to enhanced compliance (including communication, documentation and document control, records management, EMS audits, and management review). An EMS that includes the elements described in this Guide will help your plant improve or maintain its compliance performance and facilitate the establishment of objectives and targets that go "beyond compliance." (18)

Pollution Prevention

EMS design and implementation also should take into account the **Pollution Prevention (P2) hierarchy** (see Figure 2-2). In evaluating P2 opportunities, organizations should start at the top of the pyramid (i.e., source reduction) and work their way down as needed to define the most appropriate methods for preventing pollution. (18)

Figure 2-2: Pollution Prevention Hierarchy



(18)

Continual Improvement

Continual improvement is the process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy. An EMS by design looks for ways and means to prioritize and improve. While this does not mean that you must improve in all areas at once, the policy should drive your plant's efforts to continually improve environmental management (and the improved performance that results from these efforts). (16)

The following is a sample environmental policy statement that in some way incorporates most of the principles listed above.

[YOUR COMPANY] (ABC Meat Processing)

ENVIRONMENTAL POLICY

[This is an example policy. Adapt portions if they are useful and applicable for your plant.]

ABC Meat Processing Company is committed to managing environmental matters as an integral part of our business. In particular, it is our policy to assure the environmental integrity of our processes and facilities at all times and at all places. We will do so by adhering to the following principles:

COMPLIANCE

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

RISK REDUCTION, PREVENTION, and RESOURCE MANAGEMENT

We will seek opportunities, beyond regulatory compliance requirements, for reducing risk to human health and the environment, and we will establish and meet our own environmental quality standards where appropriate.

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

We will strive to minimize releases to the air, land, or water through use of cleaner technologies and the safer use of chemicals. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste.

We will manage scarce resources, such as water, energy, land, forests, in an environmentally sensitive manner.

COMMUNICATION

We will communicate our commitment to environmental performance to our employees, vendors, and customers. We will solicit their input in meeting our environmental goals and in turn will offer assistance to meet their goals.

CONTINUOUS IMPROVEMENT

We will measure our progress as best we can. We will review our progress at least on an annual basis. We will continuously seek opportunities to improve our adherence to these principles and to improving our environmental performance, and we will periodically report progress to our stakeholders. (90)

{Signature}

President

Date

HOMEWORK

Who is your EMS representative and Core Team? Have the Core Team look at what the scope of the EMS should be, justify it, and get senior management buy in to your approach. If your plant has a policy or guiding principles, determine if it meets the recommended components. If no policy exists create one and provide it to top management for their consideration.

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**ATTACHMENT 2-A: ADDITIONAL SOURCES OF INFORMATION AND CONTACTS
(189)**

There are many resources available to help your plant develop and implement an EMS that are 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>	US EPA EMS Home Page	www.epa.gov/ems	Information about EPA's efforts to develop policies and related materials about environmental management systems (EMS). This site lists state programs for EMS and nonprofit TAPS.
	Small Business Compliance Assistance Centers	http://www.epa.gov/compliance/assistance/centers/index.html	Centers are Internet Web Sites with comprehensive environmental compliance, technical assistance, & pollution prevention information for various industry sectors.
	Design for the Environment (DfE) Guide, Fact Sheets and EMS Template	http://www.epa.gov/opptintr/dfe/tools/iems.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	http://www.epa.gov/compliance/resources/policies/incentives/smallbusiness/sbcompolicy.pdf	Effective May 11, 2000, this policy supercedes the June 1996 version. Published in the Federal Register on April 11, 2000 (65 FR 19630).

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FEDERAL AGENCIES

Compliance-Focused EMS – Enforcement Agreement Guidance	http://www.epa.gov/compliance/resources/publications/incentives/ems/ems12elemr.pdf	Presents the key elements of a compliance focused EMS model.
Environmental Compliance Auditing Protocols	EPA National Service Center 1-800-490-9198 (for environmental publications) http://www.epa.gov/compliance/resources/policies/incentives/auditing/	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.
Pollution Prevention Information Clearinghouse (PPIC)	1-202-566-0799 http://www.epa.gov/opptintr/library/ppicindex.htm	Technical Information on materials and processes, including publications related to waste minimization and pollution prevention.
Office of Wastewater Management	http://www.epa.gov/OWM/	Provides information on various EPA-sponsored EMS projects.
Public Information Center	http://www.epa.gov/epahome/pic.htm	General information about EPA programs.
RCRA, Superfund & EPCRA Hotline	1-800-424-9346	Provides information about hazardous waste regulations and handles requests for federal documents and laws.
Small Business and Asbestos Ombudsman	http://www.epa.gov/sbo/whois.htm 1-800-368-5888	Information and advice on compliance issues for small quantity generators of hazardous waste.
Technology Transfer & Support Division of EPA's Office of Research and Development's (ORD) National Risk Management Research Laboratory (NRMRL)	http://www.epa.gov/ttnrmrl/ 1-513-569-7562	Access to the ORD research information and publications.
TSCA Assistance Information Service (TAIS)	1-202-554-1404	Assistance and guidance on TSCA regulations.

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FEDERAL AGENCIES

	EnviroSenSe	http://es.epa.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.
<i>U.S. Small Business Administration</i>	SBA Answer Desk	1-800-8-ASK-SBA	Information about SBA programs, and telephone numbers for local offices.
	SBA Home Page	http://www.sbaonline.sba.gov	Information about business services available to your organization, with links to other related sites.
<i>Government Printing Office</i>	GPO Superintendent of Documents	1-202-512-1800	Information about available documents and instructions on ordering GPO publications.
<i>US Department of Energy</i>	Pollution Prevention Information Clearinghouse	http://epic.er.doe.gov/epic/	Pollution prevention and environmental design information.

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STATE AGENCIES			
Organization	Resource	Telephone Number / Internet Address	Description
<i>State Environmental Protection Agencies</i>	Environmental Assistance Programs	Contact your state's Environmental Protection Agency	Many state environmental protection agencies provide publications, technical assistance, and information on pollution prevention technologies, waste reduction, and regulatory compliance, at little or no charge.
	Small Business Assistance Programs (Mandated under Title V of the Federal Clean Air Act)	Call the EPA Small Business Ombudsman (1-800-368-5888) for the phone number and address of the Small Business Assistance Program in your state.	Provides information and technical assistance to small businesses regulated under the Clean Air Act. Several states, including Texas and Virginia have established "EnviroMentor" programs with their Small Business Assistance offices, to help small companies comply with regulations.
	State and Local Pollution Prevention Programs	Contact the National Pollution Prevention Roundtable (1-202-299-9701; http://www.p2.org/) for the phone number and address of the pollution prevention program in your 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 (WRAP)	Iowa Department of Natural Resources	502 E. 9 th Street Des Moines, IA 50319-0034 Phone: 1-515-281-4367; Fax: 1-515-281-8895 http://www.state.ia.us/dnr/organiza/wmad/wmabureau/pollution/wrap.html	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 your state agency for details of existing programs and other forms of assistance available.

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NON-PROFIT ORGANIZATIONS

Organization	Address	Phone Number	Description
Industrial Technology Institute (ITI) (also known as the Michigan Manufacturing Technology Center)	2901 Hubbard Road P.O. Box 1485 Ann Arbor, Michigan 48106-1485	1-800-292-4484 Fax: 1-734-451-4201	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.

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INTERNET RESOURCES

Resource	Internet Address	Description
American National Standards Institute (ANSI) Online	http://www.ansi.org	Contains information related to the American National Standards Institute, including meetings, events, and standards information databases.
Canadian Standards Association	http://www.csa.ca/language/default.asp?thisUrl=%2FDefault%2Easp	A center for information and services related to ISO 9000 and ISO 14000, maintained by the Canadian Standards Association.
Consortium on Green Design and Manufacturing (UC-Berkeley)	http://cgdm.berkeley.edu/	Environmental design and sustainable development.
Industrial Technology Institute (ITI) (also known as the Michigan Manufacturing Technology Center) Home Page	http://www.iti.org	Information about ITI, how to find environmental information on the Internet, and links to other organizations.
International Network for Environmental Management (INEM)	http://www.inem.org/	Case studies, publications and how-to information on environmental management. Interactive tools for assessing environmental policies and reports.
ISO 14000 Information Center	http://www.iso14000.com	Answers to questions on ISO 14000 standards.
ISO 14000 Integrated Solutions (ANSI/GETF)	http://www.gnet.org	Will provide training, conferencing, on-line information services and publications on a fee basis.

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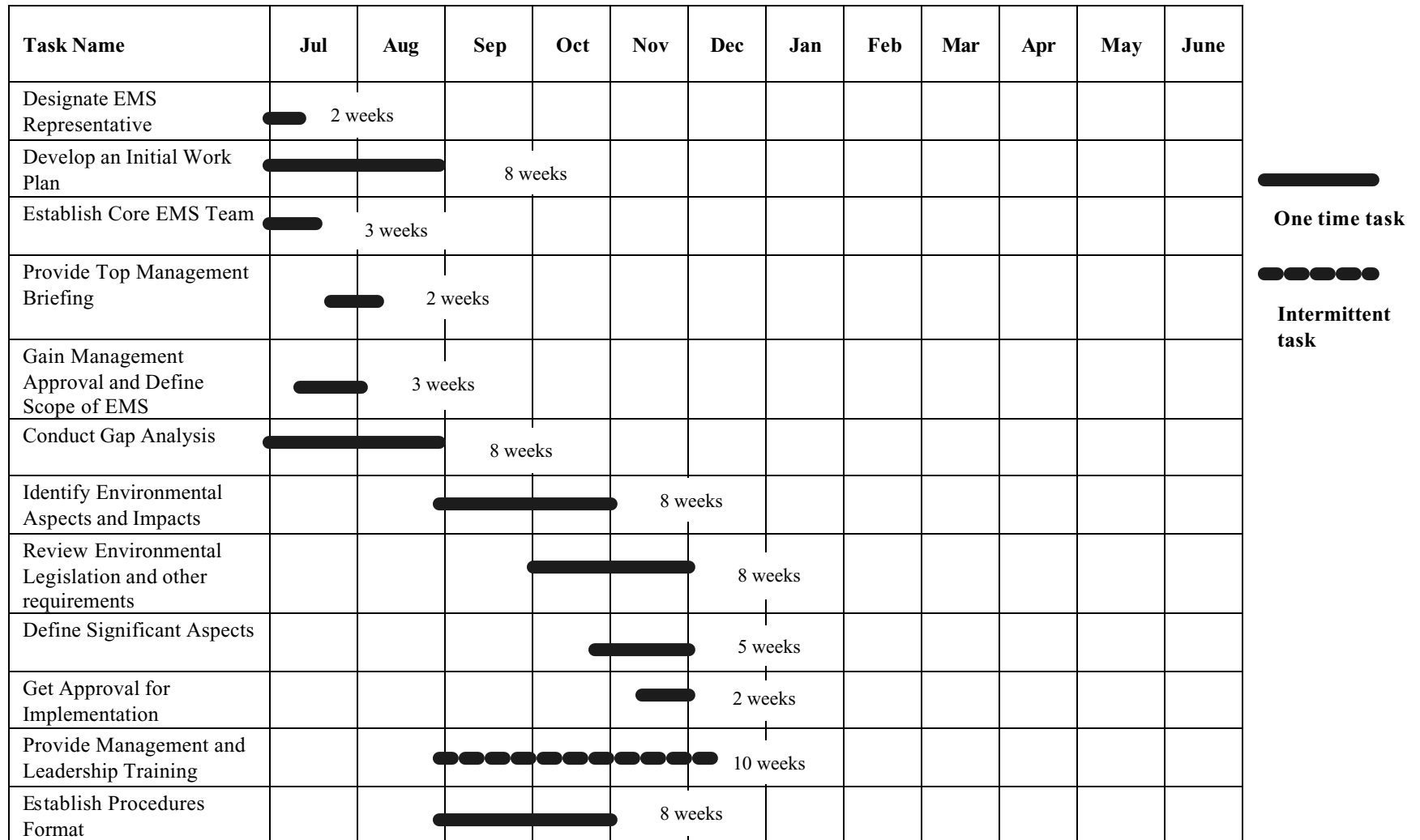
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INTERNET RESOURCES

Resource	Internet Address	Description
Multi-State Working Group on Environmental Performance	http://www.mswg.org/	Describes the activities of this group regarding EMS and ISO 14001.

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ATTACHMENT 2-B: GANTT CHART FOR EMS IMPLEMENTATION



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Module 2: Get Ready

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							
Identify and Develop Operational Controls / Emergency Plans							██████████	4 weeks						
Identify and Develop Measuring and Monitoring Programs							██████████	4 weeks						
Develop Community Outreach		██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	44 weeks
Designate and Formalize Roles and Responsibilities		██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████				24 weeks
Provide Internal Auditor Training								██████████	██████████	██████████	██████████			5 weeks
Identify Communication Requirements		██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	44 weeks
Identify and Develop Documents and Records Required					██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	██████████	36 weeks
Conduct Training Needs Assessment					██████████	██████████	██████████	██████████	██████████	██████████	██████████			18 weeks
Provide Documentation and Record Keeping Training						██████████	2 weeks							
Provide Employee Implementation Training							██████████	██████████	██████████	██████████	██████████	██████████	██████████	22 weeks

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Module 2: Get Ready

Task Name	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	
Verification Test of Emergency Response Plans								●●●●●	5 weeks				
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

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Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry

Module 3: Identifying Environmental Aspects and Impacts

EMS Implementation Guide for the Meat Processing Industry
Module 3: Identifying Environmental Aspects and Impacts

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Module 3: Identifying Environmental Aspects and Impacts

INTRODUCTION

In order to control your plants environmental impacts, you must know what these impacts are **where these impacts come from**. Stated another way, *how does your plant (i.e., your plant's products, services and activities) interact with the environment?*¹

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 plant's activities, products or services that can have an impact or that can 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 plant's activities, products or services.

Therefore, the aspect is the cause and the impact is the effect.

These definitions can be difficult to understand. A simple example will help.

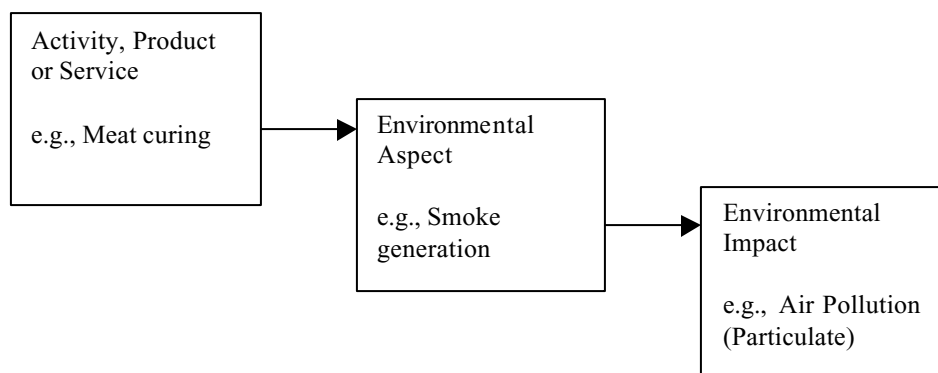
A curing operation at a plant is an activity. The air emissions that result from the burning of wood to cure or smoke the meat are the environmental aspect, since the air emissions interact with the environment. One of the environmental impacts associated with (or caused by) that operation is air pollution, 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 plant's "operations" drive the environmental aspects, which in turn drive the environmental impacts (see Figure 3-1).

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 20. Subsequent references to this document will be given in parentheses in text.

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Module 3: Identifying Environmental Aspects and Impacts

Figure 3-1: Relationship Between Activities, Products, and Services and Aspects and Impacts



THE RECOMMENDED APPROACH

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 your EMS (Module 2);
- Identify all activities, products, and services within the scope;
- Identify the environmental aspects associated with the activities, products, and services;
- Affirm that your plant's management has control and influence over aspects and determine the significance of the aspects (Module 4), and prioritize them accordingly; and
- Group the aspects according to some criteria to ensure that the number of aspects is manageable.

Hint: It is important to not get overly detailed in the process of identifying your aspects and impacts. **Do this to a level appropriate for your business.** Periodically step back as you proceed through the aspect and impact identification process and ask yourself if you are thinking about aspects at the level of detail that you would need if you were going to make a change now or in the future on how you manage that aspect. For example, it is good to know that your various cooling systems based on ammonia can result in emissions but there may be no need to think of each system separately especially if they are all maintained by the same maintenance team.

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). Tables 3-1 through 3-5 in Attachment 3-A present examples of activities, products, and services that are commonly associated with meat processing operations and their corresponding environmental aspects and impacts.

Note: The process tables are based on both core processes typically associated with the meat processing sector and on general plant operations.

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Module 3: Identifying Environmental Aspects and Impacts

In understanding environmental aspects and impacts, it helps to think about the processes in which your plant generates products and services. Figures 3-5 through 3-17 in Attachment 3-A present a number of process flow diagrams detailing the steps involved in production and manufacturing of different meat products.

Note: Figures 3-5 to 3-17 were developed using figures from United States Department of Agriculture (USDA) Guidebooks for the Preparation of Hazard Analysis and Critical Control Point (HACCP) Plans. **The use of process flow diagrams that have been developed specifically for your plant is encouraged.**

The tables and figures presented in Attachment 3-A can be used as a starting point in determining actual environmental aspects and impacts for your plant according to the recommended approach described below. Attachments 3-B and 3-C provide sample templates or procedures, 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 completed when you defined the scope of your EMS in Module 2. The boundaries of your 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 plants 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 your plant. The tables and figures given in Attachment 3-A identify general related activities, products and services for particular areas of meat manufacturing and processing. Additional detail is provided below to help you understand how these tables and figures relate to each other and how to use them.

In each of the tables, activities/products/services, and associated aspects and impacts have been identified for particular areas of meat processing and manufacturing. Keep in mind however the information presented in these tables is not a comprehensive listing of all activities/products/services and aspects and impacts associated with meat processing and manufacturing. These tables are for you to use as a starting point in beginning to think about your own plant.

You will in fact use the lists in the tables and amend them to reflect the actual environmental aspects and impacts identified for your plant. Be sure to look at all activities, products and services within the scope of your plant's EMS.

The process flow diagrams provided in Attachment 3-A are to assist you in identifying your plant's environmental aspects and impacts. The following list is a "cross-walk" of the process flow diagrams and topics covered in the tables.

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<u>Table</u>	<u>Process Flow Diagram</u>
Table 3-1: General Slaughtering Process	Figure 3-7, Figure 3-8, Figure 3-12
Table 3-2: General Meat Processing	Figure 3-5, Figure 3-6, Figure 3-7, Figure 3-8, Figure 3-9, Figure 3-10, Figure 3-11, Figure 3-12, Figure 3-13, Figure 3-14, Figure 3-15, Figure 3-16, Figure 3-17
Table 3-3: Specialized Meat Processing	Figure 3-14, Figure 3-15, Figure 3-16, Figure 3-17
Table 3-4: Rendering Process	Figure 3-7, Figure 3-8, Figure 3-12
Table 3-5: General Facilities Operation	No process flow diagrams

As a good starting point for this exercise, a general definition of what is meant by the term “activities, products, services” is needed. This is given below.

“Activities, Products and Services” is a catchall phrase that was developed to capture all of the “things” done at a facility or plant. When trying to identify activities, products or services you may (and probably will) find issues that do not obviously fall into any of these three categories (for the sake of simplicity just call these activities if you are not sure which label is the right one). 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 you have identified the aspect so that you can determine if there are any associated known or potential environmental impacts that require consideration.

Identify aspects and associated impacts for each of the activities, products or services.

Examples of common aspects relating to specific activities/products/services have already been given in the process tables in Attachment 3-A. Knowing these common environmental aspects, you can determine which activities, products or services at your plant, have a specific aspect associated with them.

For example, the aspect of generation of wastewater, you should identify all activities/products/services that result in wastewater being generated and those which also contribute to contaminant levels in the wastewater stream.

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 your plant may include some of the following:

- Employees;
- HACCP;
- Process flow chart;

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- Process hazard analysis;
- Emission inventory / risk assessment;
- Safety and hazard reviews; and
- Compliance and pollution prevention audits.

Hint: At the end of this section you should have identified and developed a list of all activities, products and services related to your plant and their associated aspects and impacts. A sample template is given in Attachment 3-B to help you organize these. Keep in mind that if your plant has not previously identified these, your list will not likely be 100%-complete or correct. Don't be discouraged, rather think about applying a "90 / 10 rule". Get about 90 % of the way there and realize that as you work on subsequent parts of your EMS you will identify other aspects and impacts you had not originally thought of and add them into your EMS. As others in your plant become more aware of the environment they may also identify additional aspects and impacts.

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

Data Sources for Identifying Environmental Aspects and 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 (see Figures 3-5 to 3-17): 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. Your HACCP process maps will provide you with 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.

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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.

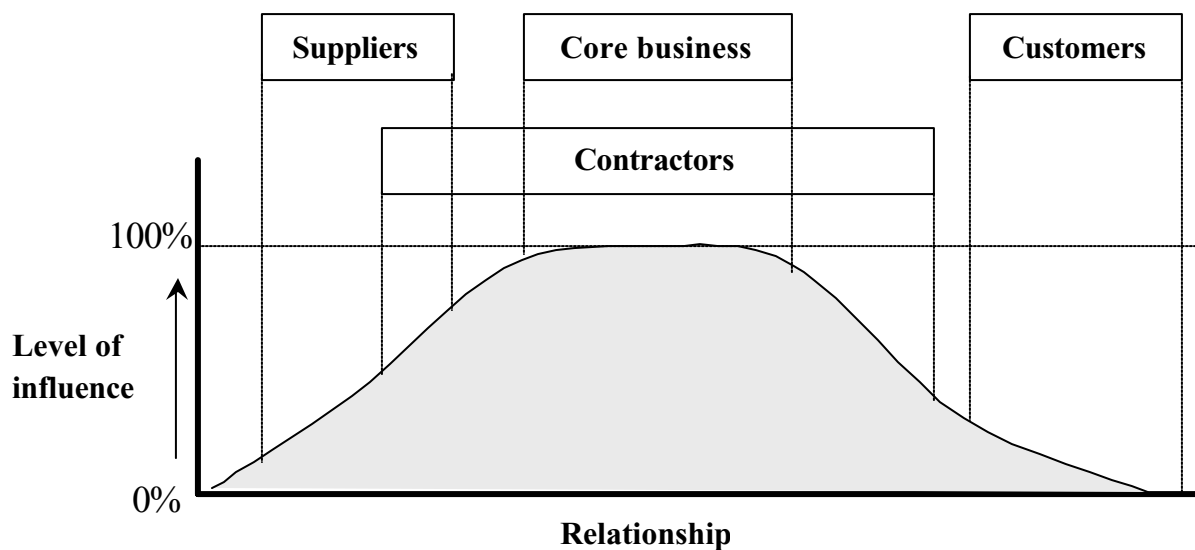
Pollution Prevention or Waste Minimization Audits: Used to identify opportunities to reduce or eliminate pollution at the source and to identify recycling options. Requires fairly rigorous assessment of plant operations. Does not usually examine off-site impacts.

Environmental Property Assessments: Used to assess potential environmental liabilities associated with plant or business acquisitions or divestitures. Scope and level of detail is variable. This does not assess impacts associated with products or services. (97)

Identify and assess environmental aspects that the organization **can control** and over which it can **have an influence** (see Figure 3-2). An organization is **not expected** to manage issues outside its sphere of influence or control. (20)

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

Figure 3-2: Assessment of Level of Control or Influence



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.

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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.

Hint: In keeping with the less complexity is better approach, use the figures in this guide and your own detailed process diagrams as tools to ensure that you don't miss aspects and impacts you were not previously considering in your existing environmental programs. At the same time remember that you do not need to create a list that itemizes every impact associated with every process step in those figures. **The level of detail provided in this portion of this guide is in case you need it, and is not designed to suggest that all plants should have this much detail.**

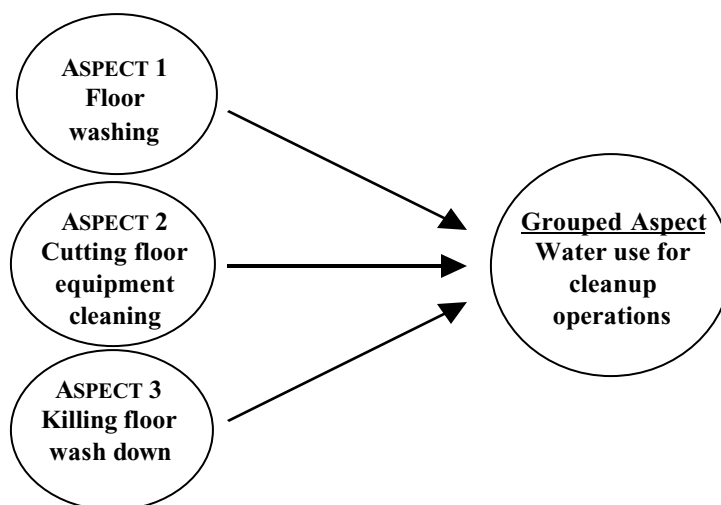
The first level of organization of aspects should be the categories defined on a practical level for your plant. Use categories that fit with the way your plant works. All aspects should be placed in one of these categories, which can accommodate any number of individual aspects. Match the categories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

Examples (see Figure 3-3):

A plant that has different operating areas (killing 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 various trades perform work 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.

Figure 3-3: Grouping of Aspects



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Be sure that when you group aspects, that you **don't loose track** of the areas where impacts occur and the sources of the impacts.

If, for example, all hazardous wastes at the plant are collected and disposed of the same way then these aspects should be combined into one group. Note: 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 a 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 plant-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 you might achieve certain efficiencies through a plant-wide effort, your actual environmental improvement will be attained through objectives set for each process step.

General rule of thumb: A manageable list might include anywhere between **20 - 50 aspects**. If your list includes < 20 or > 50 aspects, you should re-evaluate your grouping scheme. More than 50 aspects are possible if you have a larger fully integrated plant with your own water treatment and rendering operations.

Remember to keep it simple!

LEGAL AND OTHER REQUIREMENTS

Once you have identified your activities, products, and services and associated environmental aspects and impacts, consider legal and other requirements related to these aspects and impacts. By the end of this module you will have built onto the aspect and impact list you previously created, by stating explicitly the legal and other requirements of each aspect and impact. It is recommended that you first develop a listing of activities, products, services and environmental aspects and impacts and then examine legal and other requirements related to these, rather than first assessing your 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 you operate apply to your plant's activities, products and services, aspects and impacts?

Legal requirements include:

- Federal statues and regulations;
- State and local regulations;
- Standards in locations where your company sells products/services; and

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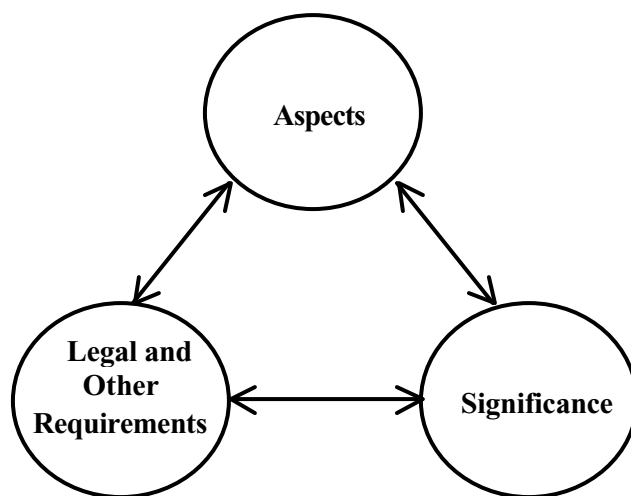
- Permit conditions.

Other requirements might include, for example:

- Company-specific codes, and
- Other industry codes or programs to which your plant voluntarily subscribes (e.g., AMI or AAMP policies).

Your plant's EMS should include a procedure **for identifying, having access to, and analyzing** applicable legal and other requirements. (25) Attachment 1-B in Module 1 of this guide provides a good starting list of Federal requirements to consider. Attachment 3-D provides a sample procedure for the identification of legal and other requirements. Figure 3-4 illustrates the relationship between aspects, legal and other requirements, and significance.

