ADDITIONAL TOOLS

Additional tools provided in this Appendix include:

- A list of requirements for an EMS.
- A PowerPoint presentation entitled, “Specialty-batch Chemical Manufacturing: Environmental Management Systems Implementation;” and
- Launch and Implementation Tools, including:
  - Launch Guidance Document and EMS Management Review Meeting forms;
  - An Environmental Management System development and implementation flowchart; and
  - An EMS development and implementation schedule.

List of Requirements for an EMS

<table>
<thead>
<tr>
<th>Who/What</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| Top Management    | - Define the Environmental Policy  
                      - Provide resources essential to the implementation and control of the EMS  
                      - Appoint a specific Environmental Management Representative (EMR)  
                      - Review the EMS  
                      - Address the possible need for changes to policy, objectives, and other elements of the EMS in light of audit results, changing circumstances, and continual improvement |
| Environmental Policy | - Be appropriate to the nature, scale, and environmental impacts of the facility’s activities and services  
                          - Include a commitment to continual improvement  
                          - Include a commitment to comply with relevant environmental legislation regulations and other requirements to which the facility subscribes  
                          - Provide the framework for setting and reviewing environmental objectives and targets  
                          - Be documented, implemented, maintained, and communicated to all employees  
                          - Be available to the public |
| Facility          | - Establish and maintain procedures to identify environmental aspects  
                          - Ensure that aspects related to significant impacts are considered in setting objectives  
                          - Keep aspects information up to date  
                          - Establish and maintain procedures to identify and have access to legal and other requirements |
### Who/What Responsibilities

<table>
<thead>
<tr>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish and maintain documented environmental objectives and targets</td>
</tr>
<tr>
<td>Consider legal and other requirements, significant environmental aspects, technological options, financial operations and business requirements, and views of interested parties</td>
</tr>
<tr>
<td>Establish and maintain programs for achieving objectives and targets</td>
</tr>
<tr>
<td>Identify training needs</td>
</tr>
<tr>
<td>Require that all personnel whose work may create a significant impact receive appropriate training</td>
</tr>
<tr>
<td>Establish and maintain procedures to make employees at all levels aware of importance of conformance to requirements of the EMS</td>
</tr>
<tr>
<td>Establish and maintain procedures to make employees at all levels aware of the significant environmental aspects of their work and benefits of improved personal performance</td>
</tr>
<tr>
<td>Establish and maintain procedures to make employees at all levels aware of the potential consequences of departure from specified operating procedures</td>
</tr>
<tr>
<td>Establish and maintain procedures for internal communication between various levels of the facility</td>
</tr>
<tr>
<td>Establish and maintain procedures for responding to relevant communication from external interested parties</td>
</tr>
<tr>
<td>Consider processes for external communication on its significant environmental aspects and record the decision</td>
</tr>
<tr>
<td>Establish and maintain information (in paper or electronic form) to describe the core elements of the EMS and provide direction to related documentation</td>
</tr>
<tr>
<td>Establish and maintain procedures for controlling all environmental documents</td>
</tr>
<tr>
<td>Identify those operations or activities that are associated with the identified significant environmental aspects</td>
</tr>
<tr>
<td>Plan activities, including maintenance, to ensure that they are carried out under specific conditions</td>
</tr>
<tr>
<td>Establish and maintain documented procedures for significant aspects to cover situations where their absence could lead to deviations from the policy, objectives, and targets</td>
</tr>
<tr>
<td>Establish and maintain procedures to identify and respond to accidents and emergencies</td>
</tr>
<tr>
<td>Review and revise, where necessary, the emergency preparedness and response procedures (particularly after the occurrence of an accident)</td>
</tr>
<tr>
<td>Periodically test the emergency preparedness and response procedure</td>
</tr>
</tbody>
</table>
### Who/What Responsibilities

<table>
<thead>
<tr>
<th>Who/What</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish and maintain procedures</td>
<td>• Establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of operations and activities that have significant environmental impacts</td>
</tr>
<tr>
<td>Record information</td>
<td>• Record information to track performance for defining responsibility and authority for investigating nonconformance, taking action to mitigate impacts caused, and initiating and completing corrective actions</td>
</tr>
<tr>
<td>Implement and record changes</td>
<td>• Implement and record changes in the documented procedures resulting from corrective or preventive actions</td>
</tr>
<tr>
<td>Environmental programs</td>
<td>• Establish and maintain programs and procedures for periodic EMS audits</td>
</tr>
<tr>
<td>Establish and maintain procedures</td>
<td>• Establish and maintain procedures for the identification, maintenance, and disposition of environmental records</td>
</tr>
<tr>
<td>Establish and maintain programs</td>
<td>• Establish and maintain procedures for the identification, maintenance, and disposition of environmental records</td>
</tr>
</tbody>
</table>