Figure 3-4: The Relationship Between Aspects, Legal and Other Requirements, and Significance



Your first step will be to obtain information about applicable laws and regulations, their interpretation, and how they impact your 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 (see USEPA web site at <http://www.epa.gov>);
- Public libraries;
- Seminars and courses;
- Newsletters / magazines;
- Consultants and attorneys; and
- Customers, vendors and other companies. (25)

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In order to consult and analyze these requirements on a regular basis, you must 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 you have established the requirements that apply to your plant, your 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.

Such Environmental Management Programs (EMPs) will be discussed further in Module 5.

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 plant) is an important but often overlooked step. (26). Communications programs will be discussed at length in Module 6.

As with many EMS elements, this is **not a “one time” activity**. Since legal and other requirements change over time, your process should ensure that you are working with up-to-date information. (26)

HOMEWORK

Your homework for this module will be to complete the aspects, impacts and legal and other requirements analysis.

Once you have created your list of aspects and impacts and have identified associated legal and other requirements, move on to Module 4.

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ATTACHMENT 3-A: IDENTIFYING ACTIVITIES, PRODUCTS, AND SERVICES, ENVIRONMENTAL ASPECTS AND IMPACTS ASSOCIATED WITH MEAT PROCESSING OPERATIONS

Process flow diagrams and tables of aspects and impacts are provided in this Attachment to assist you in identifying your plant’s environmental aspects and impacts. The following list is a “cross-walk” of the process flow diagrams and topics covered in the tables.

<u>Table</u>	<u>Process Flow Diagram</u>
Table 3-1: General Slaughtering Process	Figure 3-7, Figure 3-8, Figure 3-12
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Table 3-4: Rendering Process	Figure 3-7, Figure 3-8, Figure 3-12
Table 3-5: General Facilities Operation	No process flow diagrams

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Table 3-1: General Slaughtering Process
 (Related Process Flow Diagrams: See Figure 3-7, Figure 3-8, Figure 3-12)

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
1 - Housing live animals	Animal waste (manure) generated	<p>If untreated and not properly handled, wastes from animals emitted into the environment can cause widespread contamination of the air, surface water, groundwater and land</p> <p>For example, if mishandled, manure may contaminate water supplies with nitrogen, phosphorus, inorganic salts, organic solids and microorganisms. If present in sufficient quantities, those contaminants can cause considerable problems. Phosphorus is one of the most common and serious surface water contaminants causing eutrophication</p>
	Odors generated	<p>Offensive odors can be emitted into the environment</p> <p>Such odors can negatively impact human health and quality of life</p>
	Water effluent generated from daily washing of barn facilities	<p>Environmental hazards associated with water effluent high in BOD and suspended solids</p> <p>Excess water use could lead to depletion of a finite resource</p> <p>Use of and disposal of water for washing can cause pollution and disruption of natural systems</p>
2 - Stunning/killing	Use of fuel/energy	Energy used in the case of mechanical or electrical stunning
	Air pollutants generated	<p>Carbon dioxide stunning operations may be sources of CO₂ emissions</p> <p>Carbon dioxide is the primary global warming gas</p> <p>Global warming has multiple effects including not only extending the range of tropical pests and diseases but increasing the likelihood of fires and severe weather events such as storms, floods and drought</p>

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Animal waste (blood) produced

The blood recovered is sent for edible or inedible rendering

The disposal of blood as sewage can drive up the Biological Oxygen Demand In wastewater streams

Generation of animal-by product waste

Three categories of animal waste materials are distinguished:
(a) High risk category, includes animal by-products presenting a risk related to the presence of residues of prohibited substances used illegally or residues of environmental contaminants. These materials must be completely disposed of as waste by incineration or landfill

Impacts associated may include increased disposal to landfill sites

Landfill sites can pollute the air, surface, and groundwater, spoil the scenery and represent an imminent risk to public health

Disposal from incineration can release toxins into the air and create ash that requires disposal in hazardous waste landfills

(b) This category includes animal by-products presenting a risk related to animal diseases or a risk or residues of veterinary drugs. These materials may only be recycled (through rendering) for uses other than animal nutrition (ie: biogas, composting, oleo chemical products, etc.)

(c) This category includes by-products derived from healthy animals (i.e animals slaughtered for human consumption which passed the health inspection). Only by-products belonging to this category can be used as feed materials following appropriate rendering treatment.

Impacts associated with rendering plants may include harmful odors and air pollution

Airborne emissions from rendering plants may cause a variety of health issues

Harmful viruses and bacteria may not be fully eliminated in rendering and may be transmitted into the environment

Waste generated from rendering plants if released into the environment can result in negative environmental impacts

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3 - Carcass washing and rinsing

Water effluent generated

Environmental hazards associated with water effluent high in BOD, suspended solids, fats and grease

Excess water use could lead to depletion of a finite resource

Use of and disposal of water for washing/rinsing can cause pollution and disruption of natural systems

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Table 3-2: General Meat Processing

(Related Process Flow Diagrams: See Figure 3-5, Figure 3-6, Figure 3-7, Figure 3-8, Figure 3-9, Figure 3-10, Figure 3-11, Figure 3-12, Figure 3-13, Figure 3-14, Figure 3-15, Figure 3-16, Figure 3-17)

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
1 - Packaging material use	Use of resources in the manufacture of products for storage	<p>Excess water use could lead to depletion of a finite supply of natural resources</p> <p>Extraction and manufacturing of resources utilizing energy and generating flows of waste at each stage of processing</p> <p>Hidden impacts associated with the process of extraction, including soil erosion and degradation</p>
	Generation of waste from packaging	<p>Increased disposal to landfill sites</p> <p>Landfill sites can pollute the air, surface, and groundwater, spoil the scenery and represent an imminent risk to public health</p> <p>Disposal from incineration can release toxins into the air and create ash that requires disposal in hazardous waste landfills</p>
2 - Preparing/processing meat	Air exhaust and particulate generated from processing	<p>Pollutants emitted may include sulfur dioxide, nitrogen dioxide, carbon monoxide</p> <p>Harmful effects depend on their concentration and the duration of exposure to the pollutant</p> <p>Physical and chemical processes in an ecosystem may also suffer impacts</p>
	Generation of noise/vibration	<p>Impacts depend upon the magnitude and frequency of the noise and vibration</p> <p>High levels/intensities can be detrimental to quality, reliability, safety and performance in plant operations</p>

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<p>Generation of animal waste from processing</p>	<p>Some associated health effects may range from noise-induced hearing loss to high blood pressure</p>
	<p>Animal by-products presenting a risk related to the presence of residues of toxic substances or environmental contaminants used in processing, can be disposed of as waste by incineration or landfill</p>
	<p>Landfill sites can pollute the air, surface, and groundwater, spoil the scenery and represent an imminent risk to public health</p>
	<p>Airborne emissions from landfills are known to contain ammonia, hydrogen sulfide, VOCs, dust and endotoxins. These emissions cause health problems including headaches, sore throats, diarrhea and burning eyes</p>
	<p>Disposal from incineration can release toxins into the air and create ash that requires disposal in hazardous waste landfills</p>
	<p>Certain wastes are recycled at a rendering plant for production of tallow, grease and high-protein meat and bone meal</p>
	<p>Impacts associated with rendering plants may include harmful odors and air pollution</p>
	<p>Airborne emissions from rendering plants may cause a variety of health issues</p>
<p>Harmful viruses and bacteria may not be fully eliminated in rendering and may be transmitted into the environment</p>	
<p>Waste generated from rendering plants if released into the environment can result in negative environmental impacts</p>	

3 - Storage meat (cold)

Use of CFCs and HFCs as refrigerants

Emission of ozone-depleting substances (ODSs) such as CFCs into the atmosphere

Depletion of ozone will increase UV_B radiation reaching the earth's surface with adverse effects for humans, plants and animals

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Use of (anhydrous) ammonia as a refrigerant	<p>ODSs will also have a global warming effect</p> <p>Global warming can have multiple effects, not only extending the range of tropical pests and diseases but increasing the likelihood of fires and severe weather events such as storms, floods and droughts</p> <p>HFCs contribute to global warming but have no ozone depleting potential</p> <p>Ammonia is a dangerous refrigerant if not properly handled.</p> <p>Ammonia is primarily a respiratory toxicant that can cause lung irritation, and in higher concentrations, death.</p>
---	--

4 - Receiving and shipping meat	Emissions of CO, NOx, VOCs and particulates from vehicles	<p>These pollutants collectively impact urban air quality</p> <p>Air pollution from vehicles causes cancer and premature death in addition to aggravating chronic respiratory illnesses such as asthma</p> <p>Vehicles are a major source of carbon monoxide, the primary global-warming gas. This pollution has multiple effects, not only extending the range of tropical pests and diseases but increasing the likelihood of fires and severe weather events such as storms, floods and drought</p> <p>Pollutants may chemically react in the atmosphere to produce secondary pollutants such as acid rain and ozone</p>
	Noise generation from vehicles	<p>Impacts depend upon the magnitude of the noise</p> <p>Noise caused by traffic can endanger health and quality of life</p> <p>The growth and spread of traffic have exacerbated the noise problem</p>
	Waste generated from road and traffic sources	<p>These wastes may impact the environment by causing pollution of surface waters, groundwater and land</p> <p>Consumption of huge quantities of gasoline leads to offshore oil spills, expansion of offshore oil drilling, toxic leaks from underground storage tanks, fallout from acid rain, and runoff from roads and highways</p>

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Table 3-3: Specialized Meat Processing

(Related Process Flow Diagrams: See Figure 3-14, Figure 3-15, Figure 3-16, Figure 3-17)

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
1 - Meat cooking	Air pollutants generated	Possible odor, and products of combustion.
2 - Meat smoking	Air pollutants generated	<p>Particulate matter (PM), carbon monoxide (CO), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAH), organic acids, acrolein, acetaldehyde, formaldehyde, and nitrogen oxides are identified pollutants</p> <p>Acetic acid has been identified as the most prevalent organic acid present in smoke, followed by formic, propionic, butyric, and other acids</p> <p>The emission is also dependent on the quantity of wood (or liquid smoke) used, rather than the quantity of meat processed</p> <p>Emissions can impact air quality and pose a risk to human health</p>
	Odors generated	<p>Heating zones in smokehouses are a source of odor that includes VOCs</p> <p>VOCs are considered an odor nuisance in residential areas in close proximity to rendering plants</p> <p>In the presence of sunlight, VOCs can react with nitrogen oxides to create ground level ozone and photochemical smogs, which can in turn contribute to pollution of the atmosphere</p> <p>Some individual VOCs are believed to be a threat to human health. For example, benzene is classified as carcinogenic (cancer-causing) to humans and hexane as a cause of nervous system disorders</p>
	Use of resources (wood) to produce	Excess use could lead to depletion of a finite supply of natural resources

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smoke

Extraction and manufacturing of resources utilizing energy and generating flows of wastes at each stage of processing

Hidden impacts associated with the process of extraction, including soil erosion and degradation

3 - Meat curing (using salt, sugar, sodium nitrite and sodium nitrate)

Water effluent generated

Residual additives used in curing processes in water generated during cleaning steps and processing area wash downs resulting increased loading in wastewater

Salts are not removed by normal secondary treatment systems and therefore ability of treatment works to meet surface water discharge criteria is limited

4 - Ingredient application (spices, preservatives, extenders, etc)

Water effluent generated

Residual additives contributing to wastewater treatment requirements

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Table 3-4: Rendering Process
 (Related Process Flow Diagrams: See Figure 3-7, Figure 3-8, Figure 3-12)

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
1 - Washing of receiving area	Water effluent generated	Environmental hazards associated with water effluent high in BOD, suspended solids, fat and grease
		Excess water use could lead to depletion of a finite natural resource
		Untreated wastewater can cause pollution and disruption of natural systems
2 - Rendering processing	Air pollutants generated	Volatile organic compounds (VOCs) are the primary air pollutants emitted from rendering operations
		VOCs are considered an odor nuisance in residential areas in close proximity to rendering plants
		In the presence of sunlight, VOCs can react with nitrogen oxides to create ground level ozone and photochemical smog, which can in turn contribute to pollution of the atmosphere
	Some individual VOCs are believed to be a threat to human health. For example, benzene is classified as carcinogenic (cancer-causing) to humans and hexane as a cause of nervous system disorders	
Odors emitted		In addition, particulate matter is emitted from grinding and screening of the solids in the rendering process
		Offensive odors may be emitted into the environment
		Such odors can negatively impact human health and quality of life

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Table 3-5: General Facilities Operation
 (No Related Process Flow Diagrams)

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
1 - Fuel use/energy use	Fuel/energy used in operations	<p>Increased consumption will deplete a finite supply of natural resources Extraction and manufacturing of resources utilizes energy and generates flows of waste at each stage of processing</p> <p>Hidden impacts associated with the process of extraction of resources may include soil erosion and degradation</p> <p>Carbon dioxide, most of which results from fossil fuel combustion, causes about half of global warming. The greenhouse effect of fossil-fuel-derived methane, nitrous oxide, carbon monoxide, and the nitrogen oxides must also be considered</p> <p>Global warming has multiple effects including not only extending the range of tropical pests and diseases but increasing the likelihood of fires and severe weather events such as storms, floods and drought</p>
2 - Refrigeration/air conditioning systems	Use of CFCs and HFCs as refrigerants	<p>Emission of ozone depleting substances (ODSs) such as CFCs into the atmosphere</p> <p>Depletion of ozone will increase UV_B radiation reaching the earth's surface with adverse effects for humans, plants and animals</p> <p>ODSs will also have a global warming effect</p> <p>Global warming can have multiple effects, not only extending the range of tropical pests and diseases but increasing the likelihood of fires and severe weather events such as storms, floods and droughts</p> <p>HFCs contribute to global warming but have no ozone depleting potential</p>

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	<p>Use of (anhydrous) ammonia as a refrigerant</p>	<p>Ammonia is a dangerous refrigerant if not properly handled.</p> <p>Ammonia is primarily a respiratory toxicant that can cause lung irritation, and in higher concentrations, death</p>
<p>3 - Shipping and receiving operations</p>	<p>Emissions of CO, NOx, VOCs and particulates from vehicles</p>	<p>These pollutants collectively impact urban air quality</p> <p>Air pollution from vehicles causes cancer and premature death in addition to aggravating chronic respiratory illnesses such as asthma</p> <p>Vehicles are a major source of carbon monoxide, the primary global-warming gasses</p> <p>This pollution has multiple effects, not only extending the range of tropical pests and diseases but increasing the likelihood of fires and severe weather events such as storms, floods and drought</p> <p>Pollutants may chemically react in the atmosphere to produce secondary pollutants such as acid rain and ozone</p>
	<p>Noise generation from vehicles</p>	<p>Impacts depend upon the magnitude of the noise</p> <p>Noise caused by traffic can endanger health and quality of life</p> <p>The growth and spread of traffic have exacerbated the noise problem</p>
	<p>Waste generated from road and traffic sources</p>	<p>These wastes may impact the environment by causing pollution of surface waters, groundwater and land</p> <p>Consumption of huge quantities of gasoline leads to offshore oil spills, expansion of offshore oil drilling, toxic leaks from underground storage tanks, fallout from acid rain, and runoff from roads and highways</p> <p>Road salt used in parking lots and access roads can cause localized elevation of Sodium and Chloride concentration in soil and ground water an contribute to stressed vegetation</p> <p>Road salt can also contribute to Chloride concentrations in waste water or storm water runoff depending on sewer routing from parking areas.</p>

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4 – Vehicle Maintenance	Generation of Wastes	<p>Oils, lubricants and hazardous wastes generated vehicle fleet maintenance</p> <p>See above list associated with shipping and receiving and apply to on-site vehicles</p>
5 - General lighting	Use of fluorescent light bulbs	<p>There are environmental issues associated with the use and disposal of fluorescent light bulbs</p> <p>Spent light bulbs may contain hazardous waste. Most older fluorescent light ballasts have small capacitors that contain high concentrations of PCBs. PCBs are toxic chemicals which have a history of persistent and potential ecological damage.</p> <p>The mercury used in the light bulbs represents a small part of the total mercury potentially entering the environment. While high amounts of mercury are obviously toxic, there is debate over the health effects at lower levels.</p>
6 - General trash	Generation of solid waste	<p>Increased disposal to landfill sites</p> <p>Landfill sites can pollute the air, surface, and groundwater, spoil the scenery and represent an imminent risk to public health</p> <p>Disposal from incineration can release toxins into the air and create ash that requires disposal in hazardous waste landfills</p>
7 - Maintenance of plant grounds	Use and discharge of water for ground maintenance	<p>Impact may include excess water use and depletion of a finite resource</p> <p>Modern use of water resources can cause pollution and disruption of natural systems</p> <p>Water effluent generated can be treated at a waste water treatment plant</p>
	Use of fertilizers, pesticides and herbicides in maintenance operations	<p>There is a wealth of toxicological and environmental impact data for these products</p>

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The main chemicals contained in fertilizers are nitrogen and phosphorus. These two chemicals can cause accelerated growth of aquatic plants leading to oxygen depletion and large fish kills

Pesticides and herbicides contain toxic materials that pose environmental and Human health risks. Humans, animals, aquatic organisms, and plants can be severely threatened by these chemicals

Use of toxic substances for cleaning

Hazardous wastes generated from cleaning agents may pollute soil, air, surface water or groundwater

Pollution of soil may affect people who live on it, plants that put roots into it and animals that move over it

Air may become contaminated by direct emission of hazardous wastes
Evaporation of toxic solvents from cleaning agents is a common problem

River and lake pollution, if it is toxic enough, may kill animal and plant life
Immediately, or it may injure slowly

Underground pollutants can be carried by underground water flow to contaminate water supplies

Water effluent generated from washing can be treated at a wastewater treatment plant

8 - Washing and maintenance of machinery and plant

Use of toxic substance for cleaning

Hazardous wastes generated from cleaning agents may pollute soil, air, surface water or groundwater

Pollution of soil may affect people who live on it, plants that put roots into it and animals that move over it

Air may become contaminated by direct emission of hazardous wastes
Evaporation of toxic solvents from cleaning agents is a common problem

River and lake pollution, if it is toxic enough, may kill animal and plant life
Immediately, or it may injure slowly

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Underground pollutants can be carried by underground water flow to contaminate water supplies

Water effluent generated from washing can be treated at a wastewater treatment plant

9 - General operations

Use of salt for safety measures on floors

Wastes generated from the use of salt may pollute the surrounding soils, air, and waterways

Sodium and calcium chlorides can severely impact vegetation through soil contamination, direct foliar contact, and water pollution

Aquatic life may also be impacted due to changes in water chemistry and habitat loss

Pollutants can be seen to negatively impact human health and quality of life

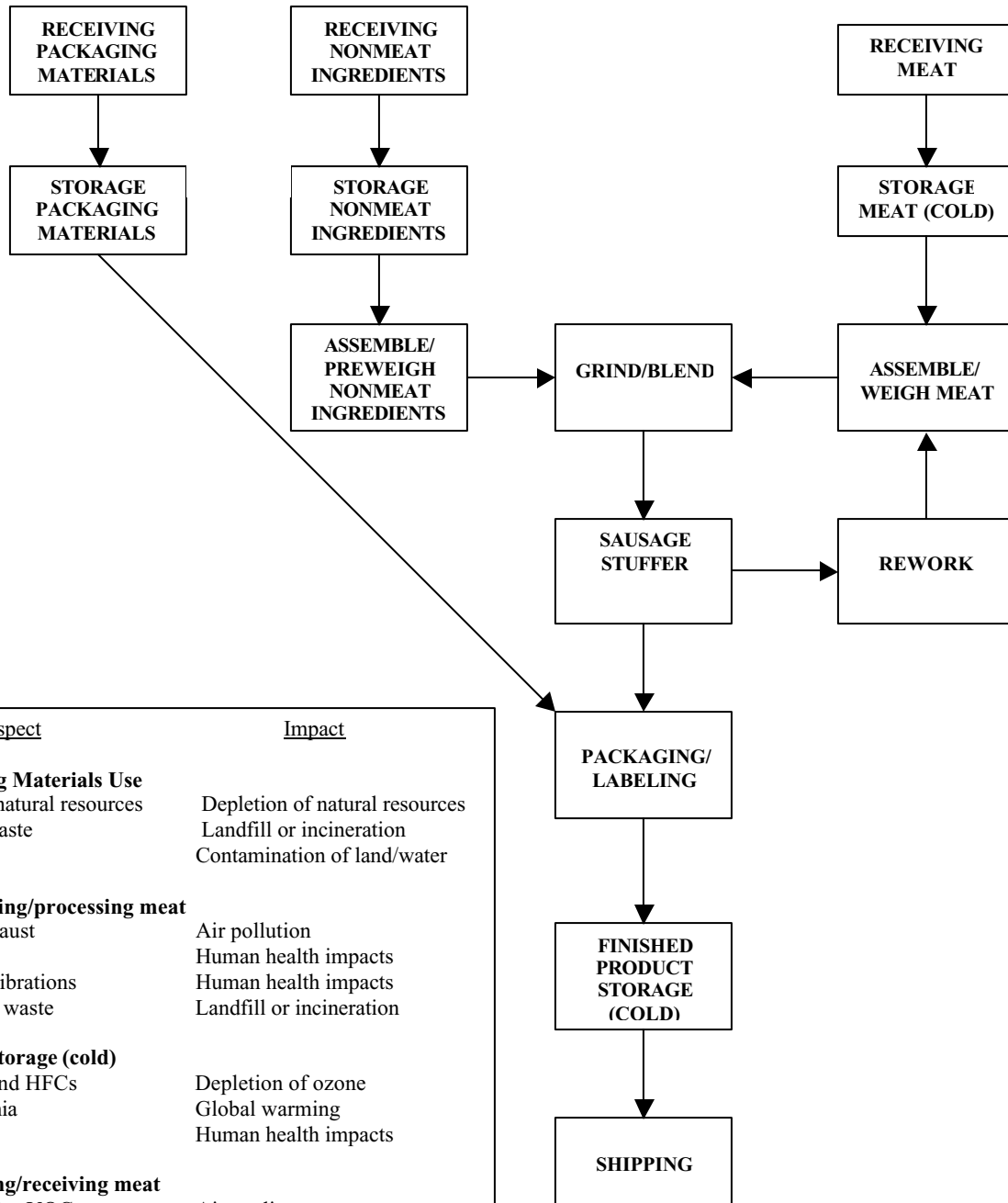
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Figures 3-5 - 3-17: Process Flow Diagrams

Figure 3-5

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: RAW PRODUCT, GROUND
PRODUCT: FRESH PORK SAUSAGE



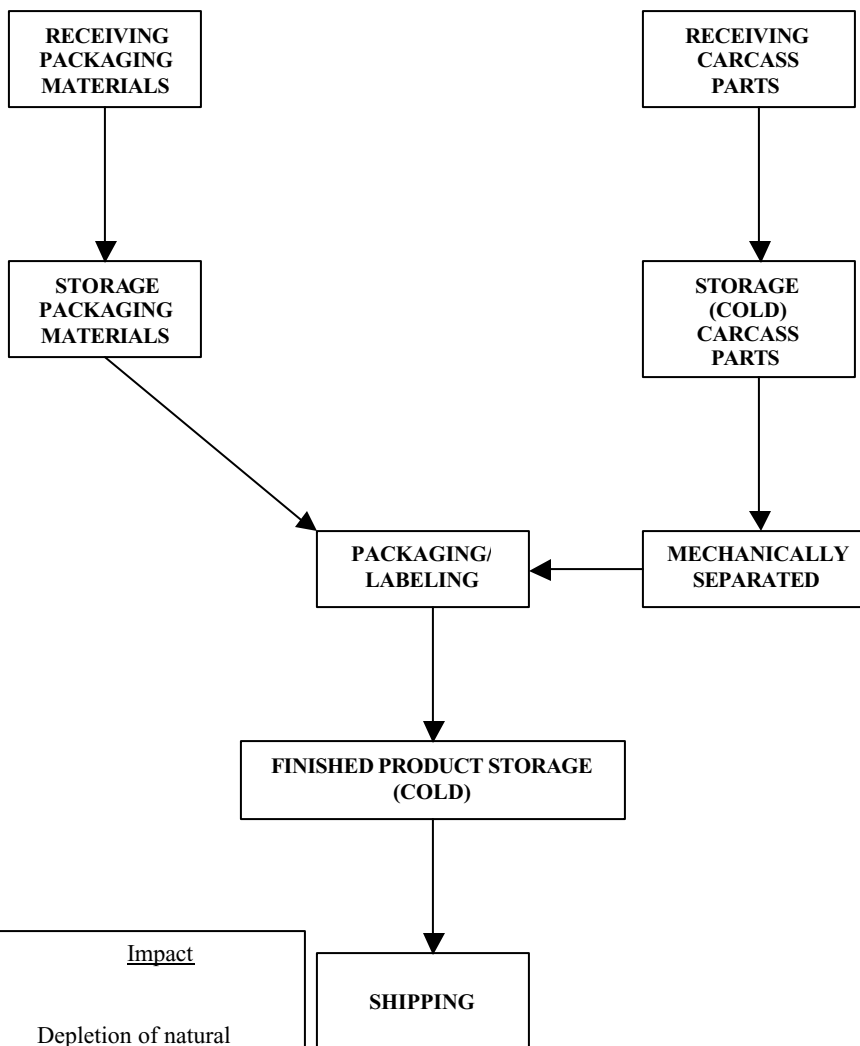
<u>Aspect</u>	<u>Impact</u>
Packing Materials Use	
Use of natural resources	Depletion of natural resources
Solid waste	Landfill or incineration Contamination of land/water
Preparing/processing meat	
Air exhaust	Air pollution Human health impacts
Noise/vibrations	Human health impacts
Animal waste	Landfill or incineration
Meat Storage (cold)	
CFCs and HFCs	Depletion of ozone
Ammonia	Global warming Human health impacts
Shipping/receiving meat	
CO, NOx, VOCs	Air quality Human health impacts Global warming
Noise	Human health impacts
Road/traffic waste	Contamination of land/water

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Figure 3-6

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: MECHANICALLY SEPARATED (SPECIES)
PRODUCT: MECHANICALLY SEPARATED PORK



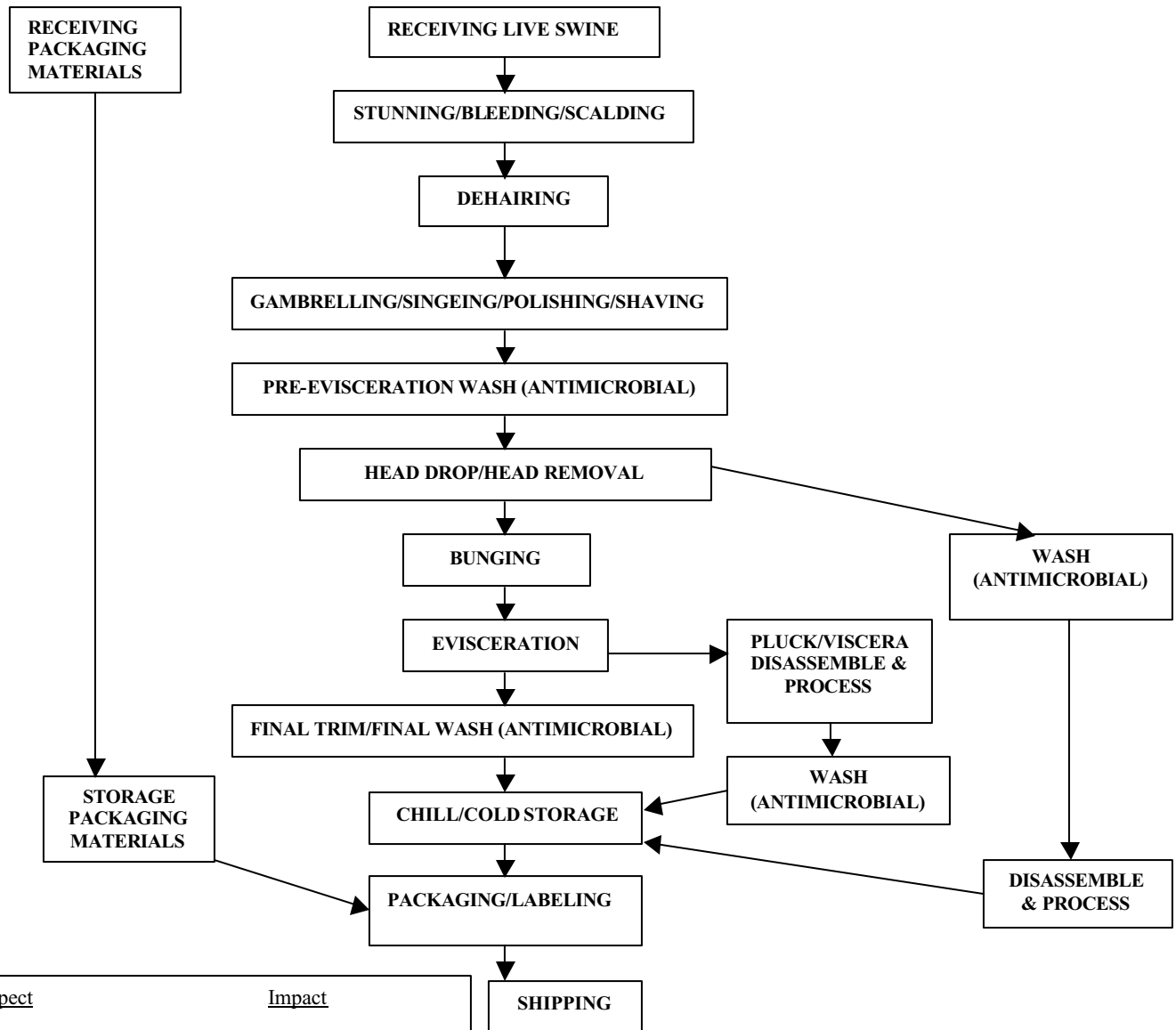
<u>Aspect</u>	<u>Impact</u>
Packing Materials Use	
Use of natural resources	Depletion of natural resources
Solid waste	Landfill or incineration Contamination of land/water
Meat Storage (cold)	
CFCs and HFCs	Depletion of ozone
Ammonia	Global warming Human health impacts
Shipping/receiving meat	
CO, NOx, VOCs	Air quality Human health impacts Global warming
Noise	Human health impacts
Road/traffic waste	Contamination of land/water

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Figure 3-7

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: SLAUGHTER
PRODUCT: PORK (CARCASSES)



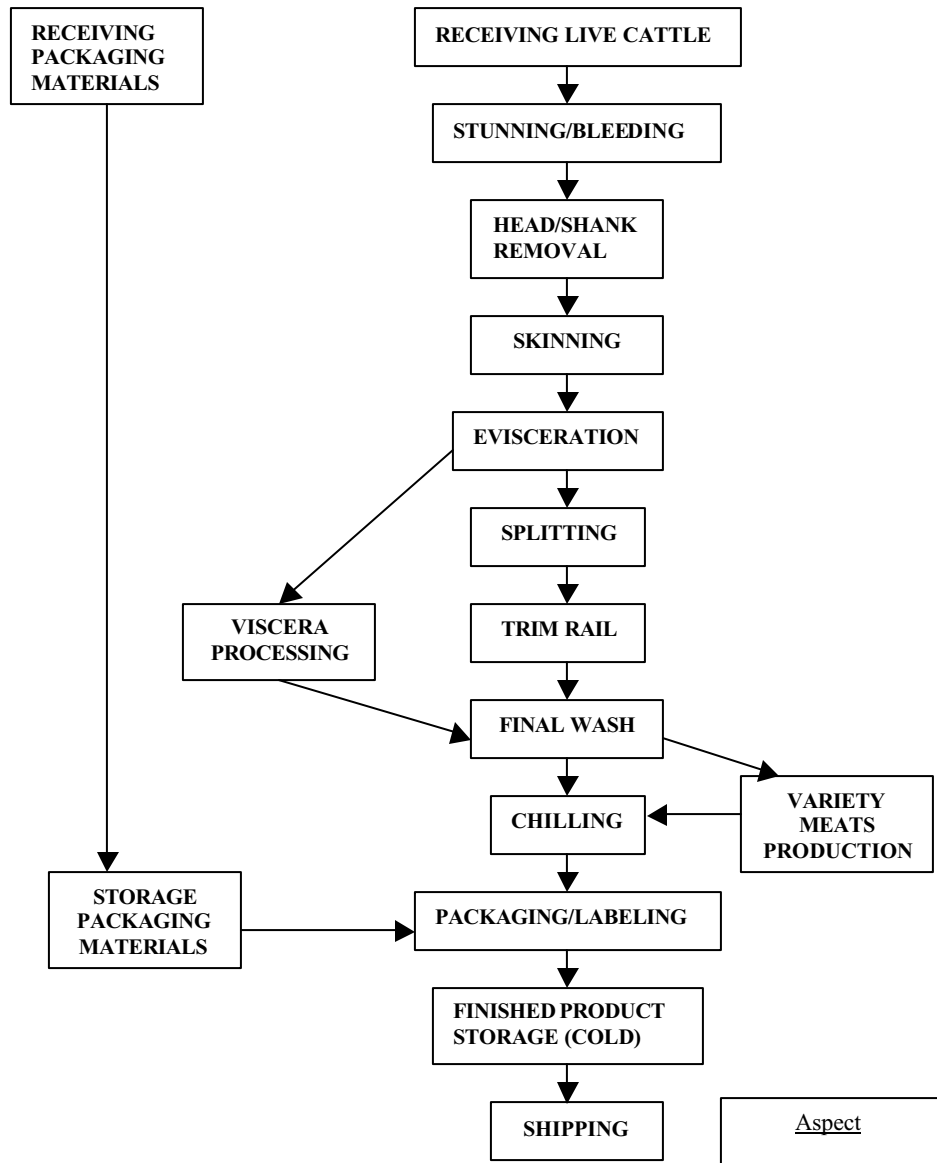
<u>Aspect</u>	<u>Impact</u>
Housing live animals	
Animal waste	Contamination of land/water
Odors	Air pollution
Water effluent	Human health impact
Sunning/killing	
Fuel/energy usage	Depletion of natural resource
Air emissions	Air pollution
Animal waste	Landfill or incineration
	Human health impacts
Carcass washing and rinsing	
Water effluent	Depletion of natural resource
	Contamination of water supply
	Human health impacts

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Figure 3-8

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: SLAUGHTER
PRODUCT: BEEF



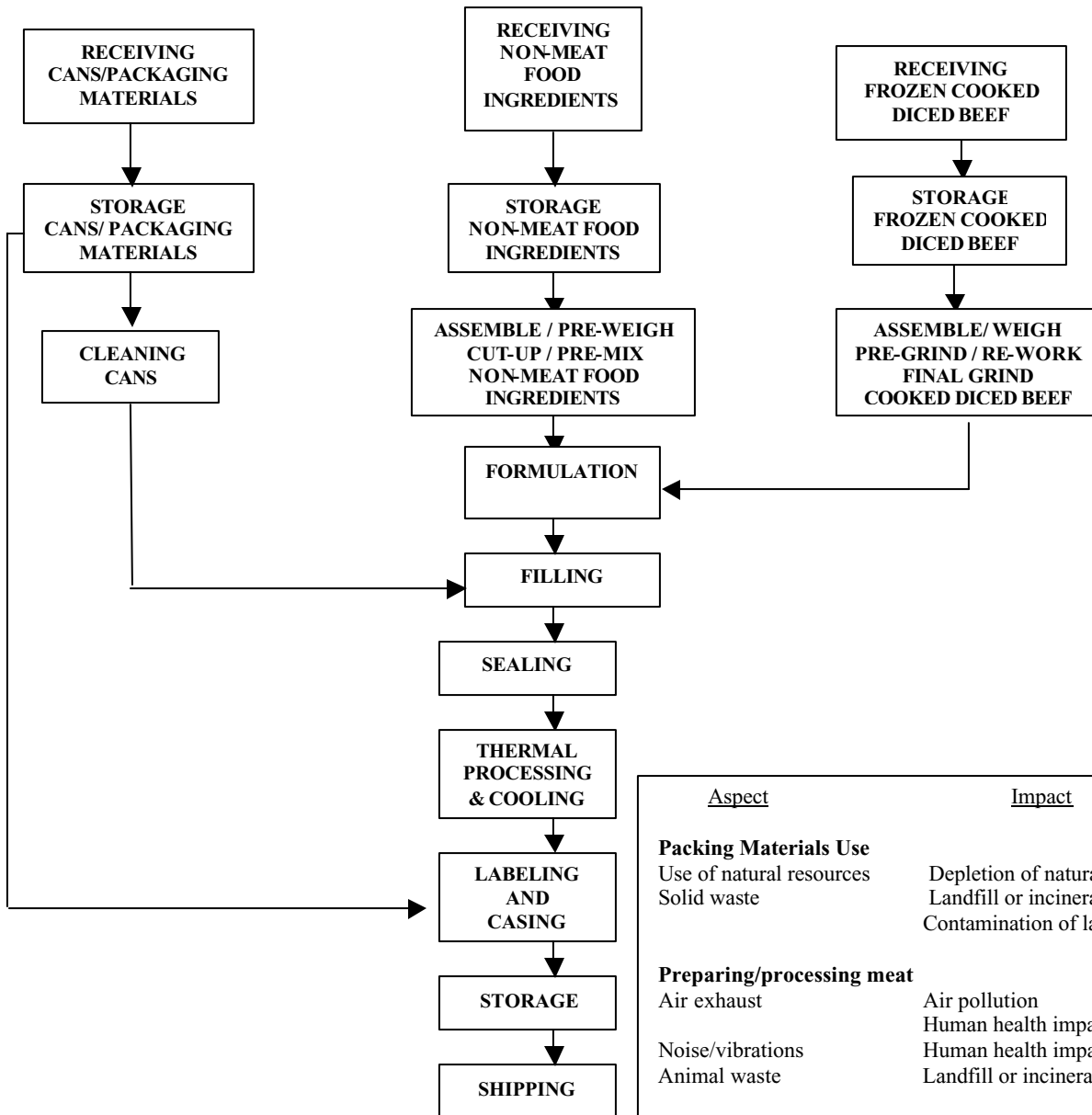
<u>Aspect</u>	<u>Impact</u>
Housing live animals	
Animal waste	Contamination of land/water
Odors	Air pollution
Water effluent	Human health impact
Sunning/killing	
Fuel/energy usage	Depletion of natural resource
Air emissions	Air pollution
Animal waste	Landfill or incineration
	Human health impacts
Carcass washing and rinsing	
Water effluent	Depletion of natural resource
	Contamination of water supply
	Human health impacts

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Figure 3-9

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: THERMALLY PROCESSED, COMMERCIALY STERILE
PRODUCT: BEEF STEW



<u>Aspect</u>	<u>Impact</u>
Packing Materials Use	
Use of natural resources	Depletion of natural resources
Solid waste	Landfill or incineration Contamination of land/water
Preparing/processing meat	
Air exhaust	Air pollution Human health impacts
Noise/vibrations	Human health impacts
Animal waste	Landfill or incineration
Meat Storage (cold)	
CFCs and HFCs	Depletion of ozone
Ammonia	Global warming Human health impacts
Shipping/receiving meat	
CO, NOx, VOCs	Air quality Human health impacts Global warming
Noise	Human health impacts
Road/traffic waste	Contamination of land/water

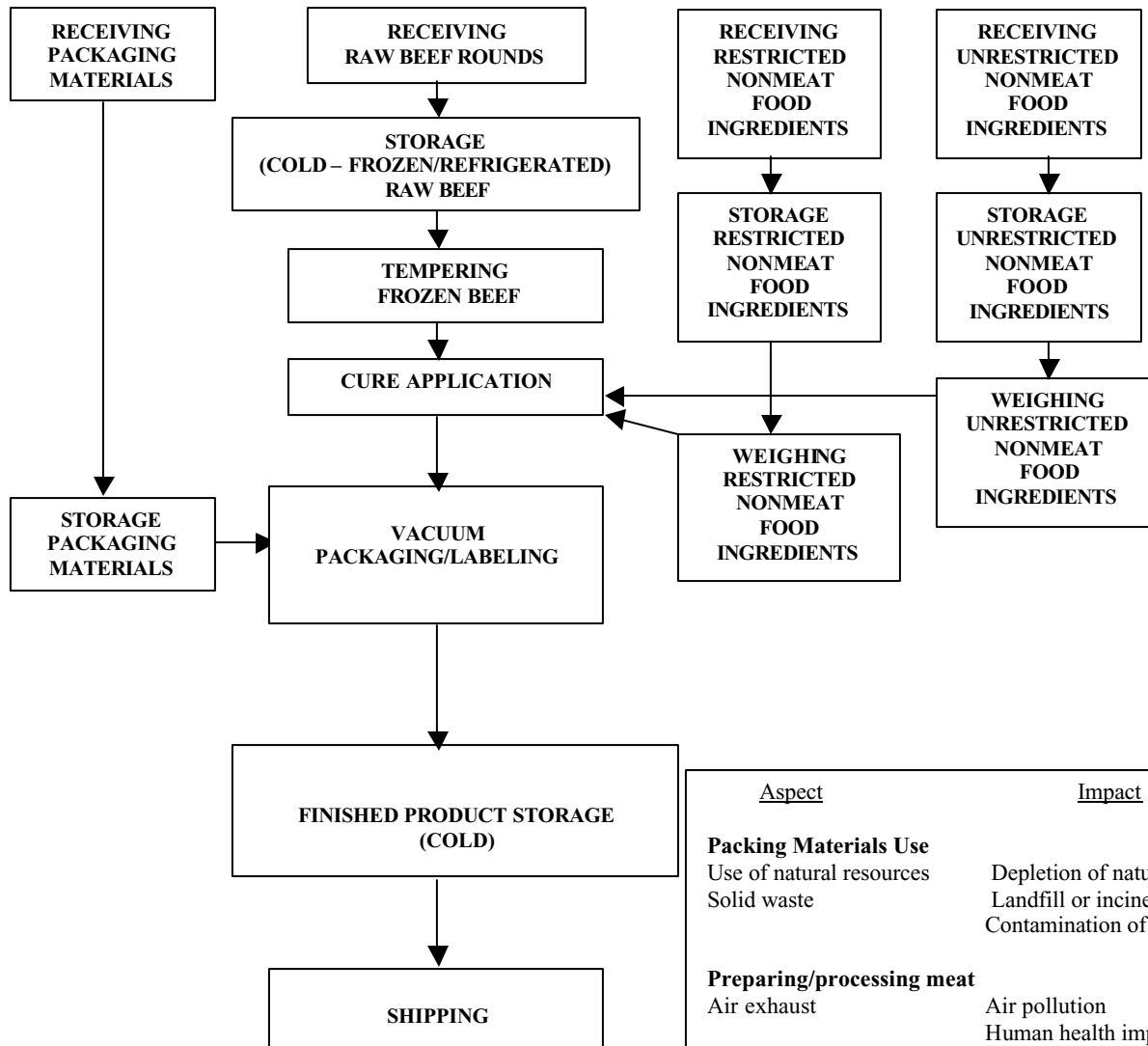
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Figure 3-10

PROCESS FLOW DIAGRAM

**PROCESS CATEGORY: PRODUCTS WITH SECONDARY INHIBITORS,
 NOT SHELF STABLE
 PRODUCT: CORNED BEEF**



<u>Aspect</u>	<u>Impact</u>
Packing Materials Use	
Use of natural resources	Depletion of natural resources
Solid waste	Landfill or incineration Contamination of land/water
Preparing/processing meat	
Air exhaust	Air pollution
Noise/vibrations	Human health impacts
Animal waste	Human health impacts Landfill or incineration
Meat Storage (cold)	
CFCs and HFCs	Depletion of ozone
Ammonia	Global warming Human health impacts
Shipping/receiving meat	
CO, NOx, VOCs	Air quality Human health impacts Global warming
Noise	Human health impacts
Road/traffic waste	Contamination of land/water

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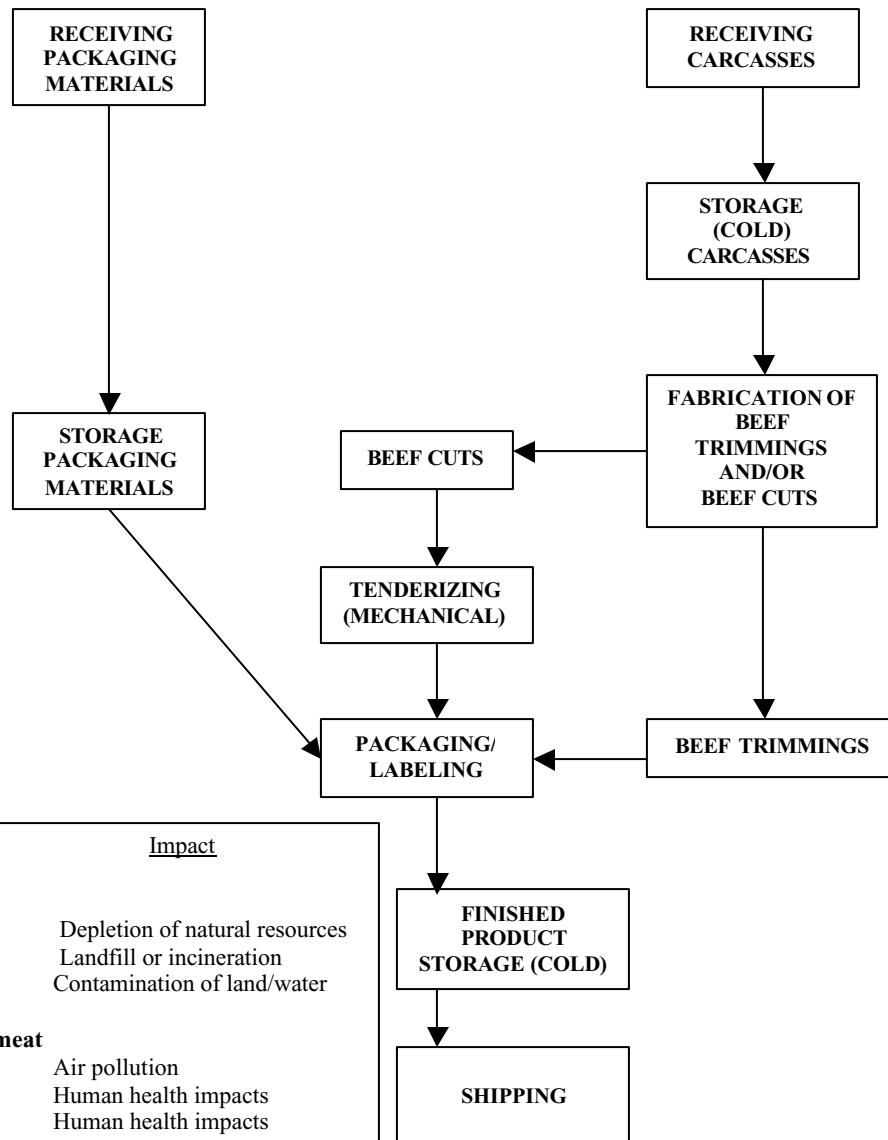
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Figure 3-11

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: RAW PRODUCT, NOT GROUND

PRODUCT: BEEF TRIMMINGS, TENDERIZED (MECHANICALLY) BEEF CUTS



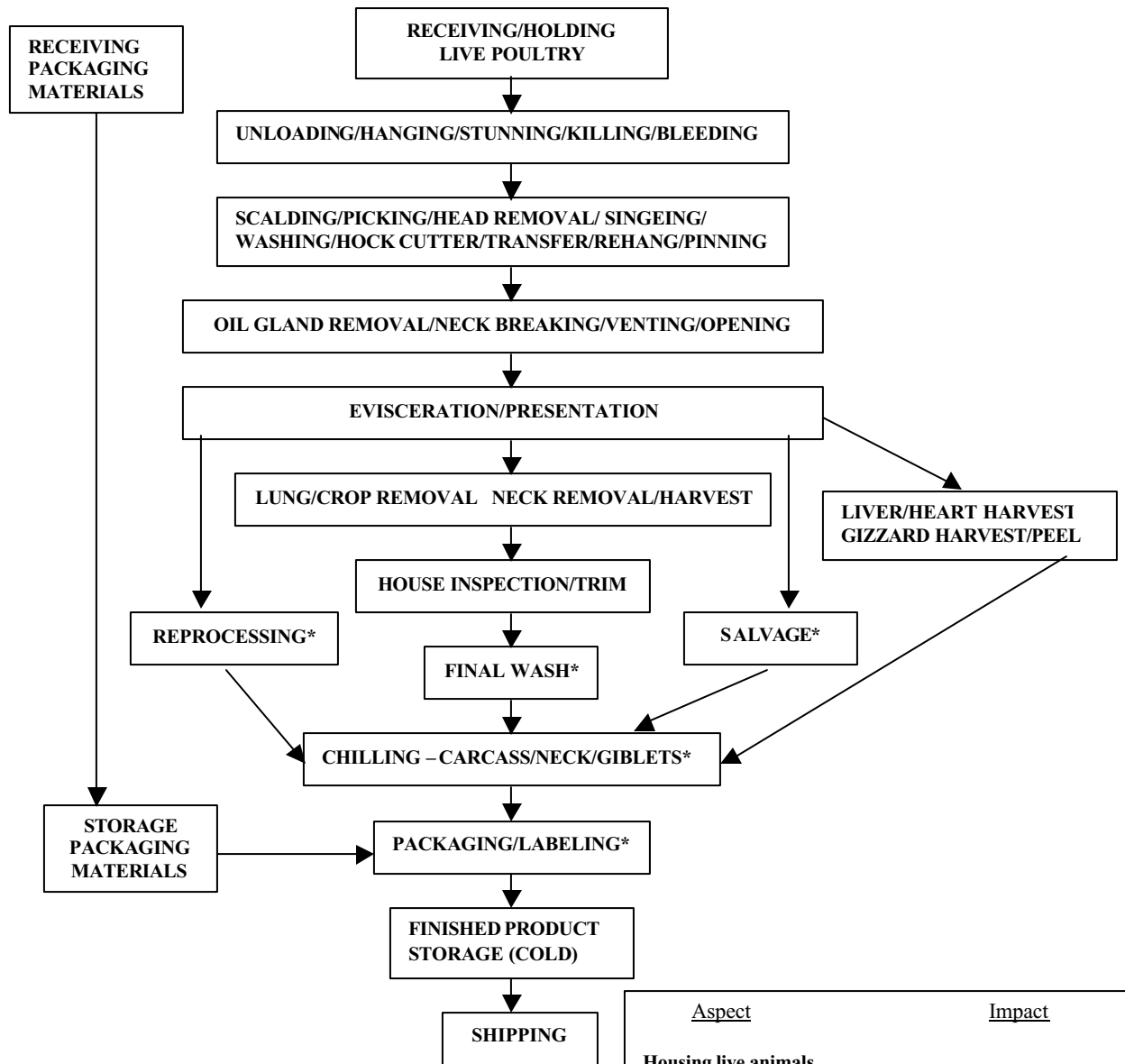
<u>Aspect</u>	<u>Impact</u>
Packing Materials Use	
Use of natural resources	Depletion of natural resources
Solid waste	Landfill or incineration
	Contamination of land/water
Preparing/processing meat	
Air exhaust	Air pollution
	Human health impacts
Noise/vibrations	Human health impacts
Animal waste	Landfill or incineration
Meat Storage (cold)	
CFCs and HFCs	Depletion of ozone
Ammonia	Global warming
	Human health impacts
Shipping/receiving meat	
CO, NOx, VOCs	Air quality
	Human health impacts
	Global warming
Noise	Human health impacts
Road/traffic waste	Contamination of land/water

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Figure 3-12

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: SLAUGHTER
PRODUCT: YOUNG CHICKEN



* Steps in the process where non-meat ingredients (e.g., antimicrobials) are added to or comes in contact with product.