---

### Objectives and Targets

<table>
<thead>
<tr>
<th>Objectives and Targets</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be consistent with the</td>
<td>• Be consistent with the Environmental Policy, including the commitment to pollution prevention</td>
</tr>
<tr>
<td>Environmental Policy</td>
<td></td>
</tr>
<tr>
<td>Include designation of</td>
<td>• Include designation of responsibility for achieving objectives and targets</td>
</tr>
<tr>
<td>achieving objectives and targets</td>
<td></td>
</tr>
<tr>
<td>Include the means and time frame</td>
<td>• Include the means and time frame by which objects and targets are to be achieved</td>
</tr>
<tr>
<td>by which objects and targets are</td>
<td></td>
</tr>
<tr>
<td>to be achieved</td>
<td></td>
</tr>
<tr>
<td>Be amended to address</td>
<td>• Be amended to address new developments or modifications</td>
</tr>
<tr>
<td>new developments or modifications</td>
<td></td>
</tr>
</tbody>
</table>

### Environmental Programs

<table>
<thead>
<tr>
<th>Environmental Programs</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have defined role, responsibility, and authority for ensuring EMS requirements are established</td>
<td>• Have defined role, responsibility, and authority for ensuring EMS requirements are established</td>
</tr>
<tr>
<td>Have defined role, responsibility, and authority for reporting on the performance of the EMS to top management</td>
<td>• Have defined role, responsibility, and authority for reporting on the performance of the EMS to top management</td>
</tr>
<tr>
<td>Responsible for identifying, assigning, scheduling, providing the necessary support for, and ensuring completion of all tasks relating to the EMS</td>
<td>• Responsible for identifying, assigning, scheduling, providing the necessary support for, and ensuring completion of all tasks relating to the EMS</td>
</tr>
<tr>
<td>Works closely with the CFT</td>
<td>• Works closely with the CFT</td>
</tr>
<tr>
<td>Responsible for maintaining the EMS manual, under leadership of the EMR</td>
<td>• Responsible for maintaining the EMS manual, under leadership of the EMR</td>
</tr>
</tbody>
</table>

### EMS Coordinator

<table>
<thead>
<tr>
<th>EMS Coordinator</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be competent on the basis of</td>
<td>• Be competent on the basis of training education or experience</td>
</tr>
<tr>
<td>training education or experience</td>
<td></td>
</tr>
</tbody>
</table>

### Personnel Performing Tasks Related to Significant Environmental Impacts

<table>
<thead>
<tr>
<th>Personnel Performing Tasks</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be easily located</td>
<td>• Be easily located</td>
</tr>
<tr>
<td>Be periodically reviewed, revised as necessary, and approved for adequacy by authorized persons</td>
<td>• Be periodically reviewed, revised as necessary, and approved for adequacy by authorized persons</td>
</tr>
<tr>
<td>Be current and available at all locations where operations are performed</td>
<td>• Be current and available at all locations where operations are performed</td>
</tr>
<tr>
<td>Be legible</td>
<td>• Be legible</td>
</tr>
<tr>
<td>Be dated (with dates of revision)</td>
<td>• Be dated (with dates of revision)</td>
</tr>
<tr>
<td>Be maintained in an orderly manner</td>
<td>• Be maintained in an orderly manner</td>
</tr>
<tr>
<td>Be retained for a specific period</td>
<td>• Be retained for a specific period</td>
</tr>
<tr>
<td><strong>Who/What</strong></td>
<td><strong>Responsibilities</strong></td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| Obsolete Documents | • Be promptly removed from all points of issue or otherwise assured against unintended use  
• Retained for legal or knowledge preservation purposes |
| Procedures Related to Significant Environmental Aspects | • Define normal operating criteria  
• Be communicated to suppliers and contractors |
| Monitoring Equipment | • Be calibrated, maintained, and retain records of this process |
| Corrective or Preventive Actions | • Be appropriate to the magnitude of problems and commensurate with the environmental impact encountered |
| Environmental Records | • Be legible, identifiable, and traceable to the activity, product, or service involved  
• Be stored and maintained in a way that they are readily retrievable and protected from damage, deterioration, or loss  
• Contain specific recorded retention times  
• Be maintained as appropriate to the system and the facility to demonstrate conformance to the requirements of the EMS |
| EMS Audits | • Be carried out to determine if the EMS conforms to planned arrangements and has been properly implemented and maintained  
• Provide information to top management  
• Be prioritized based on environmental importance and the result of previous audits |
The Challenge