<u>Aspect</u>	<u>Impact</u>
Housing live animals Animal waste Odors Water effluent	Contamination of land/water Air pollution Human health impact
Sunning/killing Fuel/energy usage Air emissions Animal waste	Depletion of natural resource Air pollution Landfill or incineration Human health impacts
Carcass washing and rinsing Water effluent	Depletion of natural resource Contamination of water supply Human health impacts

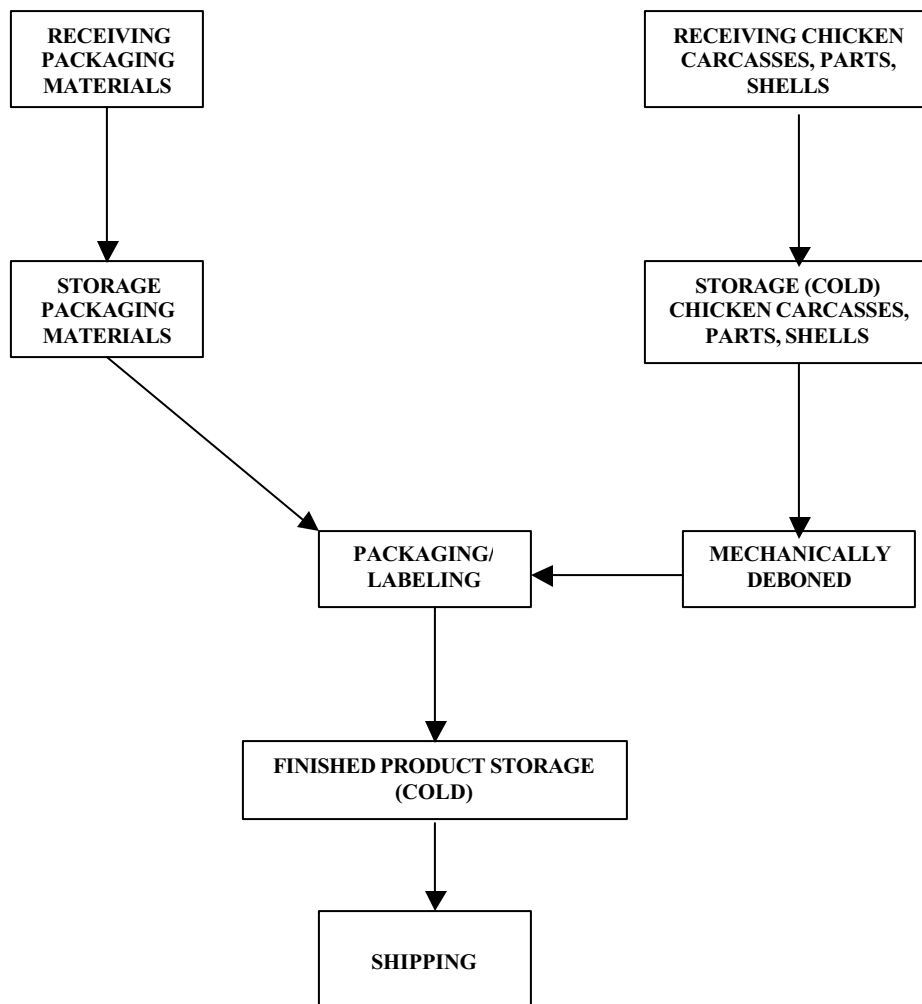
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Figure 3-13

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: MECHANICALLY DEBONED POULTRY
PRODUCT: MECHANICALLY DEBONED CHICKEN



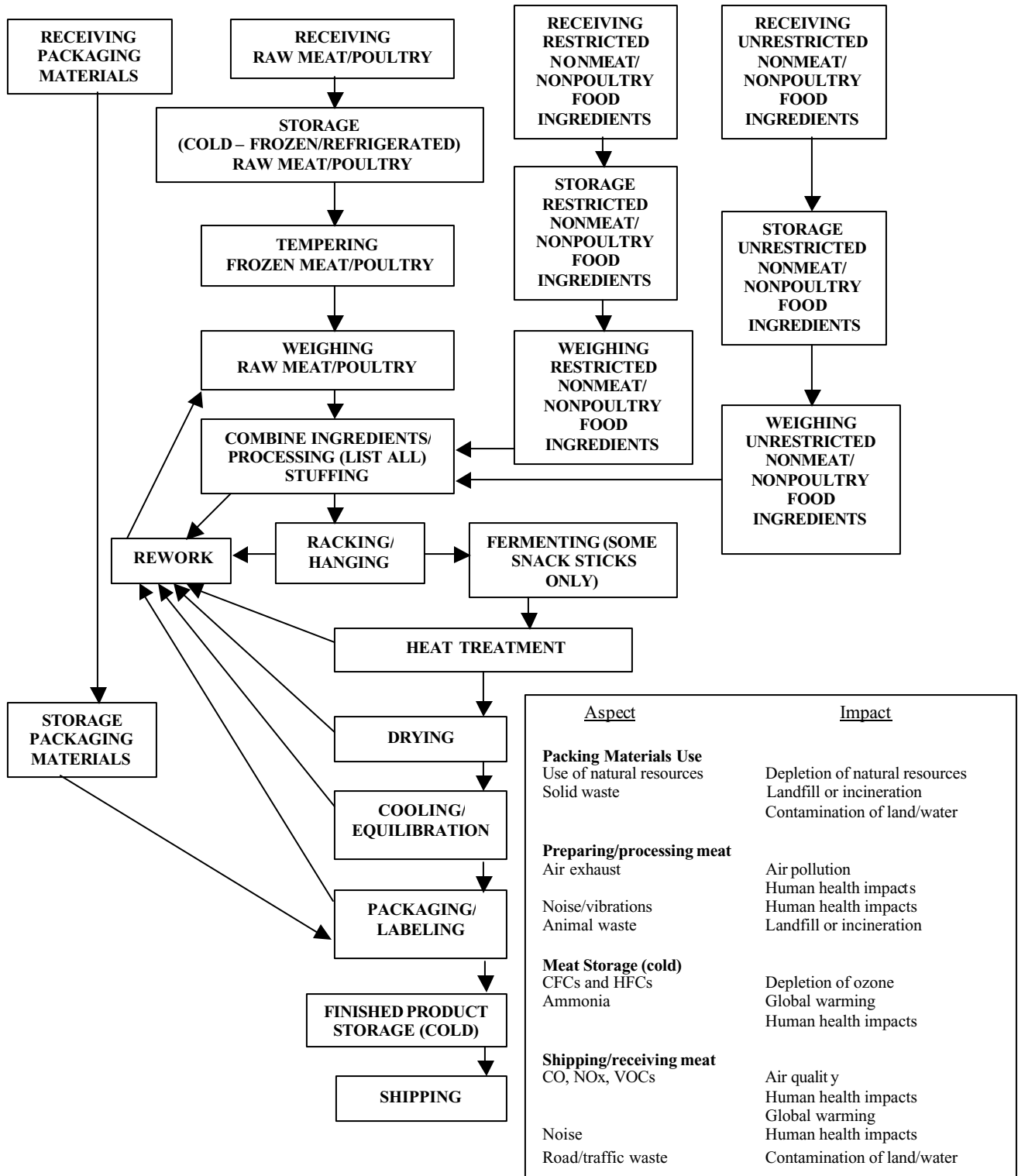
<u>Aspect</u>	<u>Impact</u>
Housing live animals	
Animal waste	Contamination of land/water
Odors	Air pollution
Water effluent	Human health impact
Sunning/killing	
Fuel/energy usage	Depletion of natural resource
Air emissions	Air pollution
Animal waste	Landfill or incineration
	Human health impacts
Carcass washing and rinsing	
Water effluent	Depletion of natural resource
	Contamination of water supply
	Human health impacts

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Figure 3-14

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: HEAT TREATED, SHELF STABLE
PRODUCT: SNACK STICKS, JERKY



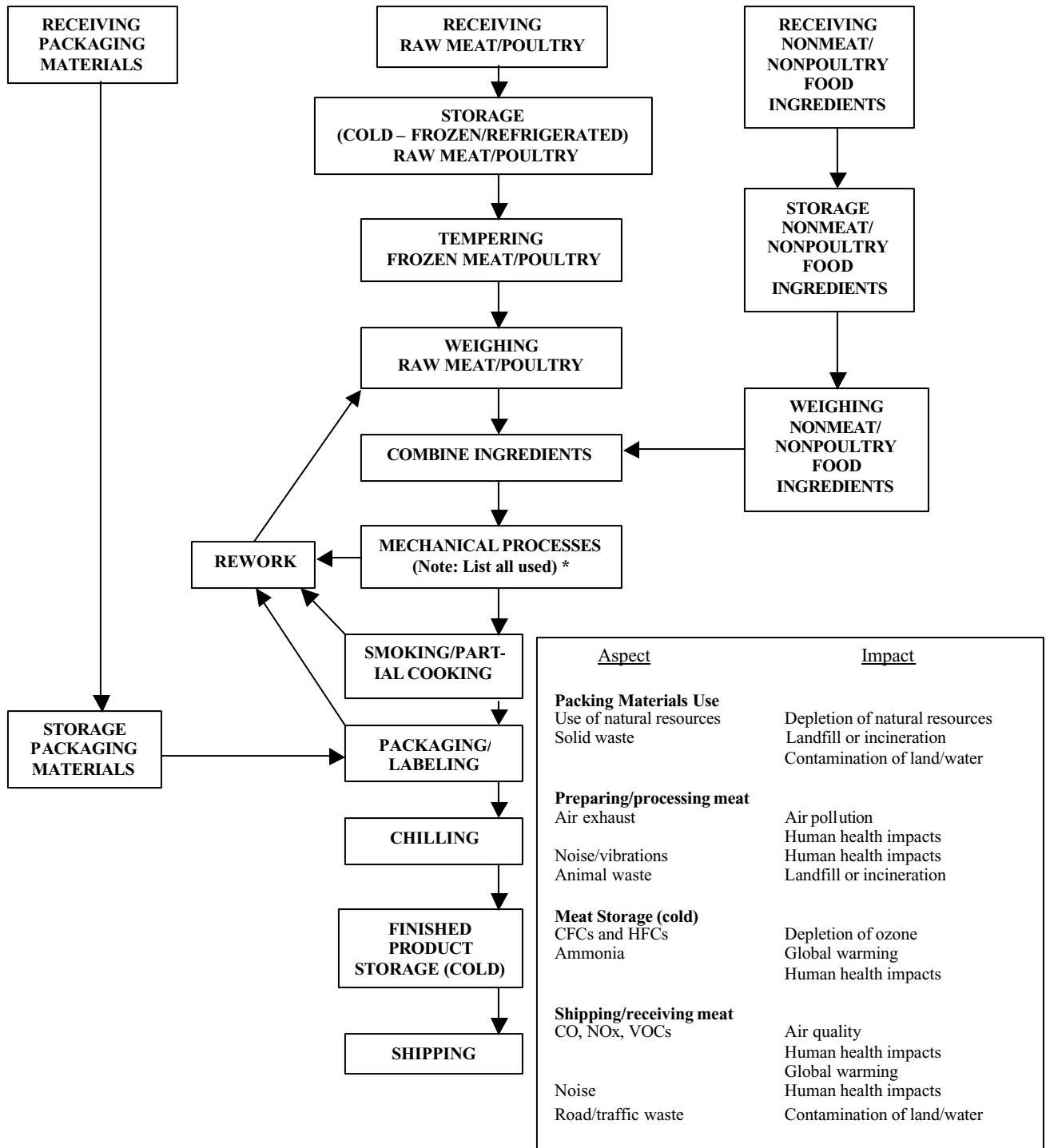
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Figure 3-15

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: HEAT TREATED BUT NOT FULLY COOKED, NOT SHELF STABLE
PRODUCT: SMOKED SAUSAGE, PARTIALLY COOKED CHICKEN PATTIES



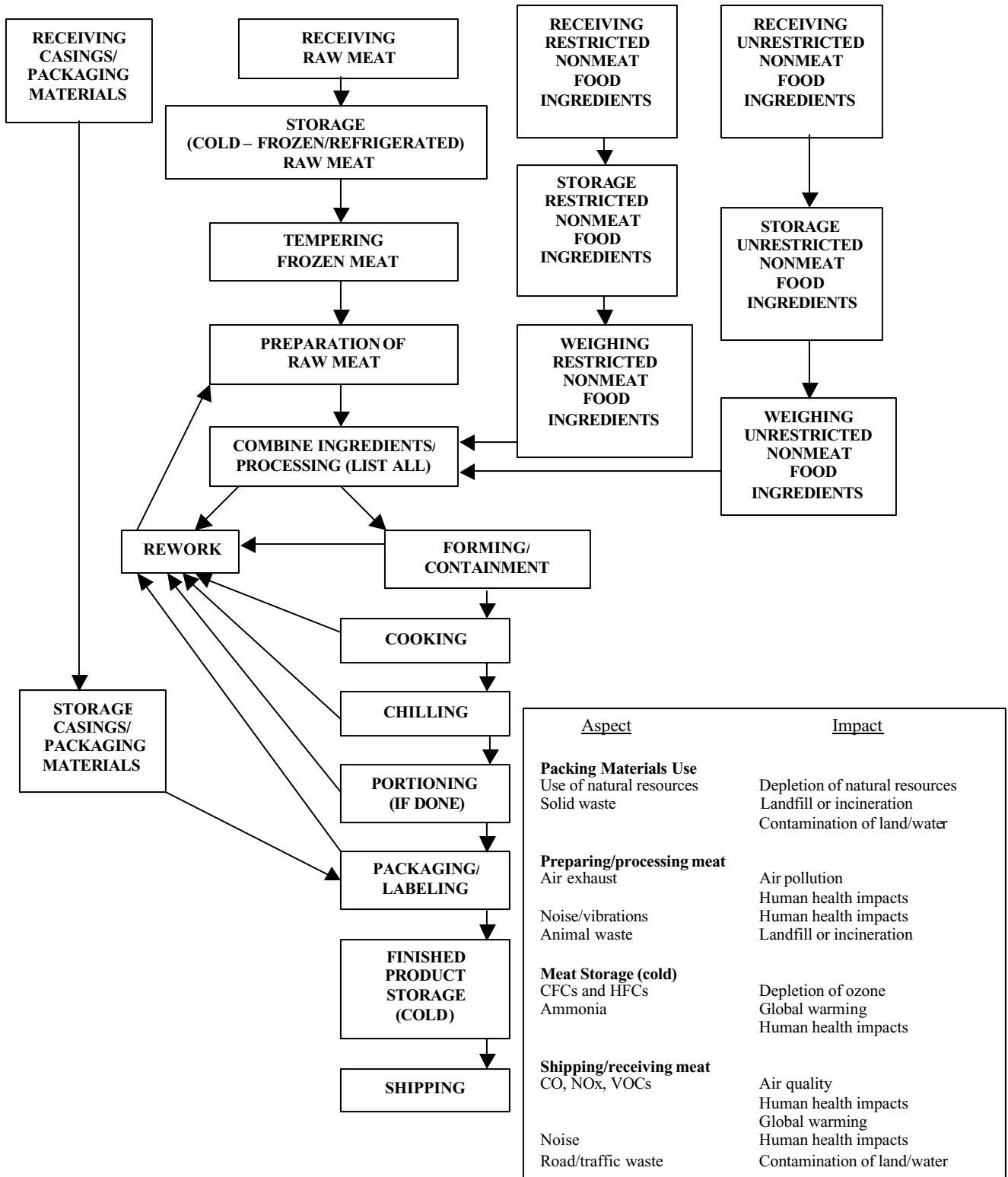
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Figure 3-16

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: FULLY COOKED, NOT SHELF STABLE
PRODUCT: HAM/ROAST BEEF

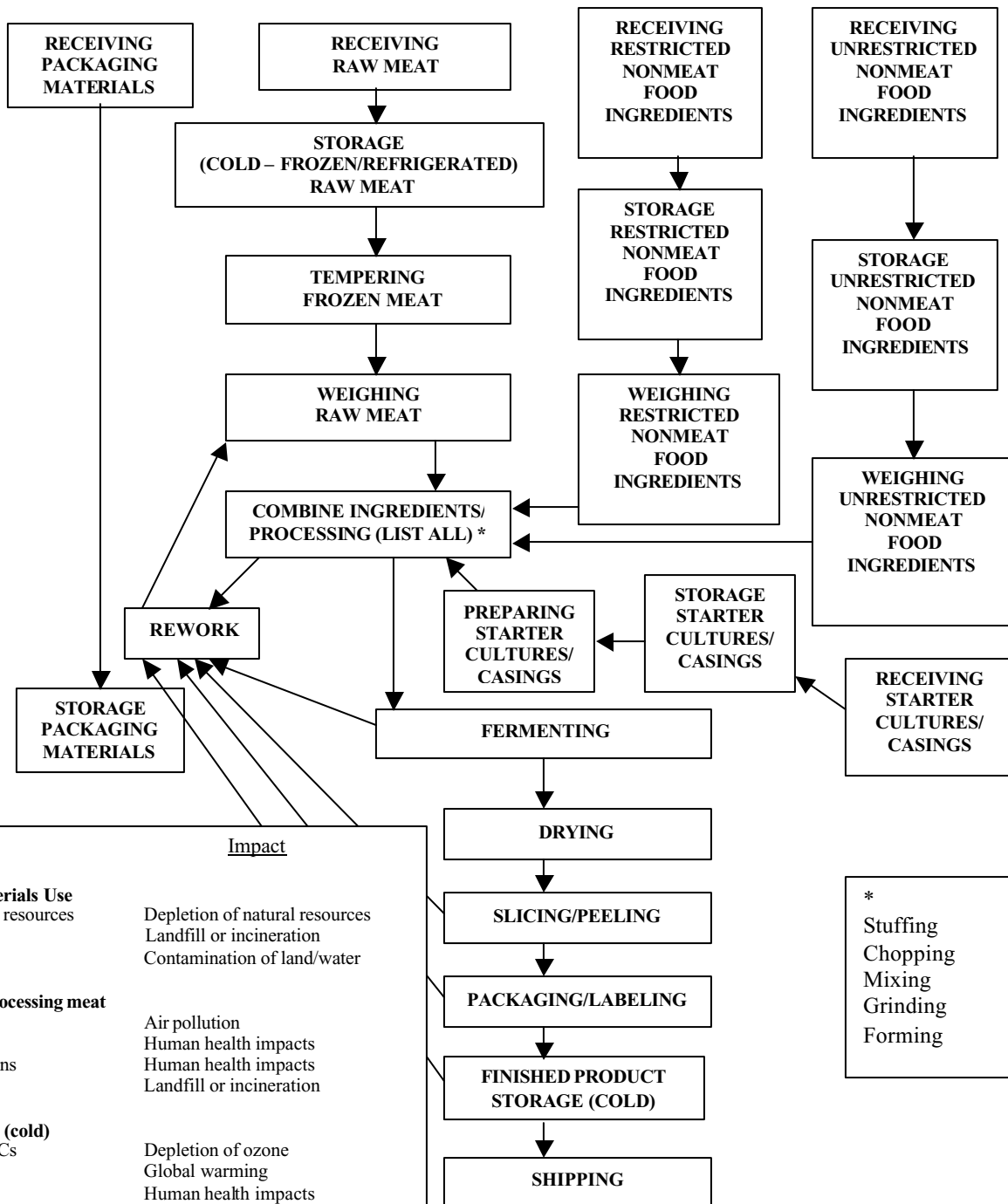


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Figure 3-17

PROCESS FLOW DIAGRAM

PROCESS CATEGORY: NOT HEAT TREATED, SHELF STABLE
PRODUCT: PEPPERONI AND SALAMI



**EMS Implementation Guide for the Meat Processing Industry
Module 3: Identifying Environmental Aspects and Impacts**

**ATTACHMENT 3-B: SAMPLE TEMPLATE FOR IDENTIFYING ACTIVITIES/PRODUCTS/SERVICES, ENVIRONMENTAL ASPECTS AND IMPACTS
AND LEGAL/OTHER REQUIREMENTS**

<u>Activities/Products/Services</u> * Things at your plant that can interact with the environment	<u>Environmental Aspects</u> * Interaction of these things with the environment - beneficial or adverse	<u>Environmental Impacts</u> * Any change in the environment - beneficial or adverse	<u>Legal/Other Requirements</u> * What rules relate to the environmental aspect
Boiler operation	Air emissions that result from the burning of fuel to heat the boiler	Air pollution (from the emission of nitrogen oxides (NO _x))	Clean Air Act (CAA)
Cleanup	Floor washing and cleanup	BOD loading of the POTW	Local POTW sewer ordinance and the POTW's NPDES discharge criteria

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ATTACHMENT 3-C: IDENTIFICATION OF ENVIRONMENTAL ASPECTS PROCEDURE

I. Purpose

In order to understand and manage its actual and potential environmental impacts, ABC Meat Processing identifies the environmental aspects of its activities, products, and services as they fall within the scope of the EMS.

II. Procedure

1. Using processing mapping (or input/output flow charts), the EMS committee identifies the basic manufacturing and supporting operations that fall within the scope of the EMS. These are recorded, with supporting material flow diagrams and tables.
2. The EMS coordinator arranges for the environmental aspects of these operations to be identified by a team of several employees from the operation in question, using the process mapping approach where feasible and under the oversight of the EMS coordinator or a committee member where appropriate.
3. Environmental aspects are grouped where appropriate and their actual or potential impacts (quantified to the extent possible) are listed by activity, product, or service in a format similar to EA-02.

III. Frequency

This procedure is repeated annually to ensure that any new environmental aspects are identified.

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EA-02: Sample Aspect Identification Form

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

Contact Person:

Date Completed:

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ATTACHMENT 3-D: IDENTIFICATION OF LEGAL REQUIREMENTS

I. Purpose

ABC Meat Processing is committed to complying with all applicable environmental regulations. This procedure describes how ABC Meat Processing identifies applicable regulations.

II. Procedure

1. The EMS management representative is responsible for tracking applicable environmental laws and regulations and evaluating their potential impact on the company's operations. He or she employs several techniques to track, identify, and evaluate applicable laws and regulations. These techniques include commercial databases, information from the trade association, direct communication with national and state regulatory agencies, and periodic refresher training on environmental laws.
2. As necessary, the management representative may call upon off-site resources such as consultants or attorneys.
3. The management representative compiles and maintains updated copies of applicable environmental laws and regulations.
4. The management representative, working with the EMS coordinator and committee, correlate these regulations to the business activities and environmental aspects associated with them using format similar to LR-01, given below.

III. Frequency

Periodic: depends on information source.

IV. Records

The EMS coordinator maintains the format (LR-01: Applicable Legal Requirements). The EMS management representative maintains copies of the applicable regulations.

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LR-01: Applicable Legal Requirements

The following table provides a list of environmental regulations that apply to ABC Meat Processing’s activities. The specific operation(s) to which each regulation applies are also shown.

Regulatory Agency	Regulation and Specific Provision	Operation(s) to which Provision Applies

Contact Person:

Date Completed:

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Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry

Module 4: Determining Significant Environmental Aspects and Setting Objectives and Targets

EMS Implementation Guide for the Meat Processing Industry
Module 4: Determining Significant Environmental Aspects and Setting Objectives and Targets

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Module 4: Determining Significant Environmental Aspects and Setting Objectives and Targets

INTRODUCTION

Once your plant'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. This module will help you **prioritize these aspects** and to determine which one(s) to work on first.

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 (see Module 3) you need to be concerned with reducing the effects by **ranking** them and **prioritizing** which causes to focus your efforts on. For example: If you identified five separate processes around your plant (aspects) with air pollution impacts and ten that have water pollution impacts, your plant needs a process to **decide** on which of the aspects that result in these impacts, will be **focus of your efforts at prevention of pollution**. Your management will want to spend its limited resources in the most effective way and get the “best bang for the buck”. This module provides guidance how to decide on which aspects to **focus** your management efforts.

Managing your environmental aspects consists of the ways you plan to achieve **prevention of pollution, compliance and continual improvement**, which will often be as unique as your operation. Do not expect to work on all of the aspects you have identified in Module 3. Expect to work on some now and others in the future.

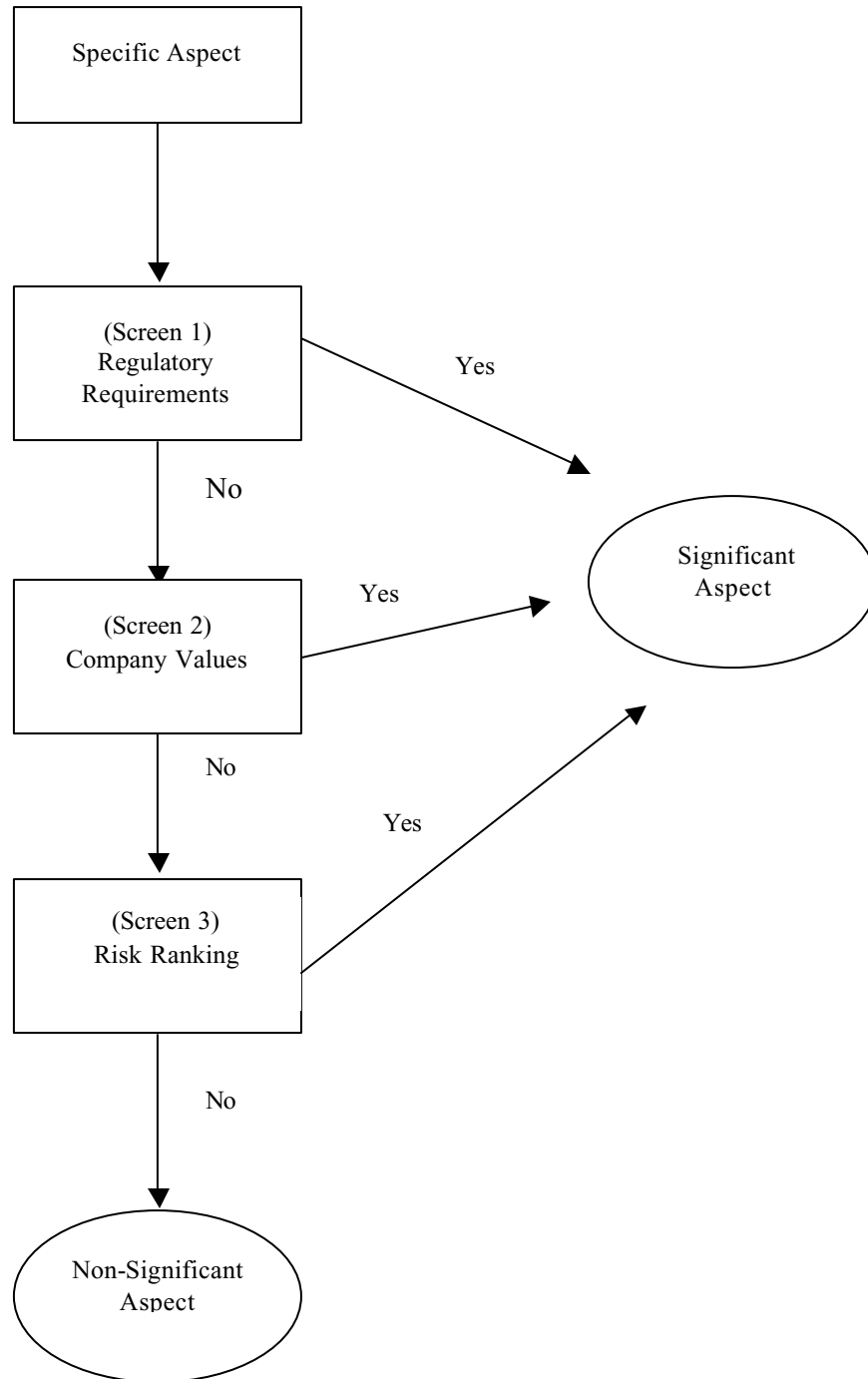
The ranking and prioritization process, which is called determination of significance, is intended to identify significant environmental aspects associated with activities, products, or services, and is not intended to require a detailed life-cycle assessment. You do not have to evaluate each product, component, or raw material input. You may instead **select categories of activities, products or services** to identify those aspects most likely to have a significant impact.

Every plant is unique and therefore the rationale behind where to put the greatest emphasis in environmental management programs is also unique. Depending on how your plant has defined its process for identification of Hazard Analysis and Critical Control Point (HACCP) critical control points, it may provide you with building blocks and ideas on approaches for determining your plant's significant aspects.

The following is an example of a procedure that can be used to identify significant environmental aspects. It is recommended that you and your Core Team consider this procedure as a starting point to develop your own customized procedure. Figure 4-1 graphically represents this procedure.

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Figure 4-1: Impacts Screening Procedure for Determining Significant Environmental Aspects



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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.

Hint: 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.

Note: Many of your existing environmental programs keep you in compliance with regulatory requirements. This first screen is based on the state of your plant at the time of the assessment of significance. When determining significant aspects you are looking for 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 your plant and may include:

- Corporate commitments and requirements,
- Financial operational and business requirements,
- Aspirations and initiatives that are designed to move your 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 and environmental groups, etc.

Environmental aspects, which are considered a priority based upon your plant’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.

Note: This type of screen allows you to decide that regardless of other factors that the aspect is significant. For example, if you decide that recycling wooden pallets is important to your plant and you would like to have an environmental management program for it, you can make it significant although the other screens (regulatory and risk) would not make it significant. However, it does not allow you to override a finding of significance indicated by the other screens.

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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 your plant in advance of applying the risk ranking. For this ranking scheme consider a minimum value of 9 and a maximum value of 15. For your first analysis of significance it is recommended that you start with a value 12 for N and evaluate all of your aspects with this level of screening.

Note: Over time a plant can drive continual 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 two variables:

Consequence * 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.

Note: To add consistency into your 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 - Low | 3 - High; or |
| 2 - Moderate | 4 - Very High |

Note: 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.

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Geographic extent and duration are considered together and are assigned values of:

- 0 – Low; or
- 1 - High

Note: Low geographic extent and duration would be an impact in the immediate vicinity or neighborhood of the plant or one that does not have a lasting effect. For example: noise. A high extent might be water contamination that travels downstream in 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 your plant
- 4 - Occurs several times per year at your plant (For example: up to 3 times a year historically)
- 5 - Occurs regularly at your plant (For example: once a month or more)

OVERALL RISK RATING

The overall risk rating of an aspect is determined by multiplying the Consequence rating by the Relative Probability rating. Figure 4-2 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.

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Figure 4-2: Risk Rating Matrix

Consequence	Relative Probability						
	Unheard of in sector	of in Suspected or known to occur in sector	Has happened at plant	Occurs several times/year at plant	Occurs regularly at plant		
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		

Note: 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.

Hint: 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.

The following examples illustrate the procedure involved in risk ranking to determine if an aspect is significant. For both of these examples, it is assumed that the aspect was not significant at Screens 1 and 2.

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EXAMPLE 1

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
Packaging material use	Generation waste from packaging	Increased disposal to landfill Air, surface, groundwater contamination from landfill

Consequence Rating

- Impact intensity - 2 (moderate)
- Geographic extent and duration - 0 (low)

Overall score $2 + 0 = 2$

2 - Minor impact (Moderate intensity, Low extent and duration: $2 + 0 = 2$)

Relative Probability Rating

The probability ranking is 5 (occurs regularly at your site(s)).

Risk Rating

Consequence * Relative Probability

$$2 * 5 = 10$$

Based upon an arbitrary rating system, which considers that those aspects with a rating of more than 11 are significant, this aspect with an overall rating of 10 would be labeled non-significant.

EXAMPLE 2

<u>Activity/Product/Service</u>	<u>Aspect</u>	<u>Impact</u>
Meat smoking	Air pollutants generated	Affects air quality and poses a risk to human health

Consequence Rating

- Impact intensity - 3 (high)
- Geographic extent and duration - 1 (high)

Overall score $3 + 1 = 4$

4 - Major impact (High intensity, High extent and duration: $3 + 1 = 4$)

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Relative Probability Rating

The probability ranking is 5 (occurs regularly at your site(s)).

Risk Rating

Consequence * Relative Probability

$$4 * 5 = 20$$

Given the same rating system as in Example 1, this aspect with an overall rating of 20 would be considered significant.

Note: At some point in the future the factors that resulted in aspect being deemed significant may change. Before you can consider an aspect no longer significant, be sure to reapply the entire significance procedure to ensure that no other factors exist that would result in it being significant.

The information gathered in the process of identifying significant environmental aspects is useful for setting objectives and targets for your plant.

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Table 4-1: Significance Spreadsheet

Environmental Aspect	Intensity	Duration and Extent	Sum	Probability	Overall Rating	Significant?	Rationale / Comments
	Pick 1 to 4	Pick 0 or 1		Pick 1 to 5			
Generation of waste from packaging	2	0	2	5	10	Not Significant	Landfill impacts for packaging materials are not generally considered severe except that materials do take up limited space
Air emissions from meat smoking	3	1	4	5	20	Significant	Air emissions can adversely effect local and adjacent properties (if there are nearby residences for example)
Air emissions from the boiler	1	1	2	5	10	Not Significant	A boiler is not a major air emissions source in the area but does operate year round
Floor washing and cleanup	3	1	4	5	20	Significant	Floor washing generates large quantities of waste water and occurs frequently

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EXAMPLE SIGNIFICANCE PROCEDURE 2

Purpose

This procedure defines another method for the determination of significance for aspects that have actual or potential significant impacts on the environment.

Procedure for Determination of Significant Environmental Aspects

Using the Significance Determination portion of Table 4-2, the EMS Core Team or a subset thereof shall evaluate, using its best judgment, each identified aspect and determine whether or not it is significant. The environmental aspects of ABC Meat Processing may be considered by the EMS Core Team to be “significant” where the aspect has an impact on the environment and meets one or more of the following criteria:

1. Subject to specifically relevant regulation and/or permit requirements that address significant impacts to the environment. This will likely include aspects associated with processes and activities if (1) environmental regulations specify controls and conditions, (2) information must be provided to the authorities, and/or (3) there are or may be periodic inspections or enforcements by the authorities. Potential aspects that are subject to environmental regulations in the event of incidents will be recognized as significant when such as event occurs.
2. Subject to or associated with environmentally related company goals, directives, policies or subject to or associated with voluntary covenants to which the company had committed.
3. Subject to or associated with community concerns, such as those previously expressed in the form of complaints or critical inquiry. This criterion only shall be reviewed when an aspect is not significant because criteria 1 or 2 apply.
4. Based on technical and business conditions has a high potential for pollution prevention or resource-use reduction. This criterion only shall be reviewed when an aspect is not significant because criteria 1 or 2 apply.
5. Associated with potential release to the environment from the high environmental loading due to one or more of the following:
 - a. Toxicity (compositional characterization of materials and wastes)
 - b. Amounts (volumes and masses or release)
 - c. Amounts (consumption of renewable and non-renewable resources)
 - d. Frequency of episodes
 - e. Severity of actual or potential impacts

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This criterion only shall be reviewed when an aspect is not significant because criteria 1 or 2 apply.

Frequency

This procedure is to be repeated at least annually, if not more frequently. More frequent updates apply especially to new project or processes that affect the list of the facility's significant aspects.

Records

Table 4-2 is maintained by the Environmental Management Representative (EMR) or their designee.

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Table 4-2: Sample Form for Identification and Significance Determination of Environmental Aspects

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:											

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SETTING ENVIRONMENTAL OBJECTIVES AND TARGETS

Objectives and targets help an organization **translate purpose into action**. These environmental goals should be factored into your strategic plans and can facilitate the integration of environmental management with your other management processes.¹

First the terms *environmental objective* and *environment target* will be defined.

<p>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.</p> <p>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. (28)</p>

Example of both objectives and targets is given in the Table 4-3 below.

Table 4-3: 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 (30)

In setting environmental objectives and targets, keep in mind not only your significant environmental aspects and the reduction of adverse impacts, (see Figure 4-3), but also:

- Your environmental policy commitments;
- Preventing non-compliance with applicable legal and other requirements;
- Performance commitments your plant has made and improving performance;
- Pollution prevention (see Module 2 for description);

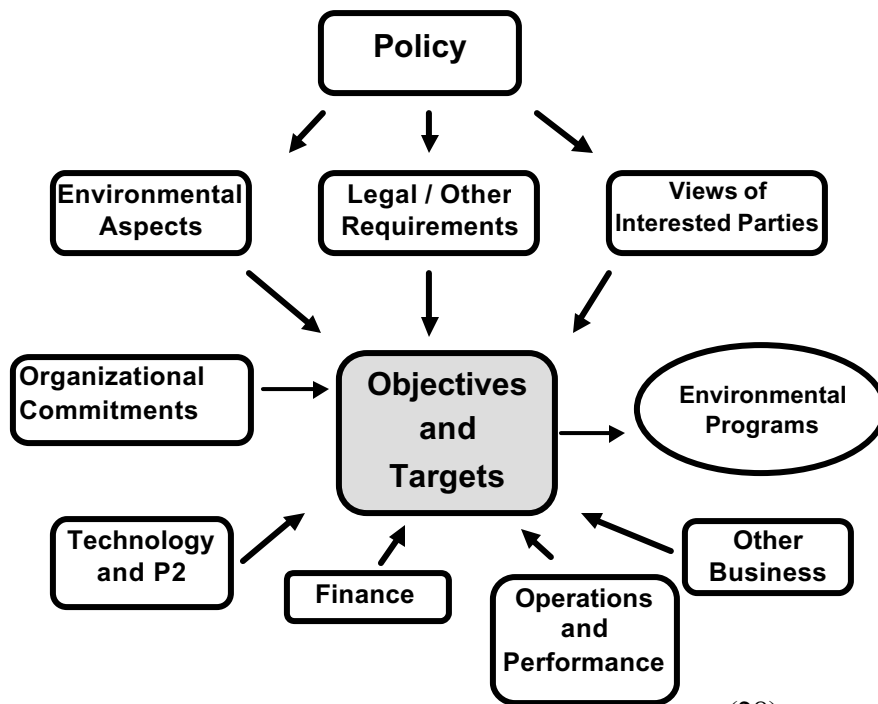
¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 28. Subsequent references to this document will be given in parentheses in text.

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- 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. (28)

Not all of these factors will necessarily apply to a specific objective or target. Use your judgement on a case-by-case basis.

Figure 4-3: Considerations for Setting Objectives and Targets



(28)

One approach for setting objectives and targets is as follows.

Before considering setting specific objectives and targets, you must first **examine your current management programs and operational controls**. It is important to go through an exercise of knowing everything your plant does, formally and informally, to manage the environment. In this process, you will likely discover that certain programs are **already performing effectively** and therefore do not need further improvement or control. In which case, it would be redundant to set objectives and targets for them.

If you have followed the significance determination procedure outlined earlier in this module, there may a number of aspects that you have not defined as being significant because of the existence of **current management programs and operational controls**.

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This is a reflection of the fact that you are already doing good things to protect the environment. **Take credit for your existing work** by recognizing that you are already succeeding in preventing some aspects from being significant.

These existing successes may include:

- Operation and maintenance programs for equipment and for other operations that ensure that you are in legal compliance;
- Operation and maintenance programs for equipment and for other operations that ensure that other environmental aspects are not significant; and
- Existing pollution prevention activities that are effective in reducing environmental impacts.

Be sure that these are understood to a sufficient level of detail so that:

- Where appropriate they can be used as a starting point to reference when setting new objectives and targets; and
- To ensure that all existing practices are included in the EMS and that the good work which currently exists is not lost.

Any process you design for developing objectives and targets should include an evaluation of the effectiveness of your facilities current operational controls. Operational controls are discussed in detail in Module 5 and are the environmental equivalent to the controls required for HACCP program critical control points. Some objectives and targets may be geared towards general process improvements rather than any one specific significant aspect.

Review your plant's significant environmental aspects. In developing objectives and targets, it is important to gain an overview of the significant aspects at your plant, as these will be the main source for your objectives and targets. This basically involves reviewing the significant aspects that were identified earlier in this module.

The degree and complexity of objectives and targets you decide to develop for each of the significant aspects on your list will vary. Therefore, the next task is to establish a review process in which you gather and analyze information about your significant aspects in order to identify for which ones you will develop more detailed objectives and targets.

In your review of your **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 your significant aspects?

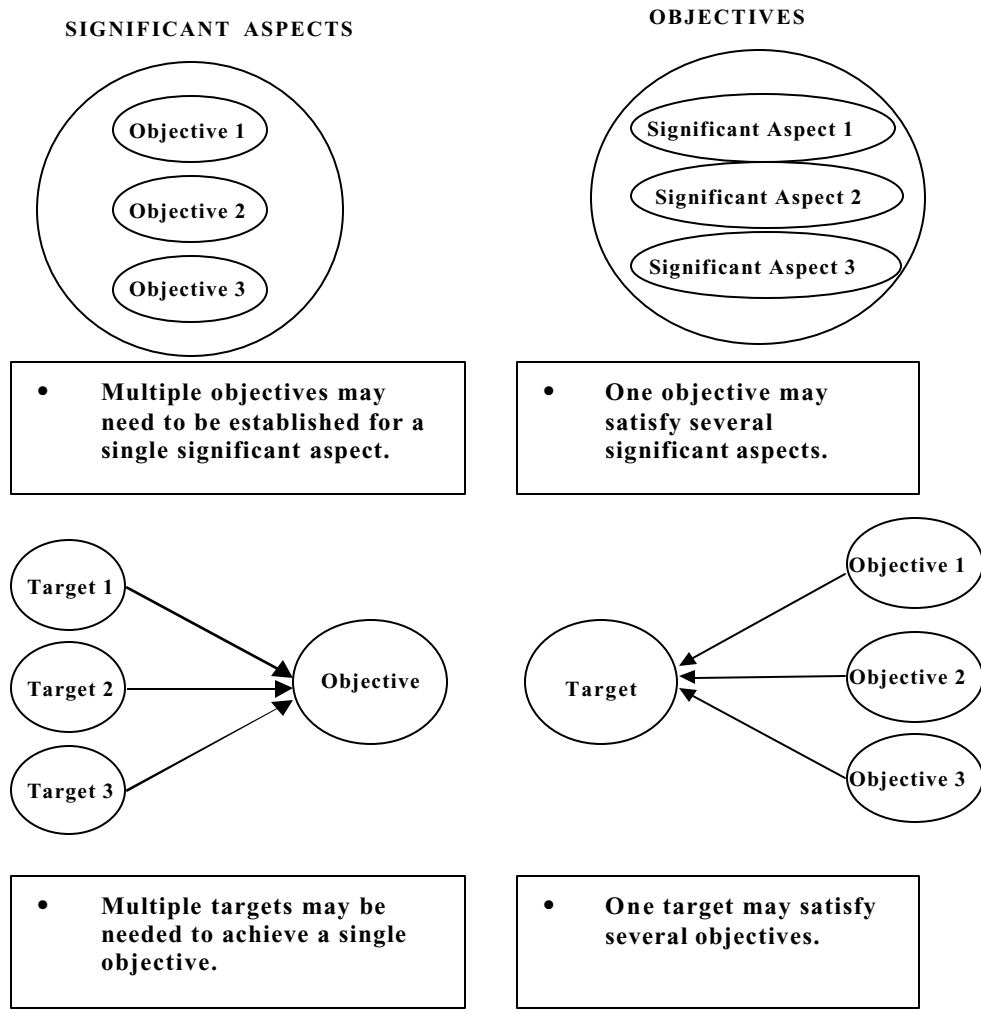
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With consideration of your current operating procedures and their feasibility, you will determine:

- Which associated aspects you will develop objectives and targets for; and
- Which associated aspects you will monitor 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 4-4.

Figure 4-4: Significant Aspects and Objectives and Targets



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As your objectives and targets become clearer, the next step is to **decide what specific measurable indicators** you will use to **measure 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 your objectives.

Targets should be sufficiently clear to answer the question: "**Did we achieve our objective?**"

More details on monitoring and measurement will be presented in Modules 5 and 8.

You should **document your objectives and targets**. It is recommended that this documentation be combined, with the corresponding management programs in a single document.

Note: It is important to keep in mind that the objectives and targets that you have determined only represent a first draft of your final objectives and targets. As you work through Module 5 and learn what resources are needed for achieving your objectives and targets, they may change. Again, don't be discouraged, rather keep in mind that the process of determining objectives and targets is an iterative one, and subject to change as you progress in achieving improved environmental management.

Once you have established your objectives and targets and decided how you will measure progress towards them, your next task is to set up Environmental Management Programs (EMPs) to implement these objectives and ensure achievement of the targets. This is the focus of Module 5.

Attachment 4-A provides an example objectives and targets procedure.

HOMEWORK

Your homework will be to define your plant's specific aspect significance determination procedure and then apply it to the aspects you have identified to date. Then draft objectives and targets. Be sure to develop an understanding of the various environmental management activities including operational controls that are already in place at your plant.

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Prepare to take your recommended objectives and targets to management for approval. You should also determine what management requires in order to approve these objectives and targets.

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ATTACHMENT 4-A: EMS PROCEDURE: SETTING AND TRACKING OF ENVIRONMENTAL OBJECTIVES AND TARGETS

I. Purpose

The purpose of this procedure is to ensure that ABC Meat Processing establishes and maintains documented environmental objectives and targets.

II. Scope

This procedure applies to environmental objectives and targets set at all relevant levels within ABC Meat Processing.

III. Definitions

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

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

IV. General

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

- Applicable laws and regulations (and requirements of other programs);
- Environmental aspects of the ABC Meat Processing's activities and products;
- Technological, financial, operational, and other ABC Meat Processing requirements and commitments;
- Opportunities for pollution prevention and minimization of cross-media pollutant transfers; and
- The views of employees and other interested parties.

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

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environmental objective might also be translated into individual projects (such as changes in production processes, materials or pollution control equipment) in different plant areas.

V. Procedure

1. ABC Meat Processing's top management is responsible for establishing environmental objectives on an annual basis. To initiate the process, the Plant Manager holds a meeting of all staff members to discuss the development of environmental objectives.
2. Objectives are action and prevention oriented and are intended to result in meaningful improvements in the ABC Meat Processing 's environmental performance.
3. Each plant area or functional manager is responsible for providing input from his / her own function (Finance, Engineering, etc.) or shop area (Fabrication, Assembly, Shipping / Receiving, etc.). ABC Meat Processing's environmental manager is responsible for providing input on applicable laws and regulations, significant site environmental impacts, and the views of interested parties. (These inputs are obtained from the separate analyses required by Procedure #'s).
4. As a starting point, ABC Meat Processing's management evaluates its performance against environmental objectives for the current year. As part of this effort, management examines the results of its environmental performance evaluations.
5. Preliminary environmental objectives are developed for further discussion and evaluation. Each manager is responsible for evaluating the potential impacts within his / her functional or shop area (if any) of the proposed environmental objectives. ABC Meat Processing's environmental manager reviews proposed objectives to ensure consistency with the overall environmental policy.
6. Environmental objectives are finalized based on review comments from site managers and employees. Each manager identifies the impacts of the objectives in his / her function or shop area, establishes targets to achieve the objectives, and develops appropriate measures to track progress towards meeting the objectives and targets.
7. Each manager is responsible for communicating objectives and targets (and the means for achieving them) to others in his / her part of ABC Meat Processing.

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8. Progress towards the objectives and targets is reviewed on a regular basis at management meetings. The progress is also communicated to plant employees via bulletin boards and other similar means.
9. At the end of each calendar year, ABC Meat Processing's management reviews its performance with regard to achieving the objectives and targets. This information is used as input to setting objectives and targets for the succeeding year. (118-119)

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Environmental Objectives

The following is a list of ABC Meat Processing’s current environmental objectives.

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

Contact Person:

Date Completed:

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Module 5: Environmental Management Programs (EMPs)

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Module 5: Environmental Management Programs (EMPs)

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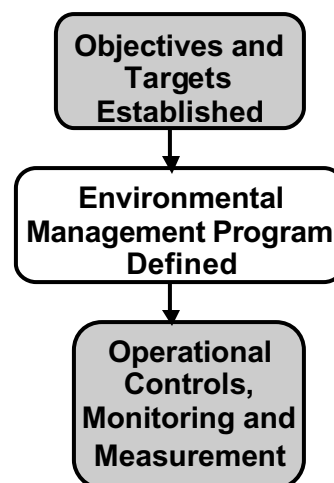
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Module 5: Environmental Management Programs (EMPs)

INTRODUCTION

Your environmental management program should be **linked directly to your objectives and targets** — the program(s) should describe **how** the organization would **translate its goals and policy commitments into concrete actions** so that environmental objectives and targets are achieved.¹

Operational controls and a plan for **monitoring and measurement** are also needed to ensure that the objectives and targets established are being met.



An Environmental Management Program (EMP):

Translates goals of the organization into concrete actions that ensure objectives and targets are met; responsibilities are designated; defines the means and time for achieving goals; monitors and measures progress; and adjust, changes, and acts based on reviews. The program(s) brings the systems together.

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

- The **responsibilities** for achieving goals (*who will do it?*);
- The **means** for achieving goals (*how will they do it?*); and
- The **time frame** for achieving those goals (*when?*). (32)

Your environmental 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, we recommend that you prepare **written programs**. Experience shows that it is difficult, if not impossible, to implement an environmental management program consistently at a plant without a written program outline.

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

- Objectives and targets are modified or added;
- Relevant legal requirements are introduced or changed;
- Substantial progress in achieving your objectives and targets has been made (or has not been made); or
- Your products, services, processes, or facilities change or other issues arise. (32)

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 32. Subsequent references to this document will be given in parentheses in text.

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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.

Your EMP(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. (32)

This program should **not** be developed in a vacuum — it should be **coordinated or integrated with other organizational plans, strategies, and budgets**. For example, if you are planning for a major expansion in one of your service operations, then it makes sense to look at the possible environmental issues associated with this operational expansion at the same time. (32)

Hints:

Build on the plans and programs you have now for compliance, health & safety, HACCP, or quality management.

Involve your 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, your environmental 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 your action plan when you are considering changes to your products, processes, facilities or materials. Make this re-evaluation part of your **change management process**.

Keep it simple (see sample tool in Figure 5-2) and **focus on continual improvement** of the program over time. (32-33)

There may be real **opportunities** here! Coordinating your environmental program with your overall plans and strategies may position your plant to exploit some significant cost-saving opportunities.

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Note: Similar to Module 4, Figure 4-4 where there may be more than one objective per target or vice versa, there may be several EMPs for a single objective or a number EMPs 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 and new programs to achieve the objectives and targets.

Organizations often do not have a formal procedure on how to develop EMPs but rather use some subset of the guidance and hints noted in this section with a format for outlining the primary components of the EMP. This allows the EMPs to vary in level of detail as appropriate. Figure 5-1 provides a format to demonstrate the connection between significant aspect, objective, target, EMP and operational controls. Figure 5-2 provides a simplified EMP format.

Figure 5-1: Sample Environmental Management Program Form (121)

(Note: Use one form per EMP)

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)	

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Figure 5-2: Environmental Management Program - Sample Tool (122)

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

EVALUATING ALTERNATIVES

In the development of strategies to reduce the impacts associated with your environmental aspects, it is necessary to evaluate alternatives for material substitution. The following is a summary of a detailed approach to material substitution provided in EPA’s Integrated Environmental Management System Guide EPA 744-R-00-011, available at <http://www.epa.gov/opptintr/library/ppicdist.htm#DfE>. Evaluation of materials for substitution can help you achieve both environmental and economic advantages.

For the Meat Processing Sector the best opportunities for alternatives may be in materials used to process, handle, store, and treat residuals associated with the primary process.

Alternative evaluation consists of the following steps:

- Define the baseline by understanding the current chemical, activity or technology that is the source of the environmental aspect;
- Define the function of the activity with which the aspect is associated;
- Develop a list of alternatives by asking how could this function be accomplished in other ways:
 - Substitute products;
 - Reduced product use through technology changes and improved work practices;
 - Improve treatment technologies; and
 - Improve disposal technologies.
- Decide how detailed an evaluation of the alternatives is feasible (economically, practically, and will regulations allow the evaluation);
- Evaluate the changes in impacts associated with the alternatives;
- Evaluate how well the alternatives perform;
- Track regulatory changes associated with implementing the alternatives;
- Evaluate the economic advantages and disadvantages of each alternative (short and long term); and
- Look at all of the information above and make an informed decision.

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This type of detailed examination of alternatives will not be practical for all issues at your plant, but you should consider this type of approach where the solution is not immediately evident, a major process change is being contemplated, or major capital expenditures are being contemplated.

Attachment 5-A provides an example procedure for conducting an Alternatives Evaluation.

OPERATIONAL CONTROLS

To ensure that you satisfy the commitments in your environmental policy, certain operations and activities must be controlled. Where operations or activities are complex and/or the potential environmental impacts are significant, operational controls should be considered. (53)

An operational control:

refers to those documented procedures that can help your plant manage its **significant environmental aspects**, ensure regulatory **compliance**, and achieve **environmental objectives and targets**. (53)

Procedures should be established for operation or activities where their absence could lead to **deviations from the environmental policy** (including the commitments to compliance and pollution prevention), or from your **objectives and targets**. Determining **which operations** should be covered by procedures and **how** those operations should be controlled is a critical step in designing an effective EMS. Keep in mind that you may need operational controls in order to manage some aspects, **regardless** of whether you established objectives and targets for each of them. (53) Some of these already exist as part of your existing EMPs.

Rule of thumb for documenting operational controls: If experience has shown that someone in your plant needed to write it down to be sure that it was done correctly, or in order to teach or show someone new how to effectively ensure the control worked, then you should consider creating a documented procedure. Conversely, do not start generating procedures for the sake of having them if they do not add value to your EMS.

In determining which operations and activities need to be controlled, **look beyond** routine production or services. Activities such as **equipment maintenance**, management of on-site **contractors**, and services provided by **suppliers or vendors** could affect your plant's environmental performance. (53)

Your plant should have operation and maintenance programs for equipment and for other operations that are related to legal compliance and significant environmental aspects.

HACCP Principle III: Establish Critical Limits for each Critical Control Point (CCP). This may prove a useful building block for the development of environmental operational controls. The CCPs are typically either an upper limit that is not to be exceeded or a specified performance range. This type of control can also be a requirement for environmental concerns. Just setting a limit in itself does not however ensure that it will be met. The steps your plant takes (e.g., equipment, and proactive measures) to meet these limits are the controls.

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Prepare **draft** procedures and review them with the people who will need to **implement** them. This will help to ensure that the procedures are appropriate, realistic, and practical. (53)

Examples of activities and operations that might require operational controls:

- Management / disposal of wastes;
- Approval of new chemicals;
- Storage & handling of raw materials and chemicals;
- Equipment servicing; or
- Wastewater treatment. (53)

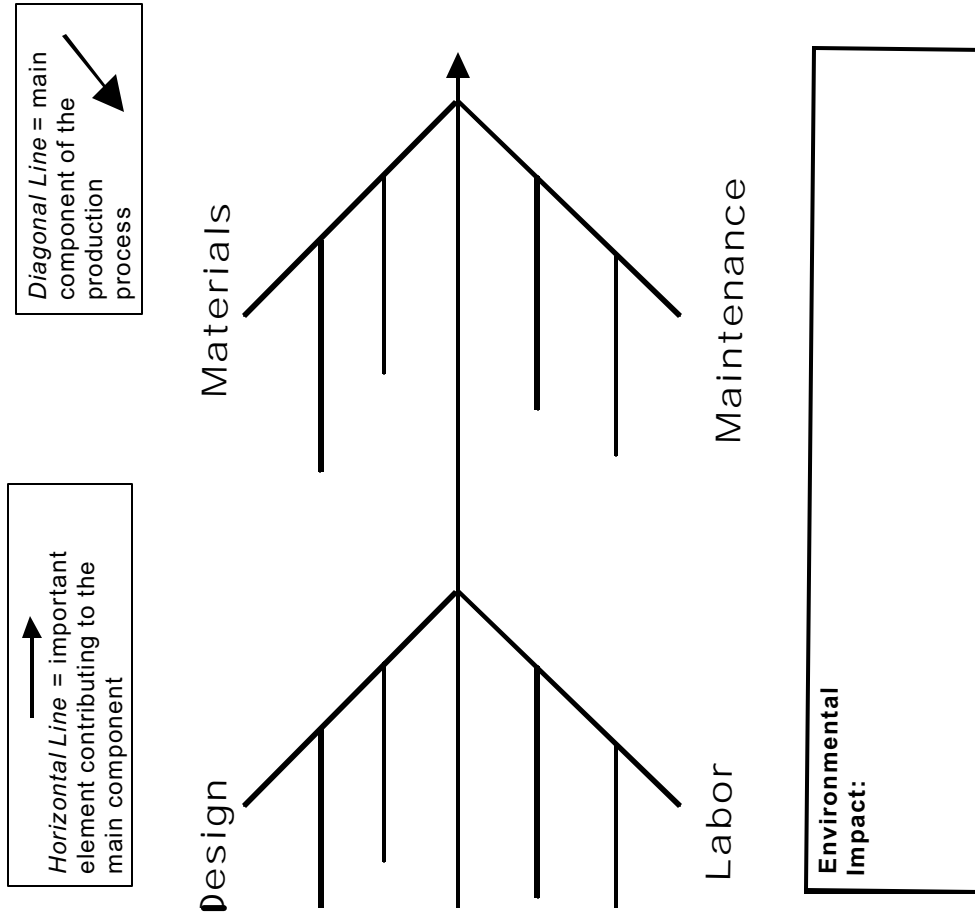
Attachment 5-B provides a sample procedure describing how to develop operational controls.

A useful tool for understanding the root causes of impacts (and therefore assists in developing the best operational controls) is the root cause diagram (also known as a fishbone diagram). The root cause diagram, shown in Figure 5-3, will help you organize your thinking when you analyze the potential for an environmental impact. This analysis can be done by one person or by a group, with one person writing down the ideas. **Each diagonal line** represents a main component of the production process. Your plant may have different or additional components (for example, “disposal”) beyond those represented here. **Each horizontal line** stemming from the diagonal represents an important element contributing to each of the main components. For example, elements of work practices might contribute to the labor component. This diagram is simply a device to help organize the analysis of the cause of potential environmental impacts. Use it if it helps, but don’t get hung up on trying to make it work. Root cause diagrams will also be discussed in Module 8 of this guide.

Hint: Review procedures you already have in place to **comply with** environmental **regulations**. Some of these may be adequate to control significant aspects (or could be modified to do so). Develop a chart to keep track of what controls are needed, such as:

Operation or Activity	Procedure is needed (none exists)	Procedure exists, but is not documented	Procedure exists and is documented	No procedure is needed
	X			
		X		
		X		
			X	

Figure 5-3: Root Cause Diagram



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

Once you have identified operations that require control, consider what kinds of maintenance and calibration may be appropriate. **Maintenance** of equipment that could have significant environmental impacts or result in non-compliance should not be overlooked. An elaborate preventive or predictive maintenance program is **not** needed in all cases. Assess your existing maintenance program and its effectiveness before making significant changes. (54)

Factors that could affect the need for documented procedures:

- Risk of activity
- Complexity of activity/method
- Degree of supervision
- Skills/training of workforce (54)

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

While the development of procedures can be time-consuming, organizations have come up with creative ways to reduce the burden. For example, consider using a college intern or temporary employee to interview employees “on the line”, collecting information on what employees do and how they do it.

If your plant uses a “work team” concept, ask the work teams to draft procedures for their work areas (or to modify existing procedures for EMS purposes). (55)

Once you have identified operations that require control it is necessary to consider what kinds of monitoring and measurement are needed.

MONITORING AND MEASUREMENT

Monitoring and measurement is necessary in order to gauge progress in meeting your objectives and targets. In general, monitoring and measurement enables an organization to:

- **Evaluate environmental performance;**
- **Analyze root causes** of problems;
- **Assess compliance** with legal requirements;
- **Identify** areas requiring **corrective action;** and
- **Improve performance** and **increase efficiency.** (60)

In short, **monitoring helps you manage your plant better.** Monitoring and measurement procedures should be developed to:

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- **Track performance** in achieving objectives and targets;
- **Monitor the environmental critical control points** (the environmental equivalent of monitoring CCPs for HACCP);
- **Calibrate and maintain** monitoring equipment; and
- Through internal audits, periodically **evaluate your compliance** with applicable laws and regulations. (60)

This discussion on monitoring and measurement focuses on these activities as they relate to being a part of EMPs and operational controls. Monitoring and measurement of the EMS in general is discussed further in Module 8 of this guide.