Many managers are in constant fire-fighting mode in dealing with environmental affairs
- Without a clear direction, environmental issues drop to the bottom of the list until they are urgent
- Urgency, limited staff time, and lack of expertise often limit options and the effectiveness of environmental actions
- Root causes are often not addressed, so reactive mode of crisis/response continues

EMS: Take Charge of Your Environmental Efforts

An environmental management system (EMS) can help a company
- Take control through understanding root causes & having time to develop effective solutions that address underlying conditions
- Shift from a reactive to proactive approach to addressing environmental efforts
- Integrate environmental efforts with business priorities and concerns

An EMS Builds on What you Already Do

- You don’t have to reinvent the wheel
- Existing environmental efforts can be leveraged to provide more efficiency & value
- EMS can be integrated with Quality management systems such as ISO 9000
- You will examine what you have now, identify where you want to go, and address any gaps

EMS Uses a Plan-Do-Check-Act Approach

- Based on quality management principles that have shown their value in all types & sizes of businesses worldwide
- Recognizes that perfection is the goal, but is never fully attained
- EMS is dynamic, allowing you to continue to adapt as future conditions change
- Focuses on continual improvement
An EMS Will Help You:

- Evaluate & define success in environmental & business terms

An EMS Will Help You:

- Understand & prioritize environmental issues and address them in a proactive manner
  - Though important, regulations don't necessarily help you understand what to do first or how far to take it
  - By aligning environmental priorities with business goals, you can focus first on those issues that provide benefits on both fronts

An EMS Will Help You:

- Develop and/or streamline internal processes
  - Thinking about control measures can lead to opportunities to simplify processes & practices
  - Eliminating or controlling environmental impacts can make job functions easier & reduce direct & indirect costs
  - Formal processes to anticipate, detect & correct problems can yield big dividends in the form of saving money, building credibility & maintaining goodwill

An EMS Will Help You:

- Promote ownership of environmental issues throughout your work force
  - Environmental management must be everyone's job
  - EMS can create environmental awareness & the structure needed to achieve environmental improvement across your organization

An EMS Will Help You:

- Identify clear objectives & tracking mechanisms
  - Improvements don’t happen on their own – you need to state what you want to accomplish & by when
  - You manage what you measure, so stating clear interim goals & having a means of measuring progress are crucial

An EMS Will Help You:

- Establish or improve controls over significant environmental impacts
  - Early stages of EMS development will identify your most important issues; appropriate priorities for action will be visible
  - Specific actions (e.g., pollution prevention, equipment modifications, process changes, training, communications) provide the means for accomplishing your goals & longterm objectives
SPECIALTY-BATCH CHEMICAL MANUFACTURING INDUSTRY — EMS IMPLEMENTATION GUIDE

Appendix E — 7

The Bottom Line

Companies don’t do EMS because it’s a nice idea – they do it because it helps them achieve better business results.

Why Pursue EMS Now?

- EPA’s Performance Track Program is providing recognition and developing other regulatory benefits (including lowering inspection priority and reducing monitoring & reporting requirements) for facilities with EMS.
- State government programs are also recognizing & rewarding facilities with EMS.

But, a Properly Implemented EMS…

- The process yields new opportunities for savings.
- Operating costs savings are permanent.
- Many companies have surprised themselves.
- Better than expected environmental & financial performance.
- Burden of formalizing approaches & developing all the connections not as great as people fear.

An EMS Will Help you:

- Report your progress to your management, regulators, customers & the community.
  - EMS provides the structure to measure progress against goals.
  - Reporting progress to stakeholders builds trust & credibility.

What it Takes

- Sustained effort.
- Top management dedication to excellence & leadership.
- Resources – your own people & some limited outside help.

Benefits of an EMS

An EMS will help Facility Name achieve:

- More control over a rapidly evolving, increasingly important business factor – The Environment.
- Better planning & therefore, fewer surprises.
- Improved efficiency & lower costs.
- Enhanced employee morale & retention.
- Better relations with regulators & the community.
- Potential regulatory relief.
- Stronger customer relationships & competitive position.