Monitoring and measuring can be a resource-intensive effort. One of the most important steps you can take is to clearly **define your needs**.

You can start **with a relatively simple** monitoring and measurement process, then build on it as you gain experience with your EMS. (60)

Hints: 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 your plant.

Equipment calibration: Identify process equipment and activities that truly affect your environmental performance. Some organizations place critical monitoring equipment under a special calibration and preventive maintenance program. This can help to ensure accurate monitoring and make employees aware of which instruments are most critical for environmental monitoring purposes. Some organizations find it is more cost-effective to **subcontract** calibration and maintenance of monitoring equipment than to perform these functions internally. One example might be the calibration of wastewater monitoring equipment.

Operational performance: Consider what information you will need to determine if your plant is implementing operational controls as intended. (61)

Satisfying HACCP Principle IV: Establish Monitoring Procedures is a good example of monitoring and measurement directly linked to operational controls. Your HACCP monitoring of CCPs should be designed to allow your plant to know if you are operating within the parameters you have established. You may wish to examine if the lessons you have learned (i.e., how often you must measure to get the performance you desire) in implementing HACCP can be applied to your EMS in this area.

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HOMEWORK

Your homework is to develop new EMPs where required and modify or expand existing EMPs to detail how objectives and targets will be met.

You are also asked to determine what operational controls and process monitoring and measurements are needed in order to meet the objectives and targets.

Remember create formal and written procedures where they improve the performance of your EMS but avoid building a paperwork empire.

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ATTACHMENT 5-A: CONDUCTING AN ALTERNATIVES EVALUATION

I. Purpose

ABC Meat Processing periodically conducts an alternatives evaluation to identify viable approaches to reaching an environmental objective. An alternatives evaluation is a tool for identifying alternative products and/or processes and evaluating them compared to the baseline based on business and environmental criteria.

II. Procedure

1. The EMS coordinator appoints a small group, overseen by a committee member or by the relevant operations manager, to identify and evaluate alternatives to a particular activity or process where an alternatives evaluation is required for meeting an environmental objective.
2. The group first identifies the function that this activity or process performs in ABC Meat Processing's operations. The group also characterizes the baseline, or the current manner in which the function is being carried out.
3. The group then brainstorms alternative ways of accomplishing this function. Potential alternatives include using a different material or chemical, changing work practices, and/or changing process technologies. Alternatives are recorded using format AE-01 and the most promising alternatives are assigned to individual members of the group for further research.
4. The group then evaluates the baseline and alternatives based on the following considerations: operational performance, cost, regulatory implications, and environmental impact. The group uses formats AE-02 to record its findings (and formats AE-03 to AE-06, as needed).
5. The group makes a recommendation and presents its recommendation to the EMS committee and appropriate operations managers.

III. Frequency

As often as necessary in the context of developing targets and action plans to meet environmental objectives.

IV. Records

Formats AE-01 (Alternatives Identification) and AE-02 (Evaluation of Alternatives) are maintained by the EMS coordinator, as well as AE-03 to AE-06 to provide, as necessary, supporting documentation.

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AE-01: Alternatives Identification

Significant Environmental Aspect(s):

Function:

	Baseline	Potential Alternatives
Products		
Technologies		
Work Practices		
Recycling/Reuse		
Treatment		
Disposal		

Contact Person:

Date Completed:

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AE-02: Evaluation of Alternatives

Significant Environmental Aspect(s):

Function:

Alternative	Performance	Regulatory Considerations	Cost	Environmental Effects	Overall Evaluation
Baseline					

Contact Person:

Date Completed:

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AE-03: Evaluation of Environmental Effects

Significant Environmental Aspect(s):

Function:

Alternative	Regulatory Concern	Worker Safety	Other Community Issues	Natural Resources	Overall Ranking	Preferred Alternative? (Y/N)
Baseline						

Contact Person:

Date Completed:

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AE-04: Evaluation of Performance

Significant Environmental Aspect(s):

Function:

Alternative	How Well it Works	Time	Ease of Use	Overall Performance Evaluation
Baseline				

Contact Person:

Date Completed:

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AE-05: Evaluation of Regulatory Concerns

Significant Environmental Aspect(s):

Function:

Alternative	Applicable Regulations	Required Controls	Cost of Compliance	Overall Regulatory Concerns Evaluation
Baseline				

Contact Person:

Date Completed:

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AE-06: Evaluation of Costs

Significant Environmental Aspect(s):

Function:

Alternative	Raw Material	Labor	Disposal	Total Cost	Savings	Net Cost
Baseline						

Contact Person:

Date Completed:

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ATTACHMENT 5-B: DEVELOPMENT OF OPERATIONAL CONTROLS

I. Purpose

By developing operational control procedures for critical activities (i.e., those activities associated with significant environmental aspects), ABC Meat Processing intends to mitigate and control, to the extent possible, the environmental impacts associated with its significant environmental aspects.

II. Procedure

1. The EMS committee, with additional input from other employees as needed, carries out a root cause analysis of each significant environmental aspect to determine the underlying cause(s) of the environmental impact. As part of the root cause analysis, the committee will determine the need for (and adequacy of, if already existing) operational control procedures to control the critical activities related to the significant environmental aspects in question and record its findings on format OC-01. The committee, with input from operations managers, will also select one or more indicators per significant environmental aspect for purposes of monitoring ABC Meat Processing environmental performance.
2. Where there is a need to create or modify an operational control procedure, the EMS committee assigns a member of the committee to draft an operational control procedure, based on consultation with the employees who undertake that procedure. In many cases, a separate operational control procedure may not be required, rather environmental control procedures can be integrated into an existing procedure. The operational control procedure should take the form of a “Work Instruction,” namely a summary list of required steps or measures. In addition to describing the steps necessary to carry out the particular activity in an environmentally sound manner, the work instruction should also include steps to conduct monitoring, where applicable.
3. After the operational control procedure has been developed and implemented, its status is recorded as such on format OC-01. The procedure itself enters into the relevant ABC Meat Processing operator’s handbook and/or is posted at the site of the activity in question.

III. Frequency

As new significant environmental aspects are identified and for existing significant environmental aspects, a review of the associated root cause analysis and operational control procedures is conducted yearly.

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IV. Records

Format OC-01 (EMS Operational Control Procedures) is maintained by the EMS coordinator. The procedures themselves are maintained in the relevant Meat Processing operator's handbook and/or posted at the site of the activity in question.

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OC-01: EMS Operational Control Procedures

Significant Environmental Aspects	Indicator(s)	Associated Job Functions	Existing Operational Control Procedures	Operational Control Procedure Development / Modification Needed	Responsible / Status	Location Posted

Contact Person:

Date Completed:

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Module 6: Supporting EMS Elements

INTRODUCTION

Top management plays a key role by **providing resources** needed to implement the EMS. This is one of the most important jobs of top management. In some organizations, “top management” might be a single individual while in others it might be a group of people (such as a board of directors). Resources might include, for example, **human resources, specialized skills, technology** and **financial resources**.¹

Small and medium-sized organizations may have **advantages** over larger ones in structuring their resources for environmental management. Because personnel and other resources are generally more limited in smaller organizations, people often “wear more than one hat” and have experience in performing multiple functions. An individual responsible for environmental management in a smaller organization also might be responsible for quality, health & safety, facilities, or other functions. In such cases, integrating environmental responsibilities with other functions can be greatly simplified. (35)

More organizational advantages of small business:

- Shorter lines of communication;
- Less complex organization;
- Limited delegation; and
- Simpler access to management. (35)

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 and provides specific examples of processes and methods to consider as you develop the structure of your EMS and define, document, and communicate roles, responsibilities, and authorities. Figure 6-1 provides a graphic representation of EMS implementation.

Roles are required for all personnel or departments who have an involvement with the EMS.

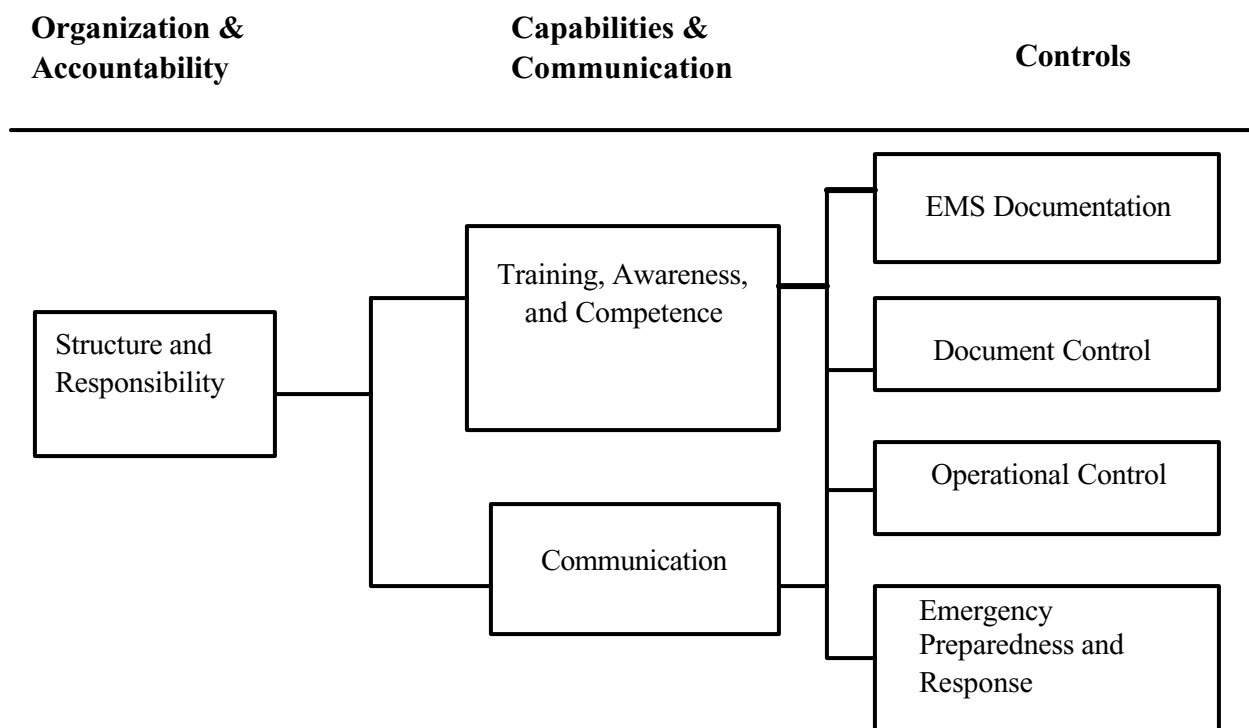
Responsibility details what, when, and how the individual or department interacts with the EMS. These details provide the basis for auditing the “human” aspects of the EMS performance.

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 35. Subsequent references to this document will be given in parentheses in text.

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Authority related 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.

Figure 6-1: Graphic Representation of EMS Implementation



Identify Environmental Tasks and Personnel

Before you can begin assigning roles, responsibilities, and authorities within your EMS, you will need to identify how each individual’s job affects the environment. Conversely if you have 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 (see next section of this Module).

Take time to revisit and review your environmental aspects, legal requirements, objectives and targets, and environmental management programs and identify required tasks and appropriate personnel for undertaking the tasks. The important point is that before you can assign appropriate roles, responsibilities, and authorities for environmental activities, you must first have a detailed understanding of these activities. This should be easier for the areas identified by your assessment of existing environmental programs in Module 4.

In fact the process of the 3R’s (roles, responsibilities, and resources) should be occurring at the same time as the objectives, targets, EMPs 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 EMPs you need to consider responsibilities, means (resources) and time frame (which will depend on resources available).

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Develop Methods of Defining, Documenting, and Communicating Roles

You need to assign roles, responsibilities, and authority for tasks within the EMS, **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, and you are free to select any method. Similarly, roles, responsibilities, and authorities can be communicated in a variety of ways.

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

- Organizational charts (see Attachment 6-A);
- Job descriptions (see Attachment 6-B for sample matrix showing accountabilities for EMS elements); 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 (see the procedural model in Module 1 Attachment 1-D).

Hint: It is better to define and describe environmental roles and responsibilities by integrating these with existing roles.

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 your EMS involves three general steps:

- **Identifying resource needs.** To identify EMS resource requirements, you will need to assess the level of effort your plant’s current environmental tasks require, the effect of other plans your firm may have on the EMS, and resources the new pieces resulting from implementation will require.
- **Preparing a budget** that addresses the 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 your EMS.
- **Tracking EMS costs** on an ongoing basis to ensure that resources continue to reflect current needs.

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By evaluating such information, you can develop a clear understanding of the time and resources required for tasks within your EMS.

Hint: Be sure to identify resource requirements and track resources using existing systems in your plant. Look at how other project resources get assigned and use the existing processes as your starting point. You may need to add more detail in order to help management understand what resources are required or how they have been used.

Ensure That a Management Representative Is Appointed

An effective management system needs an advocate. Thus, top management should appoint a management representative and possibly an EMS Core Team as discussed in Module 2 of this Guide.

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. (35)

The management representative can be the same person who serves as the project champion, but this is not mandatory. A business owner, plant or shop manager, or any number of other people might serve as an effective EMS management representative. (35)

One of the most important considerations in establishing a workable and effective organizational structure for your EMS is to build appropriate **incentives** into the system. To this end, you should consider using environmental performance as an objective in **employee performance reviews**. Environmental objectives should be based on the degree to which each employee's job responsibilities affect the environment.

Employees with jobs that directly impact the environment, such as waste disposal, should be reviewed, in part, based on the manner in which they ensured that those activities were carried out in a responsible way (i.e., wastes were disposed of in a manner having a minimal impact on the environment). Employees in jobs with less environmental impact should be reviewed, in part, based on the organization's achievement of the established environmental objectives and targets.

The ultimate decision on whether to incorporate environmental performance in overall performance reviews will most likely be made by the top management of your plant; however, this is an important part of an EMS, and you should encourage top management to adopt such a practice.

ENVIRONMENTAL TRAINING NEEDS

Environmental performance among employees can be directly linked to environmental training. Training of employees about environmental management and your EMS is needed because:

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- Every employee can have potential **impacts** on the environment; and
- Any employee can have **good ideas** about how to improve environmental management efforts. (39)

Each person and function within your plant can play a role in environmental management. For this reason, your training program should cast a wide net. Every employee and manager should be aware of the environmental policy, the significant environmental impacts of their work activities, key EMS roles and responsibilities, procedures that apply to their work, and the importance of conformance with EMS requirements. Employees should also understand the **potential consequences** of **not** following EMS requirements (such as spills, releases, fines or other penalties). (39)

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), you should establish criteria to measure the competence of individuals performing those tasks. (39)

A recommended approach to defining environmental related training needs and establishing a training program is described below.

Needs Analysis

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 your plant requires training, what type(s) of training they need, and the skill sets required. In assessing these needs, you should consider both **general** and **specific** needs (e.g., “What EMS procedures affect Joe’s daily work and what happens if they aren’t followed?” “What environmental impacts might Joe’s work cause?” “What broader understanding of environmental issues and our EMS does Joe need?”). (39) The skill level can also be referred to as the **competence** level of the individual.

Look at the **training you conduct already**, for compliance with environmental, health, safety, and food safety regulations. You may find that your existing training efforts go a long way towards satisfying the requirements for the EMS. Competence might be established on the basis of regulatory-required training. (39)

Establishing who requires EMS awareness training should be fairly simple, as everyone in your plant must have a very basic awareness of the EMS. Therefore, all personnel at your plant should receive EMS awareness training. The intensity and level of detail of awareness training may vary by type of position. Your plant 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.

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To identify job-specific training needs, you should 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 awareness of the environmental policy and 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.

Note: Be aware that you probably will not be able to identify all your EMS training requirements until you have worked through all the modules.

For general positions in your plant you may determine that there are no prerequisite environmentally related skills required. For some specialized areas, you may determine that a prerequisite skill level that your plant is not equipped to provide is needed. In such cases, the job may be contracted out, for example, maintenance of specialized water monitoring equipment.

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 your plant.

Your first step in implementing your 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 your plant. See Attachment 6-C for an example.

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) (40)

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Training Resources

- 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. (40)

Employee Competency

You have the responsibility, as part of your EMS, 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 his 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 your EMPs are a success, the higher the level of training and competency you should strive for with that employee.

When evaluation and training might be needed:

- New employee is hired;
- Employee is transferred to a new job;
- Individual doesn't follow procedure / instruction;
- Procedures are changed;
- New process, material or equipment is introduced;
- Plant changes objectives and / or targets;
- New regulations affects organization's activities; and
- Job performance must be improved. (41)

Your overall goal for your training program is to produce knowledgeable, skilled, and aware employees who assist your plant in achieving its stated goals and objectives.

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COMMUNICATION PROGRAMS

The importance of employee involvement in developing and implementing your EMS has been discussed earlier. In addition, there may be parties with an interest in your environmental performance and management efforts **outside** the plant. It is particularly important to communicate with the community in which you operate. Effective environmental management requires effective communications, both internally **and** externally. (43)

Effective communications will help you:

- Motivate your workforce;
- Gain acceptance for your plans and efforts;
- Explain your environmental policy and EMS and how they relate to the overall organizational vision;
- Ensure understanding of roles and expectations;
- Demonstrate management commitment;
- Improve your relationship with the community;
- Monitor and evaluate performance; and
- Identify potential system improvements. (43)

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; (43) 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; see Figure 6-2.

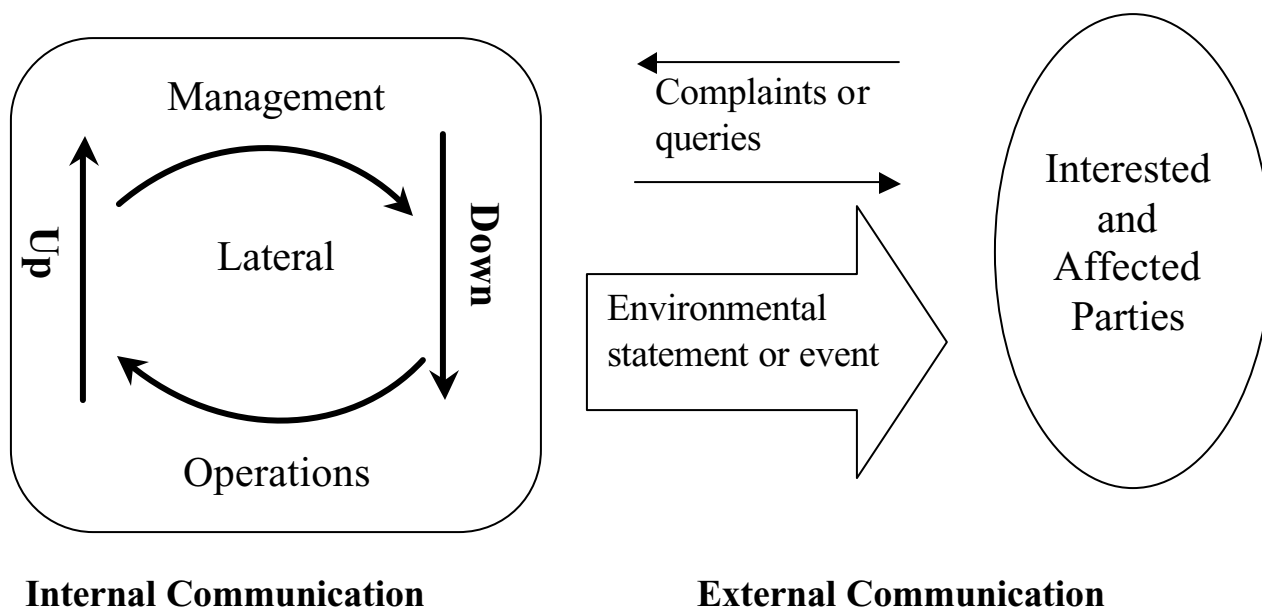
Internal Communication

Internal communication refers to all communications within the organization between different levels and functions (see Figure 6-2).

The goals of internal communication are to:

- Make employees aware of the environmental policy and any other environmentally related procedures necessary to conduct their work;
- Inform employees about the overall performance of the EMS;
- Provide employees with an opportunity and mechanism to voice their concerns about environmental issues; and
- Report back to employees on the results of EMS monitoring, audit, and management reviews.

Figure 6-2: Internal Versus External Communication



The key to achieving the goals of internal communication in an EMS is to develop a two-way communication pathway - “**top down**” communication from top management, and “**bottom-up**” communication from line workers who collectively have the greatest ability to effect environmental issues at the organization.

Effective internal communication will help to:

- Motivate your workforce in EMS implementation;
- Gain acceptance for EMS plans and efforts;
- Explain the environmental policy and EMS;
- Ensure understanding of roles and responsibilities in EMS implementation;
- Demonstrate top management commitment to EMS;
- Monitor and evaluate performance of EMS; and
- Identify areas of improvement.

External Communication

External communication broadly refers to any communication between an organization and **external interested parties** regarding environmental issues at the organization (see Figure 6-2). Interested parties could include regulators, customers, suppliers, vendors, public interest groups, and neighbors.

A requirement of the National Environmental Performance Track program is to proactively communicate with your community about your plants environmental performance. It is highly encouraged that you take a proactive approach in communicating with your community, however

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“communication” from external interested parties may typically be in the form of **inquiries**. The inquiries could be from regulators in the form of a letter or a site visit, from members of the general public through a telephone call or letter, or from a stockholder group. For example, an oil refinery may get inquiries from the public regarding odors that occur at certain times of the day.

An external communication procedure should focus on the following items:

- How your plant will receive, document, and respond to communication from external interested parties; and
- How to inform community members of important matters that affect them.

Your external communications procedures should strive to ensure that:

- Only correct information is sent out to external parties;
- The information has been appropriately reviewed; and
- The information is delivered by appropriately trained and qualified staff.

Effective external communication will help to:

- Improve relationships with stakeholders;
- Demonstrate due diligence; and
- Build trust in the community.

Begin early in the process

Let people know what you are doing. In most cases, you will need the cooperation of several people within your plant to gather information and develop an EMS that will work. In small and large organizations alike, early communication will pay off in greater acceptance of the EMS.

Set your communication objectives

Decide what you want to achieve in your communication. Setting this goal will help you 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 your plant. The policy should outline what kinds of information will be communicated to external stakeholders, and how the plant will document and respond to communications from these stakeholders. In addition, the procedure should discuss how the plant 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

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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 your EMS activities.

Examples of methods for communicating both internally and externally are given below.

Internal Methods:	External Methods:
<ul style="list-style-type: none">• Newsletters• Intranet• Staff meetings• Employee meetings• Bulletin boards• Brown bag lunches• Training• Signs	<ul style="list-style-type: none">• Open houses• Focus or advisory groups• Web site or e-mail list• Press releases• Annual reports• Advertising• Informal discussions• Attending community meetings (44)

WORKING WITH STAKEHOLDERS

Stakeholders are anyone who has an interest in your company's environmental performance. Stakeholders can play an important role in helping your plant develop an EMS. Employees have strong stakeholder interest in your plant and can provide strong support for EMS development. 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 your EMS. This section addresses the kind of stakeholders you **may** wish to include in the process and the potential benefits of including stakeholders. While involvement of employees is critical to the success of your EMS, **how far you proceed with including additional stakeholders is your decision.**

Note: Active stakeholder involvement programs are an EMS option that some companies find highly beneficial to undertake. The decision to whether your plant will engage in active stakeholder involvement is one that your management should consider by evaluating if it makes sense for you. If the decision is to not engage in such a program then record the rationale for the decision so that if conditions change, re-evaluation will be less complex.

Stakeholder Roles

Consider why you would want to include internal and external stakeholders and what roles they can play. Before engaging stakeholders, be clear on what you expect their role to be. What do you want from them? What do you intend to tell them? Would you be able to produce a list of community/local references that are familiar with your plant? Do you have a list of current or ongoing citizen concerns with your plant? What forms of reporting on the performance of your EMS and your other performance commitments will you make available to various stakeholders?

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Consider the following:

- Internal stakeholder (e.g., employee) participation can facilitate implementation of environmental projects as employees “take ownership” of the EMS process and the process changes it may bring.
- Different stakeholders bring useful perspectives identifying environmental issues, often identifying issues that might otherwise have been overlooked.
- Participation by all types of stakeholders can add credibility, transparency and value to your EMS.
- Involving external stakeholders can help them understand your business operating constraints.
- Sometimes being an environmental leader can help you gain customer recognition and loyalty, and involving customers in your EMS helps them recognize your leadership.
- Forming partnerships with customers and suppliers can help to identify shared concerns and ways to cooperate to resolve them. There may be ways that your company can help your customers meet their environmental management needs. Forming partnerships with suppliers can help your company obtain important information and may help you meet your EMS goals.

Identifying Stakeholders

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 your EMS.

The following list provides types of stakeholders:

Internal Stakeholders	External Stakeholders
<ul style="list-style-type: none">• Employees• Shareholders• Customers• Suppliers• Investors & insurers• Trading partners• Corporate HQ	<ul style="list-style-type: none">• Neighbors• Community organizations• Environmental groups• Larger companies• The media• Local government• Regulators

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You may want to start with those stakeholders who have expressed interest in your operations. If you wish additional input, you can contact the following sources in your effort to locate suitable stakeholders:

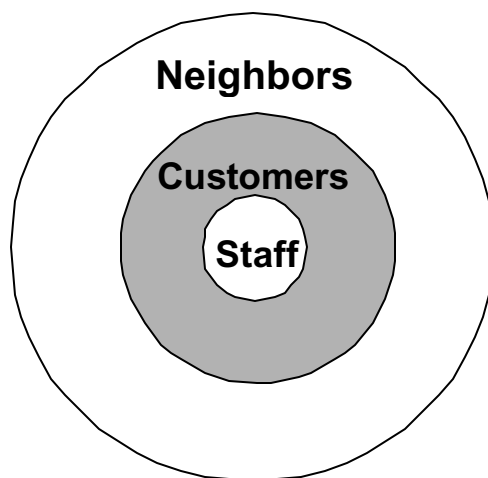
- Ask your plant's own employees, including plant/site managers and public relations personnel;
- Contact local officials for suggestions; and / or
- Contact local schools, community colleges, or universities; or contact a national advocacy group to elicit suggestions as to which local or national groups may be interested / suitable.

How to Work With Your Stakeholders

The next stage of the process is to establish dialogue with stakeholders. You may view this as an opportunity to further refine your understanding of the various interests of the groups.

Develop stakeholder participation in stages and learn as you go. You might think about the different kinds of stakeholders as forming ever-broader circles around your business (see Figure 6-3). Begin with the innermost circle and work outward.

Figure 6-3: Levels of Stakeholder Interest



Consider various methods of communication when informing stakeholders about your plant and what you are doing, or plan to do, to protect the environment. Methods may include:

- Discussion in company meetings;
- Company web site;
- Producing a fact sheet about your plant's activities, the EMS program, and why and how your company would like to include stakeholders;
- Establishing a phone line to answer questions, record concerns, etc.;
- Going to local schools, community colleges, universities, or civic organizations, such as the Rotary, that may provide a focal point of interest about your plant; and

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- Holding public meetings when you feel it is appropriate.

Ensure That Stakeholder Dialogue is a Two Way Process

The stakeholders will want to know that their comments and concerns are being listened to and taken into account. You need to convey that your plant is genuinely and actively including them.

A **sample template** which may be used to identify and keep track of stakeholders, their potential interests, information needed to communicate to them, and the method of communication is included in the sample stakeholder procedure in Attachment 6-D.

Point of Contact

In dealing with and managing feedback from these external parties, each plant should also **designate a point of contact** who has direct access to plant management and who can effectively respond and react to an inquiry from the public. When any form of communication is received from the plant 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.

HOMEWORK

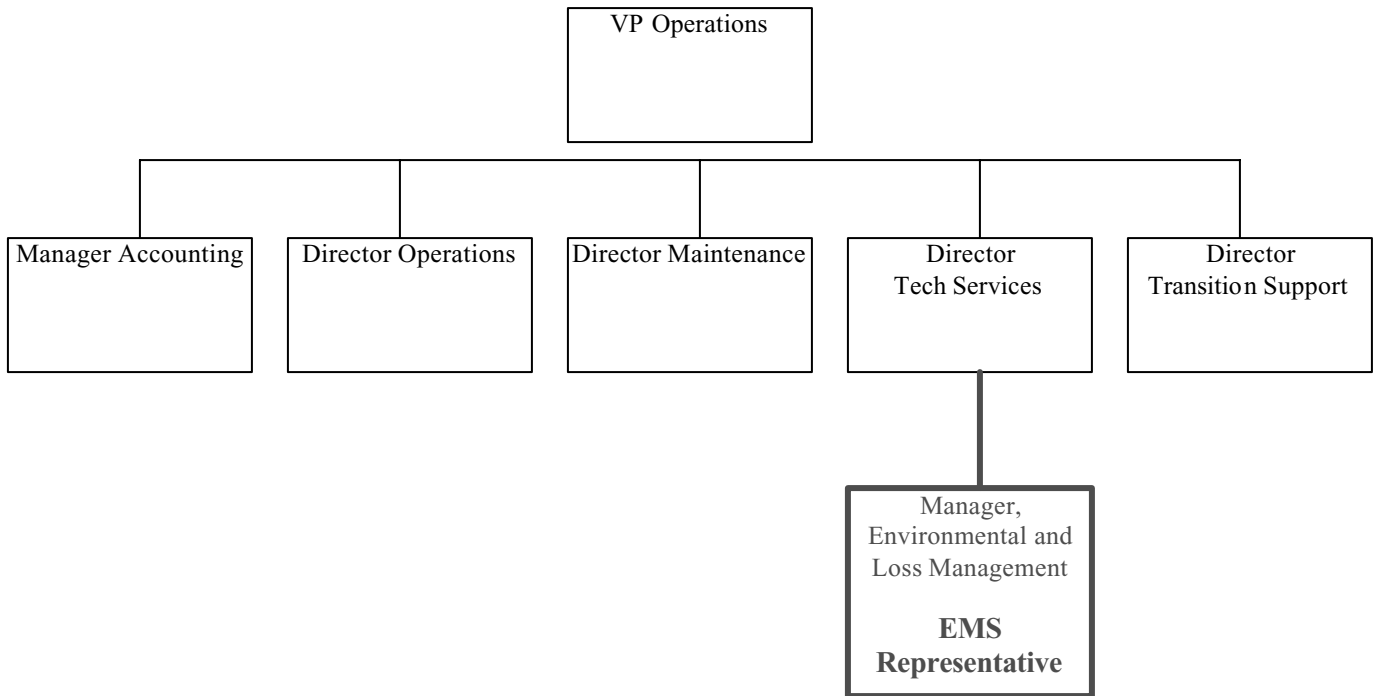
Your homework is to document roles, responsibilities and resources for your plant and ensure that those with 3R functions are aware of them.

You should conduct a review of training needs based on both existing and environmental activities in the plant and any new or planned activities associated with implementation of the EMS. Where new or modified training is needed, define what is needed to ensure this occurs.

Define both formal and informal internal communication processes and note desired outcomes from forms of communication. Also define external communication including proactive programs such as community and stakeholder involvement.

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ATTACHMENT 6-A: EXAMPLE ORGANIZATIONAL CHART



US EPA ARCHIVE DOCUMENT

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ATTACHMENT 6-B: MATRIX OF ACCOUNTABILITIES

EMS Reference Title	EMS Manual Section Number & Title	Accountability
	A-1. Index	<ul style="list-style-type: none"> None assigned
	A-2. Introduction	<ul style="list-style-type: none"> Maintain Section: EMS Representative
	A-3. EMS Scope	<ul style="list-style-type: none"> Define Scope & Applicability: Core team Maintain Section: EMS Representative
	A-4. EMS Manual Distribution	<ul style="list-style-type: none"> Maintain Section & Distribute Manual: EMS Representative
	A-5. EMS Manual Record of Revisions	<ul style="list-style-type: none"> Maintain Section & Review Manual: EMS Representative
Environmental policy	B-1. Corporate Sustainable Energy Development Policy and Principles	<ul style="list-style-type: none"> Approve/Issue Environmental Policy: Chairman, CEO Comply with Policy: all staff Maintain Section: EMS Representative
	B-1. Environmental Policy	<ul style="list-style-type: none"> Approve/Issue Policy: Executive VP Comply with Policy: all staff Maintain Section: EMS Representative
Environmental aspects	B-2. Identifying Environmental Aspects	<ul style="list-style-type: none"> Establish/Maintain/Implement Process at Director Environmental Affairs
	B-2. Determining Significant Environmental Aspects	<ul style="list-style-type: none"> Maintain/Apply Process & Develop/Maintain EMS Aspects Database: Director Environmental Affairs, EMS Representative Division Input to EMS Aspects database: EMS Representatives, Divisions.
Legal and other requirements	B-3. Interpreting Legal Requirements	<ul style="list-style-type: none"> Implement & Maintain Process: VP, Regulatory Affairs
	B-3. Interpreting Other Requirements	<ul style="list-style-type: none"> Implement & Maintain Process: VP, Regulatory Affairs Maintain this Section: EMS Representative
Objectives and targets	B-4. Developing Objectives and Targets	<ul style="list-style-type: none"> Develop Objectives & Targets, Division Directors and EMS Core Team, Director Environmental Affairs Approve Objectives & Targets: VP Operations Meet Objectives & Targets: Directors Maintain Section: EMS Representative
Environmental management programs	B-5 Environmental Programs	<ul style="list-style-type: none"> Approve Programs Division Directors Develop and Maintain Programs: Director Environmental Affairs Maintain this Section: EMS Representative
Structure and responsibility	C-1. Structure and Responsibility - Assigning EMS Accountabilities	<ul style="list-style-type: none"> Assign EMS Accountabilities: EVP Assign EMS Representatives: Director Environmental Affairs Co-ordinate EMS Planning & Strategy: Director Environmental Affairs Maintain this Section: EMS Representative

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EMS Reference Title	EMS Manual Section Number & Title	Accountability
Training, awareness and competence	C-2. Training	<ul style="list-style-type: none"> • Setting of Environmental Training Standards, & Establishing Env. Training Requirements: Training Support & Services • Staff Environmental Training: VP Operations • Record Performance: Immediate Supervisors • Maintain Records: Human Resources • Maintain Section: EMS Representative • Develop Training Program - Director Environmental Affairs
Communication	C-3. Internal Communications and Reporting	<ul style="list-style-type: none"> • Internal Communications & Reporting: VPs, Directors • Maintain Section: EMS Representative
	C-3. External Communications and Reporting and Public Outreach	<ul style="list-style-type: none"> • Implement and Maintaining the Process: EMS Representative • Public Outreach: Director Environmental Affairs • Maintain this Section: EMS Representative
Environmental management system documentation	C-4. EMS Documentation	<ul style="list-style-type: none"> • Maintain this Section & EMS Manual: EMS Representative
Document control	C-5. Document Control	<ul style="list-style-type: none"> • Electronic & Paper Document Management: Clerical & Records Supervisor • Maintain Electronic Documents: Intranet Administrator • Prepare/Approve EMS Control Documents: VP Operations • Maintain this Section: EMS Representative
Operational control	C-6. Operational Controls	<ul style="list-style-type: none"> • Maintain Section: EMS Representative • Establish, Approve & Maintain Operational Controls: Director Environmental Affairs • Comply with Operational Controls: all relevant staff & contractors
Emergency preparedness and response	C-7. Emergency Preparedness and Response	<ul style="list-style-type: none"> • Establish EPRPs: Directors Environmental Affairs • Maintain Section: EMS Representative
Monitoring and measurement	D-1. Monitoring and Measurement Programs	<ul style="list-style-type: none"> • Establish and Manage Monitoring/Measurement Programs, Director Environmental Affairs • Maintain this Section: EMS Representative
Nonconformance and corrective and preventive action	D-2. Conformances and Corrective and Preventive Action	<ul style="list-style-type: none"> • Establish, Maintain & Implement Management System to Identify Environmental Requirements and Respond to Non-conformances, etc.: Director Environmental Affairs • Maintain this Section: EMS Representative
Records	D-3. Environmental Records	<ul style="list-style-type: none"> • Maintain Section: EMS Representative • Maintain Environmental Records: Clerical & Records

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EMS Reference Title	EMS Manual Section Number & Title	Accountability
Environmental management system audit And Compliance Audit	D-4. Internal EMS Audits	<ul style="list-style-type: none"> • Authorize Internal EMS Audits: EVP • Establish Process and Conduct EMS Audits, EMS Representative • Compliance Audit: Director Environmental Affairs • Maintain Section: EMS Representative
Management review	D-5. Management Review	<ul style="list-style-type: none"> • Conduct EMS Management Review: EVP, EMS Core Team • Conduct NHQ EMS Review; VP Operations • Participate in Review, Site Reviews, Directors • Maintain this Section & Provide Information to Review Committee, etc.: EMS Representative

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ATTACHMENT 6-C: PROCEDURE FOR ENVIRONMENTAL TRAINING (AWARENESS AND TASK-SPECIFIC)

I. Purpose

ABC Meat Processing provides all employees with environmental awareness training on environmental issues and provides task-specific training to those employees whose jobs are associated with significant environmental aspects to ensure that its employees carry out their duties in as environmentally responsible a manner as possible.

II. Procedure

Awareness Training

1. All new employees receive a 15-minute introduction to the ABC Meat Processing's EMS, specifically its environmental policy, significant environmental aspects, and environmental objectives. This introduction, which includes an opportunity for the new employees to ask questions about the EMS, is given by the human resources (HR) manager as part of general orientation. Records of employees who have received this training are maintained by the HR department.

Task-Specific Training

1. Using the root cause analysis as a tool the EMS Core Team, working in coordination with the appropriate operations managers, identifies the job functions that are associated with each significant environmental aspect.
2. The EMS Core Team, in conjunction with the relevant operations manager, then determines what training employees performing each of these job functions should receive in order to control actual environmental impacts to the greatest possible extent.
3. Operations managers are responsible for ensuring that their employees receive the appropriate task-specific environmental training. Where possible, environmental training is integrated with other types of training (e.g., operational) that employees are receiving. The HR manager keeps records of the training received by each employee.
4. Training programs include consideration of specific training for those whose jobs and responsibilities involve activities directly related to achieving objectives and targets, and those whose jobs and responsibilities involve activities directly related to compliance with legal requirements.

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III. Frequency

Awareness training is given to new employees during their first week at ABC Meat Processing. Task-specific training is given to relevant employees as they take on a new function that is associated with a significant environmental aspect. Task-specific training is updated, as necessary.

IV. Records

Records of the awareness and task-specific training received by each employee are maintained by the HR manager. The job functions associated with environmentally critical activities (i.e., those functions that should receive task-specific training.

The following worksheet provides an example of a training record plan.

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Worksheet Training Plan Record						
Jobs Affecting Environment	Training Needs	How to Train	When/ Length	Budget	Completion Date	Who is Responsible
Sample: Staff EH&S Person	Environmental Policy	Staff Training Session	Once/ Two hrs.	?	?	?
Production Employees	Emergency Preparedness & Response					
Contact Person:			Date Completed:			

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ATTACHMENT 6-D: PROCEDURE FOR COMMUNICATION WITH STAKEHOLDERS

I. Purpose

To ensure that interested external stakeholders receive appropriate information about the plant's environmental activities, ABC Meat Processing has developed a company policy for considering and, where appropriate, responding to queries, comments, or complaints from stakeholders.

II. Procedure

1. The EMS committee identifies stakeholders and their potential interests in the environmental performance of ABC Meat Processing using format CS-01, Stakeholders and Environmental Issues. If the committee decides that *proactive* communication on environmental issues is necessary with any group, that decision is recorded on CS-01 and responsibility is designated.
2. When any form of communication is received regarding ABC Meat Processing's environmental performance or management from a stakeholder, that communication is immediately forwarded to the EMS management representative.
3. The EMS management representative considers the nature of the communication and makes a decision on whether and how to respond to it based on the guidance below and on the more specific guidance in CS-01. The EMS management representative is responsible for maintaining records of each such communication and response using format CS-02, Stakeholder Communication Record. Where internal actions are necessary to address the communication, this is noted on CS-02 and a Corrective Action Form is initiated.

III. Guidance for Communicating with Stakeholders on Environmental Issues

ABC Meat Processing's environmental policy is available to all stakeholders upon request. ABC Meat Processing will do its best, however, to respond in kind to all good-faith communications from stakeholders about environmental issues, including complaints, comments, and information requests. However, ABC Meat Processing may not choose to respond in all cases, particularly if the request is made in bad faith or if sensitive information is requested.

IV. Frequency

As per environmental communication.

V. Records

Records of environmental communications from stakeholders and ABC Meat Corporation responses are kept by the EMS management representative and are tracked using format CS-02. An updated version of CS-01, Stakeholders and Environmental Issues, is kept in this manual. The following worksheet provides a supporting template for recording work with stakeholders.

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Working with Stakeholders						
Your Stakeholders	Potential Environmental Interest	What you want to tell them:	What you want them to tell you:	How to communicate with/tell them:	When	Person Responsible
(Example) Employees		Environmental policy	How to get it done	Memo, bulletin board, meetings, suggestion box, intranet		
(Example) Neighbors Customers		Environmental policy and EMS plans Environmental policy and EMS plans	Their environmental concerns Their environmental concerns	Meetings, open house, flyers, suggestion box, web site Above, plus inserts in direct mail advertising, or billing, web site		
Contact Person:			Date Completed:			

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CS-01: Stakeholders and Environmental Issues

Stakeholder	Potential Environmental Interest	Proactive Communication Plan (if desired)	Person Responsible

Contact Person:

Date Completed:

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CS-02: Stakeholder Communication Record

<i>Date Communication Received</i>	
<i>Type of Communication</i>	
<i>Received From</i>	
<i>Address/Telephone Number/ Email</i>	
<i>Content of Communication (attach copy if possible)</i>	
<i>Will ABC Meat Processing Respond?</i>	YES NO
<i>Date of Response</i>	
<i>Person Responding</i>	
<i>Position</i>	
<i>Nature of Response (attach copy if possible)</i>	
<i>Are Internal Actions Necessary? (If Yes, fill out a Corrective Action Form.)</i>	

Contact Person:

Date Completed:

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Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry

Module 7: EMS Documentation and Records

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Module 7: EMS Documentation and Records

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Module 7: EMS Documentation and Records

INTRODUCTION

When undertaking a new activity like EMS development, documenting discussions, plans, targets, and programs is crucial. Documentation ensures that no information is lost and lets you track your plant's performance. Much of this documentation will become the content for your plant's EMS "Manual" (remember the "Manual" may in fact be a number of separate but related and coordinated documents). The various sample procedures in this guide and procedural guidance within the modules of this guide are provided to give you starting points for building your EMS documentation.

By now you will have already been creating procedures (possibly using the procedural guidance in Module 1, Attachment 1-D). This module looks at documentation requirements in general for your EMS.

Documentation is important to the success of your EMS for several reasons:

- Word-of-mouth information is rarely communicated consistently, whereas written information is more likely to be constant from person to person and over time.
- Creating documentation helps you assess the progress of your EMS. Some inconsistencies show up only as you commit your ideas to paper, and having a record allows you to check on progress and evaluate results.
- Documentation is vital to maintaining consistency in an EMS over time and from department to department. In most companies, change is a fact of life: new products are developed, the company grows, and employees change positions or leave the company. Accurate documentation will make it much easier to maintain an effective and flexible EMS during these changes.

Hint: Think about the pace at which personnel tend to change in your industry and within your plant. If it is not unreasonable to expect that key individuals associated with an EMS procedure (determining aspects for example) may change within two EMS cycles (typically organizations review their EMS annually), then consider formally documenting the procedure.

Conversely, you should not feel compelled to document everything about your EMS. For example: If you are in a small plant where a lot of procedures are passed on via key workers effectively apprenticing new workers, a list of the topics that are part of on-the-job training may be sufficient.

Before discussing procedures on documentation, it is necessary to define what is meant by the term documentation.

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What is “documentation”?

This term has many different interpretations, and may refer to any or all of the following:

- Instructions for doing something;
- Records of what was done;
- Policies developed;
- Printed materials that are given or sent to clients, regulatory agencies, customers, and the public; and
- Any electronic copy of the above items.

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.¹

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

Note: If you used the significance procedure within Module 4 of this Guide, aspects and associated impacts that are already well managed and in compliance will not necessarily be considered significant. If in order to achieve this, your plant may have created documentation, records and formal processes these should become part of your EMS.

Other EMS Documentation

In addition to your EMS “Manual”, your plant should maintain other documentation of its EMS.

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

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. (47)

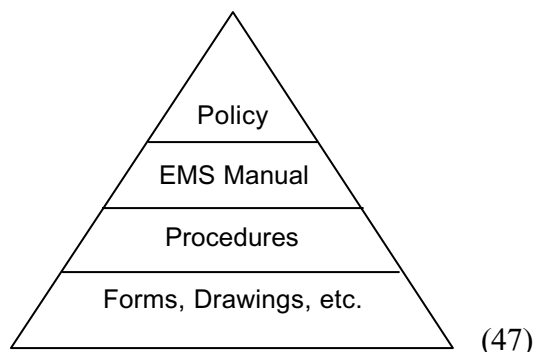
¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 47. Subsequent references to this document will be given in parentheses in text.

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Module 7: EMS Documentation and Records

One way to think about your EMS documentation is to use Figure 7-1 below, which also can be applied to quality or other management system documents. (47)

Figure 7-1: Hierarchy of EMS Documentation



The basic steps in preparing EMS documentation include:

Determine how EMS documentation can be integrated into **existing documents**. Before you dive into your documentation, learn how deep the water is. Find out what documentation already exists, its purpose, and whether it works. The goal of this search is to locate materials you can use to begin your 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 your **plant's individual needs**. You will probably have to compromise in producing documentation that meets your needs while also meeting your budget. Here are some questions to help you determine what fits your needs:

- Does your 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 your 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 your EMS documents, **plan the format** (document and page appearance) for the documents to be created.

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Note: This does not mean you should not start creating text while you are developing you EMS. But, until you have defined how to store and organize your documents in the long run, concentrate on the core content (see Attachment 1-D) of your documents. The basic unformatted text content of documentation can be moved between most commercial word processing programs with ease.

If your 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 your plant 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 plant 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 plant cannot be sure that people are working with the right tools. (50)

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, your plant 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** (*we make sure people don't use the wrong documents by mistake*). (50)

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Your procedure should designate **responsibility and authority** for preparing documents, making changes to them and keeping them up-to-date. In other words, you need to make it clear **who** can actually generate and change documents and **the process for doing so**. (50)

Your HACCP processes for document control should serve as a good starting point for this.

Hints:

Don't make your procedure more complicated than it needs to be. While larger organizations may have complex processes for document control, smaller organizations can use simpler processes. (51)

Limiting distribution can make the job easier. Could everyone have access to one or a few copies? Determine **how many copies you really need** and where they should be maintained for **ease of access**. (51)

Do they need to be in multiple languages?

As your procedures or other documents are revised, **highlight** the changes (by underlining, boldface, etc.). This will make it easier for readers to find the changes. (51)

EMS RECORDS

An EMS record is related to (but not the same as) an EMS document. An EMS **document describes** what your system consists of (i.e., what you do and how you do it), while EMS **records demonstrate** that you are doing what the documentation said you would do. (47)

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 plant to stay in compliance. However, the reports that a plant completes and sends to the regulatory agency, as required by the permit, are **records** because they are historical data that demonstrate that the plant 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 plant'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.

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

To identify all appropriate EMS records at your plant, you should review the various elements of your EMS and determine what information is generated by each element, and what information represents **critical parts** of the design or performance of your EMS.

For each element, you should ask the following key question:

What environmental information do you need to manage effectively?

Note: Be aware that you will not be able to identify all required EMS records until you have worked through all of the modules of this guide. Even after completing all of the modules you probably won't be able to sit down and create this list of records on your own in an afternoon. The process of record identification may take place over several weeks or months, because many EMS records, particularly those driven by some regulatory requirements, are generated infrequently, for instance once a year or every two years.

Your EMS records should be properly identified so you can determine what kind of information they record, and what processes, functions, or procedures to which they relate. At a minimum, your 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 record results. A **sample template** is given to help you organize existing records and records to be created for your EMS (see Table 7-1).

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, you must also incorporate procedures that cover proper record filing, storage, and access processes, and protect records from loss.

Your plant 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).

A second **template** is provided as Table 7-2 to help you manage the records used in your EMS.

Note: In developing procedures for both documentation and record keeping, keep in mind the KISS principle - **Keep It Short and Simple**. It is easy to get off-track and provide excessive detail in your EMS documentation; however, the more detailed you make this information, the more difficult and complicated it will be to update and maintain. Users of documentation find shorter documents with lists, notes, hints, and graphics easier to understand.

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Attachment 7-A provides a sample procedure for EMS documentation and record keeping.

Note: Establishment of a procedure for the identification, maintenance, retention and disposal of records related to an EMS may be facilitated by already existing processes, in particular, those developed under **HACCP Principle VI: Establish Record Keeping Procedures**. The primary requirements of HACCP Principle VI are in line with the above requirements for an EMS. One approach to developing a procedure for EMS record keeping will be to review the records you already keep for HACCP requirements and see where they are suitable, in their present form or with minor modifications, to serve the purposes of your EMS system.

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Table 7-1: Documentation of Records

List Existing Records	Name / Title of the Record	Date the Record was Generated	Person Generating Record	Citation to a procedure or permit	Person Responsible for Record	Where Record Is Located
List Records to be Created						
Contact Person:		Date Completed:				

Table 7-2: Record Control

Name / Title of Record	Who Will Use It	Permanent Location	Periodic Review Schedule/ Who	When Can Be Destroyed
Contact Person:		Date Completed:		

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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 your 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 your plant 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.

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

Documentation and especially records are the last part in the EMS philosophy of “**Say It - Do It - Prove It**”. Do your documentation and records allow you to prove it?

EMERGENCY PREPAREDNESS AND RESPONSE

Despite your plant’s best efforts to ensure that its EMS and general safety and operational systems are functioning as designed, the possibility of accidents and other emergency situations still exists. Effective **preparation and response** can reduce injuries, prevent or minimize environmental impacts, protect employees and neighbors, reduce asset losses and minimize downtime. (57)

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

- **Assessing the potential** for accidents and emergencies;
- **Preventing** incidents and their associated environmental impacts;
- Plans / procedures for **responding** to incidents;
- Periodic **testing** of emergency plans / procedures; and,
- **Mitigating impacts** associated with these incidents. (57)

Consistent with the focus on continual improvement, it is important to **review** your emergency response performance **after an incident** has occurred. Use this review to determine if more training is needed or if emergency plans / procedures should be revised. (57)

Typical elements of an emergency procedure and phases to be managed include:

- **Before**
 - Identification
 - Prevention
 - Preparedness
- **During**
 - Priority actions
 - Appropriate response
- **After**
 - Recovery
 - Review of causes
 - Correction and prevention

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Regulatory Requirements

An emergency response plan is required as part of your EMS. The following include some of the commonly applicable emergency planning requirements under U.S. federal regulations:

- OSHA - Emergency Action Plan
Citation: 29 CFR 1910.38(a);
- OSHA - Fire Prevention Plan
Citation: 29 CFR 1919.38(b);
- OSHA - Hazardous Waste Operations and Emergency Response (HAZWOPER)
Citation: 29 CFR 1910.120;
- Emergency Planning and Community Right-to-Know Act (EPCRA) and EPCRA Release Reporting
Citation: 40 CFR 355.30; 355.40;
- RCRA—Hazardous Waste Contingency Plan
Citation: 40 CFR 265.50 et. seq. (generators);
- RCRA Preparedness and Prevention Requirements
Citation: 40 CFR 265.30 et. seq. (generators);
- RCRA General Facility Standards
Citation: 40 CFR 262; 265 (generators);
- Clean Water Act (CWA) - Spill Prevention Control and Countermeasure (SPCC) Plan
Citation: 40 CFR 112;
- Superfund Amendments and Reauthorization Act of 1986 (SARA) Hazardous Chemical Inventory Reporting
Citation: 40 CFR 370;
- CWA Spill Reporting
Citation: 40 CFR 110; 117;
- CERCLA Spill Reporting
Citation: 40 CFR 302; and
- CWA Best Management Practices (BMPs)
Citation: 40 CFR 125.

Typically an organization should consider regulatory, legislative, and other requirements for:

- Environment;
- Environment-related health and safety;
- Hazardous materials and materials handling;
- Transportation of dangerous goods;
- Water and energy;
- Spills; and
- Fire and building codes.

Existing emergency response plans can be incorporated into your EMS. Review your existing plan to ensure that it meets the requirements for an EMS. If necessary augment the plan for the EMS.

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As indicated above, this is an area where you should not have to start from scratch. Several **environmental and health and safety regulatory programs** require emergency plans and/or procedures. Look at what you have now and assess how well your plan describes the following:

- Potential emergency situations (such as fires, explosions, spills or releases of hazardous materials, and natural disasters)?
- Hazardous materials used on site (and their locations)?
- Key organizational responsibilities (including emergency coordinator)?
- Arrangements with local emergency support providers?
- Emergency response procedures, including emergency communication procedures?
- Locations and types of emergency response equipment?
- Maintenance of emergency response equipment?
- Training / testing of personnel, including the on-site emergency response team (if applicable)?
- Testing of alarm / public address systems?
- Evacuation routes and exits (map), and assembly points? (57-58)

When evaluating and designing emergency procedures, bear in mind two final points: 1) your response mechanisms should be as **simple** as possible - emergencies tend to discourage clear thinking; and 2) learn from past mistakes - **incorporate lessons learned** in previous emergencies and near misses into your procedures. A sample template for developing procedures for emergency preparedness and response is given in Attachment 7-B.

HOMEWORK

Using existing systems wherever possible for documentation and records that are clear, trackable and useful. Determine both what documentation and records are needed as well as how best to do this. Ensure your EMS documentation and records are in place. This will include procedures you have been developing prior to this module and will require you to recognize that added documentation and records will be needed for the remainder of the EMS and into the future after you have completed implementation.

Review your existing emergency preparedness and response program to ensure it is satisfactory.

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ATTACHMENT 7-A: DOCUMENTATION AND RECORD KEEPING

I. Purpose

To ensure effective operation of the EMS, ABC Meat Processing documents the procedures of its EMS and keeps records of the outcomes of EMS processes, and of the important environmental issues facing the plant. This EMS Manual comprises this documentation. Documentation is kept up-to-date.

II. Procedure

1. The EMS coordinator documents the procedures that define ABC Meat Processing EMS in this manual. The EMS committee formally reviews and, if necessary, revises this manual on an annual basis. Revised manuals are assigned a new revision number (a minor set of revisions would change the number from, 1.1 to 1.2; a major revision would change the number from, 1.1 to 2.0). Finally, the EMS coordinator ensures that no employees or managers use outdated revisions of this manual.
2. The EMS coordinator maintains updated records of the following outcomes, or results, of the functioning of the EMS:
 - Environmental policy;
 - Environmental aspects;
 - Applicability of legal requirements to environmental aspects; note that copies of the regulations themselves are maintained by the EMS management representative;
 - Significant environmental aspects;
 - Objectives, targets, and action plans for environmental management programs;
 - Results of alternatives evaluations;
 - List of operational control procedures related to significant environment aspects;
 - Results of internal assessments;
 - Corrective actions taken; and
 - Management reviews.

These items are described in more detail in the relevant procedures in this manual.

3. The EMS coordinator is not responsible for maintaining records of environmental training and emergency response preparations; the operational control procedures themselves; or the New Purchase Approval Forms, the Design Approval Forms, the Plant Expansion, or Modification Plans. These records are maintained by the appropriate person or group, as specified in the relevant procedures of this manual.