An EMS Will Help you:

- Report your progress to your management, regulators, customers & the community.
  - EMS provides the structure to measure progress against goals.
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- Potential regulatory relief.
- Stronger customer relationships & competitive position.
SPECIALTY-BATCH CHEMICAL MANUFACTURING

Environmental Management Systems Implementation

Module 1

Laying the Groundwork

What an EMS is:
- A management system standard
- A management system that commits to compliance with environmental regulations
- A road map by which a company can meet its environmental goals
- A system built on previously existing programs and procedures
- A continuous improvement process
- An accountability process ("Say what you do, do what you say, prove it")
- An awareness program for the employees and the community
- A human-based system

What an EMS is not:
- Legal requirement
- Necessarily oriented toward Occupational Safety and Health
- A performance standard
- An attempt to immediately address every potential environmental impact
- A static system
- Something a consultant can do for you

The ISO 14001 EMS Model

Elements of an EMS
4.3 Planning

- Regulations
- Technological Options
- Financial Considerations
- View of Interested Parties

4.4 Implementation & Operation

- Significant Environmental Aspects
- Regulations

4.5 Checking & Corrective Action

- Four Elements
  - 4.5.1 Monitoring & Measurement
  - 4.5.2 Nonconformance & Corrective & Preventive Action
  - 4.5.3 Records
  - 4.5.4 EMS Audit

4.6 Management Review

- Key Steps in Laying the Groundwork for an EMS
  - Define organization’s goals for EMS
  - Secure top management commitment
  - Select EMS leadership
  - Build implementation team
  - Hold kick-off meeting
  - Conduct gap analysis
  - Prepare budget and schedule
  - Secure resources and assistance
  - Involve employees
  - Monitor and communicate progress
Defining an Appropriate Scope

Consider for example:
- Boundaries of permits or approvals
- Extent of authority to which environmental policy applies
- Extent of authority to allocate resources

Gap Analysis

- It is a set of questions or prompts that represent the requirements of an effective EMS
- It should identify existing system components that should be further integrated
- It should identify specific needs and areas for improvement

Gap Analysis

- Gap Analysis: It is a set of questions or prompts that represent the requirements of an effective EMS.
  - It should identify existing system components that should be further integrated.
  - It should identify specific needs and areas for improvement.

Worksheet for Persons Responsible for EMS Implementation

<table>
<thead>
<tr>
<th>Roles</th>
<th>Responsibility</th>
<th>% of Time Designated</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS Coordinator</td>
<td>Implement internal EMS audits.</td>
<td>10%</td>
</tr>
<tr>
<td>EMR with responsibility for implementing the EMS (in small businesses, this could be the owner).</td>
<td>Address records management.</td>
<td>20%</td>
</tr>
<tr>
<td>Facility Management has appointed an EMS representative.</td>
<td>Handle and investigate non-conformance with the EMS.</td>
<td>5%</td>
</tr>
<tr>
<td>Facility has defined the roles, responsibilities, and authorities to facilitate an effective EMS.</td>
<td>Periodically evaluate environmental compliance.</td>
<td>30%</td>
</tr>
<tr>
<td>EMS Coordinator</td>
<td>Implement emergency preparedness.</td>
<td>25%</td>
</tr>
<tr>
<td>Facility has defined the roles, responsibilities, and authorities to facilitate an effective EMS.</td>
<td>Address operational controls.</td>
<td>15%</td>
</tr>
<tr>
<td>EMS Coordinator</td>
<td>Address competency-based training.</td>
<td>5%</td>
</tr>
<tr>
<td>Facility Management has appointed an EMS representative.</td>
<td>Identify and determine applicability of legal and other requirem ents.</td>
<td>10%</td>
</tr>
<tr>
<td>Facility Management has appointed an EMS representative.</td>
<td>Identify and determine significance of environmental aspects.</td>
<td>20%</td>
</tr>
<tr>
<td>EMS Coordinator</td>
<td>Conduct gap analysis.</td>
<td>5%</td>
</tr>
<tr>
<td>EMS Coordinator</td>
<td>EMS Team Participants (CFT)</td>
<td></td>
</tr>
<tr>
<td>EMS Coordinator</td>
<td>EMS Coordinator</td>
<td></td>
</tr>
<tr>
<td>EMR with responsibility for implementing the EMS (in small businesses, this could be the owner).</td>
<td>EMR with responsibility for implementing the EMS (in small businesses, this could be the owner).</td>
<td></td>
</tr>
</tbody>
</table>

Areas Where Level of Effort Could Be Significant

- Aspect gathering and significance determination
- Developing procedures and work instructions
- Awareness training—each employee

How Birds See the World

EMS
Looking at everyday things from a different perspective
Module 2
Structure and Responsibility

Your EMS Checklist for Structure and Responsibility
- Designated an EMR and have letter of appointment signed by top management
- Designated an EMS Coordinator (if separate from EMR as recommended)