III. Frequency

Manual review and revision will be done on an annual basis.

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IV. Records

Maintained as outlined in the procedure.

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ATTACHMENT 7-B: EMERGENCY PREPAREDNESS

[Note: this procedure assumes that your plant has a general emergency response plan in place, into which environmental considerations can be integrated.]

I. Purpose

As part of its EMS, ABC Meat Processing strives to ensure that the environmental impacts associated with any emergency situations are minimized to the greatest extent possible.

II. Procedure

1. ABC Meat Processing has an Emergency Response Committee charged with identifying potential emergency scenarios and developing and ensuring the implementation of appropriate procedures, should an emergency situation develop.
2. With the assistance of the EMS coordinator, the Emergency Response Committee a) identifies the potential negative significant environmental impacts associated with potential emergency scenarios, b) incorporates measures to minimize these impacts into emergency response procedures, and c) ensures that adequate training (including simulations) is provided to appropriate ABC Meat Processing staff to implement these procedures.
3. The Emergency Response Committee maintains records of the potential emergency scenarios it is prepared for, the potential environmental impacts associated with each scenario, and the procedures established to minimize these impacts. The HR manager keeps records of training received by staff on implementation of emergency response procedures.

III. Frequency

The Emergency Response Committee meets quarterly to review the status of its work.

IV. Records

Records of emergency scenarios, associated potential environmental impacts, and procedures to mitigate these impacts are kept by the Emergency Response Committee. Training records are kept by the HR manager.

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Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry

Module 8: Monitoring and Measurement and Corrective and Preventive Action

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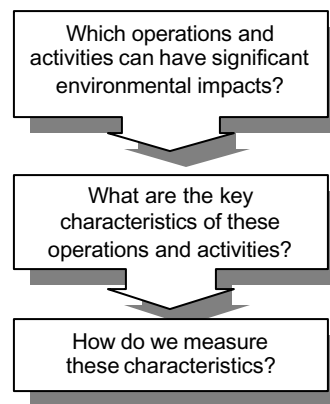
MONITORING AND MEASUREMENT

An organization should develop procedures for monitoring and measurement of its **operations** and **activities** that can have **significant environmental impacts**. As mentioned in Module 5, monitoring and measurement enables an organization to:

- **Evaluate** environmental **performance**;
- **Analyze root causes** of problems;
- **Assess compliance** with legal requirements;
- **Identify** areas requiring **corrective action**; and
- **Improve performance** and **increase efficiency**.¹

In short, **monitoring helps you manage your plant better**.

This Module contains some overlap with Module 5. The difference is that you should now be looking for ways to apply monitoring and measurement beyond direct application to EMPs and operational controls.



As noted in Module 5 your organization should develop procedures to:

- **Monitor the environmental critical control points** (the environmental equivalent of monitoring CCPs for HACCP);
- **Track performance** (including your progress in achieving objectives and targets);
- **Calibrate and maintain** monitoring equipment; and
- Through internal audits, periodically **evaluate your compliance** with applicable laws and regulations. (60)

Monitoring and measuring can be a resource-intensive effort. One of the most important steps you can take is to clearly **define your needs**. (60)

You can start **with a relatively simple** monitoring and measurement process, then build on it as you gain experience with your EMS. (60)

Hint: Most effective environmental measurement systems use a combination of **process** and **outcome** measures. Outcome measures look at **results** of a process or activity, such as the amount of waste generated or the number of spills that took place. Process measures look at “**upstream**” factors, such as the amount of paint used per unit of product or the number of employees trained on a topic. Select a combination of process and outcome measures that are right for your plant. (61) Note: This philosophy can also be applied to areas of performance not directly related to any one process, the overall success the EMS or improvements in your compliance record for example.

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 60. Subsequent references to this document will be given in parentheses in text.

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Progress on meeting objectives: You should measure progress on achieving objectives and targets on a regular basis and communicate the results of such measurement to top management and to staff. To measure progress in meeting objectives, select appropriate performance indicators. (61)

Selecting performance indicators: Performance indicators can help you understand how well your EMS is working. Start by identifying a few performance indicators that are:

- **Simple** and understandable;
- **Objective**;
- **Measurable**; and
- **Relevant** to what your organization is trying to achieve (i.e., its objectives and targets). (62)

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.

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 employees 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. (62)

Note: It is important that the documented monitoring and maintenance procedures are kept up-to-date with respect to changes at your plant; therefore, these procedures should be managed in accordance with your document control system (Module 7). You may need to modify, add, or delete operational procedures (Module 5) as operations, activities, and equipment at your plant change. Your plant's objectives and targets (Module 4) may change due to achievement and changing priorities. The environmental laws and regulations that apply to your plant will also change. Your documented monitoring and measurement procedures should be periodically reviewed and revised to ensure that they reflect current plant conditions.

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

Attachment 8-A provides a sample procedure describing how to conduct an internal compliance assessment. Use the content of Attachment 1-B and your plant's determination of applicable legal requirements (federal, state, and local) for all aspects (both significant and not significant) to assist the development of your internal compliance assessment process.

INTERNAL EMS ASSESSMENT

Once your plant 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**. (71)

Note: Assessment, Review and Audit are often used interchangeably and with slightly different meanings depending on the user. Any of these terms can be used in association with determining environmental regulatory compliance or examination of the status of the EMS. Compliance is assisted by an EMS but is not an EMS.

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. For this guide, the term **assessment** is used 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 your 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 your EMS assessment program to be effective, you should:

- Develop assessment **procedures** and protocols;
- Determine an appropriate assessment **frequency**;
- Select and **train** your auditors; and
- Maintain audit **records**. (71)

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, EMS Implementation Guide Meat Processing, Performance Track), your commitments (e.g., policy commitments), and / or the

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actual commitments you have made in your EMS procedures and documentation for environmental management. (Note: ISO 14001 call these your “planned arrangements”.)

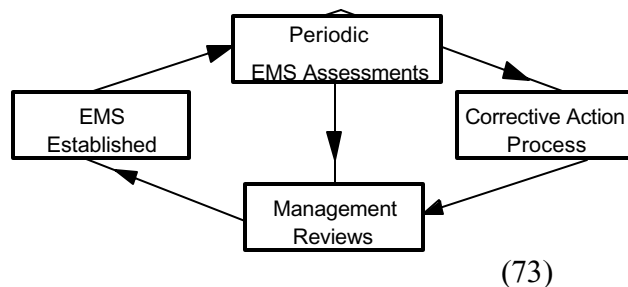
ISO 14001 Registration

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 your business and that you can work with. The auditor will review your EMS documentation and make two site visits to audit your EMS. If the auditor is satisfied with your 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.

Results of your EMS assessments should be linked to the **corrective** and **preventive action** process (see Figure 8-1), which will be described in a subsequent section of this module.

Figure 8-1: 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**. (71)

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. (73)

A key part of the assessment is the specific protocol. It should be based on the “standard(s)” to which your plant subscribes. The checklist in Attachment 1-A that was used for the Gap assessment of your plant at the start of your implementation could be used but may not provide enough useful information. This is because during the process of development of your EMS you

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may have identified different or additional commitments that you will want to determine if you have met. **Feel free to add to the checklist** to make it reflect the commitments and requirements you have set for your plant's EMS.

How frequently should you conduct the assessments?

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

- The nature of your **operations** and **activities**;
- Your significant environmental **aspects / impacts** (which you identified earlier);
- The results of your **monitoring** processes; and
- The results of **previous assessments**. (71)

As a rule of thumb, all parts of the EMS should be assessed **at least annually**. You can assess the entire EMS at one time or break it down into discrete elements for more frequent assessments. (There may be advantages to conducting frequent assessments, but the decision is up to you). (71)

Who will perform the assessments?

You should select and train EMS auditors/assessors. Auditor training should be both **initial and ongoing**. Commercial EMS auditor training is available, but it might be more cost-effective to link up with businesses or other organizations in your area (perhaps through a trade association) to sponsor an auditor training course. Some local community colleges also offer EMS auditor training courses. (72)

Auditors should be trained in **auditing techniques** and **management system** concepts. Familiarity with environmental regulations, plant operations, and environmental science can be a big plus, and in some cases may be essential to adequately assess the EMS. (72)

Some auditor training can be obtained **on-the-job**. Your plant'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. (72)

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.

Traits of a good auditor:

- Independent (of the activity being audited)
- Objective
- Impartial
- Tactful
- Attentive to detail (72)

How should management use assessment results?

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**. (72)

EMS Implementation Guide for the Meat Processing Industry

Module 8: Monitoring and Measurement and Corrective and Preventive Action

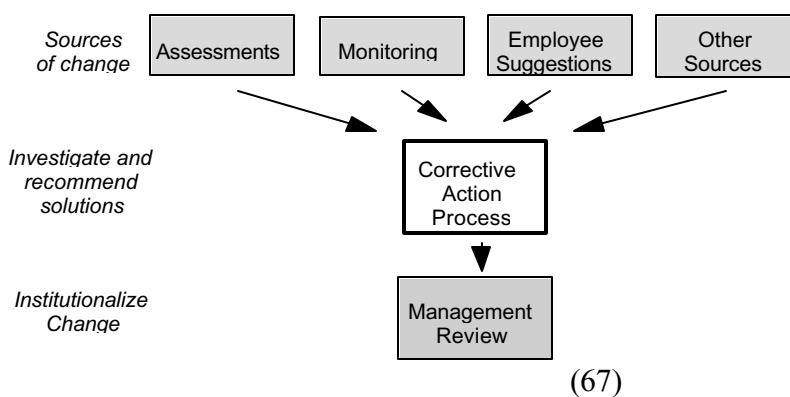
As a final thought, keep in mind that an EMS assessment **is** a check on how well your system meets your own established EMS requirements. An EMS assessment does **not** normally include an analysis of how well employees do their jobs. Finally, assessments should be judged on the **quality** of findings, rather than on the number of findings. (73)

Attachment 8-B provides a sample procedure describing how to conduct an internal EMS assessment.

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 8-2 provides a framework for the corrective action process.

Figure 8-2: Framework for Corrective Action Process



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

- **Problems** (including non-conformances) are **identified** and **investigated**;
- Root **causes** are **identified** (See Module 5);
- Corrective and preventive **actions** are **identified** and **implemented**; and
- **Actions** are **tracked** and their **effectiveness is verified**. (65)

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. (65)

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

- Identify the problem;
- Investigate to identify the root cause;

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- Come up with solution;
- Implement solution;
- Document solution;
- Communicate solution; and
- Evaluate effectiveness of solution. (65)

Hint: The amount of planning and documentation needed for corrective & preventive actions will vary with the **severity** of the problem and its potential environmental **impacts**. Don't go overboard with bureaucracy — simple methods often work quite effectively. (66)

Once you document a problem, the organization must be committed to **resolving it in a timely manner**. Be sure that your corrective & preventive action process specifies **responsibilities, resources** and **schedules** for completion. Review your **progress** regularly and follow up to ensure that actions taken are effective. (66)

Make sure your actions are based on good information and root cause analysis. While many corrective actions may be “common sense,” you need to **look beneath the surface** to determine **why** problems occur. Many organizations use the term “**root cause**” in their corrective and preventive action processes. While this term can be used to describe a very formal analysis process (see Module 5), **it can also mean something simpler** – looking past the obvious or immediate reason for a non-conformance to determine why the non-conformance occurred. (66)

Rule of thumb: 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. (66)

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 your plant 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 your plant 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 your EMS the more likely your plant is to be or become a leader rather than a follower.

Attachment 8-C provides an example procedure for taking corrective action.

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HOMEWORK

Your homework is to expand on EMS monitoring and measurement that you started in Module 5 to cover all appropriate areas of the EMS.

You should also develop and begin use of corrective and preventative action processes.

Finally, you should define compliance and EMS assessment programs and consider when you will conduct them in the implementation process.

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ATTACHMENT 8-A: CONDUCTING AN INTERNAL COMPLIANCE ASSESSMENT

I. Purpose

ABC Meat Processing conducts a periodic compliance assessment to ensure that it complies with all applicable local, state, and federal environmental regulations.

II. Procedure

1. The EMS management representative maintains copies of applicable legal regulations. Based on these regulations, the EMS management representative and coordinator compile a list of questions as a compliance assessment protocol. These questions are intended to be sufficient to the compliance status of ABC Meat Processing with respect to applicable environmental regulations (both the paperwork and the performance-related components).
2. The EMS coordinator and another operations manager carry out the assessment by determining and recording the answers to the compliance assessment protocol. When they are done with the compliance assessment, they note any actual or potential compliance issues on format CA-01 (Compliance Tracking Log). Each actual and potential compliance issue is immediately referred to corrective action.

III. Frequency

Monthly? Annually? (Note: Frequency is dependent on the type of requirement as well as past compliance history.)

IV. Records

Compliance assessment results are recorded by the internal assessment team using the compliance assessment protocol and using format CA-01. Records are maintained by the EMS coordinator.

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CA-01: Compliance Tracking Log

Person Responsible	Regulation	Root Cause	Compliance Check Date	Results	Corrective Action/Date	Compliance Verified/Date

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ATTACHMENT 8-B: CONDUCTING AN INTERNAL EMS AUDIT

I. Purpose

ABC Meat Processing conducts periodic internal assessments of its EMS to ensure that it is being implemented and operated according to the procedures laid out in this manual.

II. Procedure

1. At intervals, a team of two or three operations managers or employees, who are not on the EMS committee, conducts an internal assessment of ABC Meat Processing's EMS. The assessment team uses this manual as the basis for its assessment. In particular, the assessment team checks to make sure that:

- Each procedure is being carried out as stated in this manual;
- ABC Meat Processing's environmental policy is being upheld; and
- Progress is being made in meeting the environmental objectives.

The assessment team bases its evaluation on objective evidence, including documentation and records (e.g., those cited in this manual), interviews with key employees, and observations. Note that this is *not* a compliance audit.

2. The assessment team completes the checklist on format IA-01 and writes up its findings using format IA-02. A "major non-conformance" occurs when an EMS procedure is clearly not being implemented, when one of the commitments in the policy is not being upheld, or when no progress is being made in achieving an environmental objective. A "minor non conformance" occurs when a procedure is being implemented inconsistently, yet without causing major failings in the EMS as a whole.
3. Each non-conformance is immediately referred to corrective action (see the Taking Corrective Action procedure).
4. Records of each assessment (i.e., formats IA-01 and EMS Assessment [see Attachment 1-A]) are maintained by the EMS coordinator.

III. Frequency

At least once a year.

IV. Records

Assessment results are recorded by the internal assessment team using formats IA-01 and IA-02 (Internal Assessment Checklist and Internal Assessment Record). Records are maintained by the EMS coordinator.

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IA-01: EMS Assessment Checklist

Internal Assessment Team: _____

Date of Internal Assessment: _____

Signed: _____

EMS Procedures (Note: the list below will need to reflect the requirements for procedures that your plant has developed)

Check each item assessed (includes auditing of records, where applicable):

- ___ Environmental Policy (adherence to policy commitments)
- ___ Environmental Objectives (progress; implementation of action plans)
- ___ EMS Responsibilities
- ___ Identification of Environmental Aspects
- ___ Identification of Legal Requirements
- ___ Identification of Significant Environmental Aspects
- ___ Development of Objectives, Targets, and Action Plans
- ___ Development of Operational Controls
- ___ Environmental Training (Awareness and Task-Specific)
- ___ Emergency Preparedness and Response
- ___ Documentation
- ___ Conducting a Compliance Assessment
- ___ Conducting an EMS Assessment
- ___ Taking Corrective Action
- ___ Management Review

EMS Performance

- ___ Achieved objective #1
- ___ Achieved objective #2
- ___ Achieved objective #3

Contact Person: _____ Date Completed: _____

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IA-02: 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 ABC Meat Processing making progress in meeting its EMS objectives?	
Is ABC Meat Processing adhering to the commitments in its environmental policy?	
Suggestions for Improving the EMS	

Contact Person:

Date Completed:

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ATTACHMENT 8-C: TAKING CORRECTIVE ACTION

I. Purpose

ABC Meat Processing uses a formal corrective action process to ensure that actual or potential compliance issues and EMS non-conformance are addressed quickly and effectively.

II. Procedure

1. The management representative assigns responsibility for taking action to correct each actual or potential compliance issue or non-conformance identified in a *compliance assessment* or an *internal assessment* to an appropriate manager or employee. Together they fill out the “Statement of the Problem” part of the Corrective Action Notice (format TCA-01).
2. The person responsible then undertakes the corrective action required, calling upon the management representative, the EMS committee, and others for assistance as necessary.
3. The responsible person and the management representative fill out the “Completion of Corrective Action” part of the Corrective Action Notice when corrective action is complete.

III. Frequency

Whenever significant problems in the functioning of the EMS are identified, primarily through the internal assessment process.

IV. Records

Corrective action is recorded using format TCA-01. The records are maintained by the EMS coordinator.

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TCA-01: 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

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Module 9: Continuous Improvement

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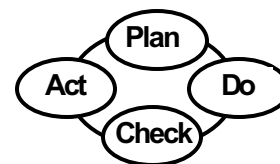
Figure 9-1: EMS Program Measurement Criteria Form.....	9-3
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CONTINUOUS IMPROVEMENT

To first understand the process for continuous improvement, recall the "Plan, Do, Check, Act" model introduced in Module 1.

To improve environmental management, your plant needs to focus not only on **what** things happen but also **why** they happen. Over time, the systematic identification and correction of system deficiencies leads to better environmental (and overall organizational) performance. This model emphasizes the concept of **continuous improvement**.



The final steps in developing your 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 your EMS include:

- Determining program measurement criteria;
- Setting up an internal assessment process (see Module 8); and
- Establishing a management review process.

MEASUREMENT CRITERIA

Determining measurement criteria, also called **environmental performance indicators**, will help you evaluate the success of your 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 your plant's employees decide whether success has been achieved or whether improvement in procedures needs to be made.

You will need performance indicators for all of the various components of your EMS. The measurement criteria selected for each component of your EMS will probably be different. For example, how will you measure the success of communication, documentation, stakeholder outreach, or training programs?

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. Figure 9-1 provides a sample template to help you organize evaluation of your EMS components using measurement criteria.

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

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- Number of environmental objectives and targets met;
- Percentage of employees completing environmental training;
- Average time for resolving corrective action;
- Number of non-conformances;
- Number of incidents of non-compliance;
- 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 your plans for **next year** and establishing **continuous improvement**.

Figure 9-1: 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:		

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MANAGEMENT REVIEW

Management reviews are one **key to continual improvement** and for ensuring that the EMS will continue to meet your plant's needs over time.¹

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 plant 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 your plant, but, in general, the overall goal is to determine if the EMS is functioning as intended. Your plant'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 your management review process will be a function of your plant's **organizational structure, management style, and overall culture**.

Hint: Two kinds of people should be involved in the management review process:

- People who have the right **information**/ knowledge; and
- People who can **make decisions** about the plant and its resources (top management). (75)

Determine management review **frequency** that will work best for your plant. 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. (75)

¹ NSF International, Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Michigan: NSF International, January 2001) 75. Subsequent references to this document will be given in parentheses in text.

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Hint: It is unlikely that top management will value taking part in a process that involves extensive meetings and discussions of detailed findings of compliance audit or EMS audit results. To successfully engage top management, focus on current and potential value-added EMS activities at your plant, such as cost avoidance (e.g., reduction in regulatory fines, costs savings from reduced waste), and new and innovative ideas for improving environmental performance.

Use the management review process to focus attention on **overall EMS performance**. The information and data needed to make an overall evaluation of the success of the EMS may be gathered from answering some of the following questions:

- Did we achieve our **objectives and targets**? If not, why not? Should we modify our objectives?
- Is our environmental **policy** still relevant to what we do?
- Are **roles and responsibilities** clear, do they make sense and are they communicated effectively?
- Are we applying **resources** appropriately?
- Are our **procedures** clear and adequate? Do we need other controls? Should we eliminate some of them?
- Are we **fixing problems** when we find them?
- Are we **monitoring our EMS** (e.g., via system audits/assessments)? What do the results tell us?
- What effects have **changes in materials, products, or services** had on our EMS and its effectiveness?
- Do changes in **laws or regulations** require us to change some of our approaches?
- What other changes are coming in the near term? What impacts (if any) will these have on our EMS?
- What **stakeholder concerns** have been raised since our last review? How are concerns being addressed?
- Are **outreach** programs working?
- Is there a **better way**? What can we do to **improve**? (76)

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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**. (75)

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 (see Attachment 9-A). The form should include the date of the meeting or discussion, attendees, items discussed and conclusions made, and action items assigned.

Management reviews should assess how **changing circumstances** might influence the suitability, effectiveness or adequacy of your EMS. Changing circumstances might be **internal** to your plant (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). (75)

After documenting the action items arising from your management review, be sure that someone **follows-up**. Progress on action items should be tracked to completion. (76)

As you assess potential changes to your EMS, consider **other organizational plans and goals**. In this way, environmental decision-making can be integrated into your overall management and strategy. (76)

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.

Attachment 9-A provides a sample procedure for conducting a management review.

HOMEWORK

Define how your management review process will work and how the management review will foster continuous improvement. You may elect to conduct management reviews before all areas of the EMS are fully implemented and operational with the understanding that the review process is ongoing.

Also review the EMS implementation process that has occurred to date in preparation for Module 10.

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ATTACHMENT 9-A: CONDUCTING A MANAGEMENT REVIEW

I. Purpose

To ensure the effectiveness of the EMS and its continual improvement, ABC Meat Processing top management periodically reviews the important elements and outcomes of the EMS.

II. Procedure

1. In preparation for the management review, the EMS management representative gathers the following information and makes it available to top plant management, including the owner and President of ABC Meat Processing and the plant manager:
 - Environmental policy;
 - List of EMS committee and others responsible for major parts of the EMS;
 - List of significant environmental aspects and criteria of significance;
 - Update on compliance status of the plant and on any potential upcoming regulations that might require an advance strategy;
 - List of environmental objectives and targets;
 - Environmental performance results (from monitoring and measuring significant environmental aspect indicators and indicators of progress toward environmental objectives and targets);
 - Bullet-point description of other accomplishments of the EMS (e.g., number of people trained, etc.);
 - Results of most recent EMS internal assessment, compliance assessment, and corrective actions taken;
 - Description and documentation of feedback from stakeholders (if received); and
 - Analysis of the costs and benefits of the EMS (as quantitative as possible).
2. Top plant management meets to review and discuss the information presented. The EMS management representative and coordinator will also be present. Depending on its review, top management may direct specific and/or significant changes in the scale and direction of the EMS in order to improve its effectiveness and business value. The conclusions and directives that result from the management review are recorded using format MR-01 and kept by the EMS coordinator.

III. Frequency

Quarterly.

IV. Records

Results of management reviews are recorded using format MR-01. Records are kept by the EMS representative.

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MR-01: Management Review Record

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

Signed: _____
EMS Representative

Plant Manager

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Environmental Management System (EMS) Implementation Guide for the Meat Processing Industry

Module 10: Lessons Learned

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Module 10: Lessons Learned

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Module 10: Lessons Learned

INTRODUCTION

This purpose of this module is to share lessons learned from Modules 1 through 9 in design and implementation of an EMS. This section contains the best practices and examples of procedures that worked well for meat processing plants implementing an EMS. Sharing of challenges faced and lessons learned will benefit both the existing and future users of a program for EMS implementation.

Five meat processing plants were asked to note successes and areas for improvement that they experienced and/or identified during their EMS implementation.

LESSONS LEARNED

Hints or lessons learned from the five plants regarding EMS implementation are described below.

- **Top management support is critical.** All five plants noted that when implementing an EMS, visible support from top management was critical for success. One of the first tasks of EMS implementation is to engage top management, so the entire company is committed to the system. As a result of having the EMS, environmental awareness and decision-making was elevated, and senior management is currently asking questions they would not have asked in the past. The more included management was in developing the EMS, the more they benefited from the EMS.
- **Corporate involvement matters.** Four of the five plants who participated are part of a larger corporation. These plants received corporate support, or direction with the intent of using the internal lessons learned from the EMS implementation in other areas of the company. The opportunities for long-term migration of the EMS and benefit to the corporation were greatest where corporate support and involvement was highest.
- **Make visible the EMS policy.** All employees needed to be made aware of the commitments of the policy, in order to strive toward the goals of the management commitments. For each individual or department, employees should determine what the policy means to them and how the intent of the policy can be incorporated into their daily operations and activities.
- **Select an appropriate EMS representative.** It was important to select an EMS representative who believes in and was committed to EMS implementation, and had the time and resources to dedicate to the EMS. The EMS representative should have the necessary authority, an understanding of the facility, and project management skills.

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Module 10: Lessons Learned

- **Have a core team.** From the early stages of EMS planning, there should be involvement of a multi-discipline core team. All five plants found that their core team was a critical element for success. The core team assisted in ensuring that: the EMS is ingrained across the organization, communication works, and there is the development of awareness among staff. A core team that included members from different departments was more able to provide diverse input. Inclusion of the core team from the beginning allowed for increased awareness of EMS processes and implementation.
- **Draw on all available personnel for EMS implementation.** Besides the core team, it was necessary to seek out all personnel who had the time to participate in EMS implementation. Like the core team, involve these individuals early on in the process so they may be aware of the EMS implementation process.
- **Involve all employees in the process.** It was important in developing and promoting an EMS to involve as many employees as possible in the process. Employees should understand why the facility needs an effective EMS, what their role is, and how an EMS will help to control environmental impacts in a cost-effective manner.
- **Provide EMS awareness training.** It is essential to provide EMS awareness training for all employees who are affected by the EMS, in addition to the specific training that the core team had taken to implement the EMS.
- **Time spent in EMS planning is highly valuable.** For a majority of the plants, time spent in the planning phase of the EMS was seen as valuable in helping them identify and understand their plant environmental issues. It is necessary and cost-effective to spend the time and energy in this phase rather than skimming through the planning, only to be lost in the next steps of implementation.
- **Define EMS procedures before drafting them.** From a cost effectiveness standpoint, some of the facilities found that it was more efficient to discuss and define the procedures for EMS implementation before writing them. This allowed for feedback to be obtained from the core team members, before time was spent writing procedures.
- **Measure it and they will care.** None of the five plants implemented extensive monitoring and measurement systems. They initially only conducted measurement activities to support the gathering of data to enable them to develop a better understanding of significant aspects. Measuring how much solid waste was generated was a key driver that led to increased awareness by staff of the significance of this aspect. This also encouraged floor-level development of practical solutions. Employees now have a greater understanding of why measurement of data is important, helping to ensure more consistent data generation under existing programs.

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Module 10: Lessons Learned

- **Follow checks and balances.** As implementation of the EMS proceeds, it is important throughout the process to monitor and make adjustments to maintain the original EMS implementation schedule. The EMS core team designated to implement the EMS must not lose sight of its initial implementation plan.
- **Do not get discouraged if the community does not show interest.** One of the companies decided to publish their EMS policy in the local newspaper. It however did not evoke any reaction or comment from the community at large. The lack of feedback could have been attributed to a lack of understanding among the community members. Communicating benefits to the community of improved environmental performance geared towards specific issues may gain more attention.
- **Scale down identification of significant aspects.** It is important to consider the time and effort you dedicate to identifying significant environmental aspects. This can be a very time consuming activity if the core team decides to develop a detailed list of significant aspects, which may not be necessary. A company is not expected to manage issues outside its sphere of influence or control.
- **Prepare for internal audits.** Prepare and plan for your internal audit. This planning is essential to ensure that the audit is appropriate to the facility and covers all relevant operations. Internal audits will help determine whether all of the requirements of the EMS are being carried out in the specific manner.
- **Expect a learning curve when completing audits.** The ideal internal auditor knows the plant and knows how to do audits. If a facility decides to use internal staff, who is not experienced in completing EMS audits, a lengthy learning phase should be expected. After training has been completed, it is important for the audit team to get out on the floor to do the audits, so as to find out what works for them.
- **Share lessons learned.** Any EMS manual will be greatly enhanced if lessons learned from the experience of similar organizations are given as examples in the implementation plan. Along with these lessons learned, sample templates, detailed programs, written procedures, and any other material used by these organizations may be provided as examples.

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