Your EMS Checklist for Structure and Responsibility
Selected CFT members who represent their departments, comprise broad expertise, and assists in:
- Identifying aspects and determining significance
- Setting objectives and targets
- Implementing environmental management programs
- Reviewing and tracking EMS internal audit results
- Cascading EMS information throughout the organization

Your EMS Checklist for Structure and Responsibility
Begun to address other important roles:
- Internal Audit Team
- Department Managers
- Area Supervisors
- Document and Record Administrator
- Quality Management System Coordinator

Your EMS Checklist for Structure and Responsibility
Making plans to:
- Include EMS responsibilities on everyone's job description
- Make meeting EMS objectives and targets a factor in performance evaluations
- Reward individuals who help the company meet EMS objectives

Your EMS Checklist for Structure and Responsibility
Making plans to:
- Structure accounting and financial functions to track true total cost of environmental issues
- Relate true cost of waste and non-compliance back to production units and make supervisors accountable
Your EMS Checklist for Structure and Responsibility

- Organizational chart that represents structure as it applies to the scope of the EMS
- Written descriptions of EMS responsibilities that correspond to the roles in org. chart
- Top management meeting minutes demonstrating concurrence with EMS objectives and targets

Module 4
Legal and Other Requirements

Your EMS Checklist for LOR

Don’t forget Other Requirements that could include:
- Corporate policies
- EPA Performance Track commitments
- Industry codes of practice
- Other voluntary commitments (CERES, etc.)

Example 4-2: Sample List of Relevant Legal and Other Requirements for Specialty-Batch Chemical Manufacturers

Module 5
Environmental Aspects
Identifying Aspects and Determining Significance

- Objectives and targets
- Operational controls and EMPS
- Monitoring and measurement requirements
- Training needs

Aspect Identification: Subdividing the Facility

- Appropriate balance between information glut and information gaps
- Appropriate for fostering ownership and local control

Aspect Identification: Who Should Do It?

Consider using small teams that include:
- Environmental staff (provide expertise and consistent approach)
- Department/area representatives (provide knowledge of the process and serve as information conduit)

Aspect Identification: What To Do?

- Inspect Each Process/Activity
- Create Process Flow Diagrams That Consider All Inputs
  - Energy Use
  - Water Use
  - Supplies/Disposables
  - Chemicals

Aspect Identification: What To Do? (Cont)

Create Process Flow Diagrams That Consider All Outputs
- Air Emissions
- Noise/Odor/Radiation
- Wastes
- Water Discharge
- Storm Water Discharge
- Spillage and Other

Aspect Identification: What To Do? (Cont)

Create Process Flow Diagrams That Consider All Situations
- Normal Operation
- Start Up
- Shut Down
- Emergency Situations
- Decommissioning
- Estimate Quantities (with available information)
**Specialty-Batch Chemical Manufacturing Industry — EMS Implementation Guide**

---

**Determining Significance**

One Option:
- Legal Requirements/Voluntary Commitments/Company Policy
- Community Concerns
- Pollution Prevention Potential
- Potential Impact to the Environment (see also App. E)
  - Toxicity (characterization of materials and wastes)
  - Amounts (volume/mass of emissions, waste, or releases)
  - Costs of changing impact
  - Frequency of episodes
  - Severity of actual or potential impacts

---

**Determining Significance (Cont’d.)**

Second Option:
- Legal and Other Requirements
- Company Policy
- Environmental Significance
  - Scale
  - Severity
  - Probability
  - Duration
- Business Significance
  - Effect on public image
  - Outcome of change on process
  - Concerns of interested parties
  - Cost of changing impact

---

**Your EMS Checklist for Environmental Aspects**

- Procedure for Identification of Environmental Aspects and Determination of Significant Aspects (incl. frequency of review)
- Documented Aspects Lists
- Documented Rationale for Significance Determination

---

**Appendix E — 14**
Module 6

Objectives and Targets

Definitions (per ISO 14001)

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

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

Three Types of Objectives

- Control or Maintain
  - Compliance with rules and regulations
  - Keep spray painting equipment operating in accordance with good operating practice
- Improve
  - Reduce energy use
  - Increase paper recycling
- Study or Investigate
  - Investigate alternate chemicals for cleaning

Objectives Can Focus on

- Performance, based on achieving:
  - Direct reduction or elimination of impact to environment
  - A number, percentage, quantity
- System, based on achieving:
  - Improvement to the system
  - Indirect reduction or elimination of impact to environment

Considerations
Environmental Target

- Performance requirement
- Quantifies the objective
- Sets the time scale
- Must be met in order to achieve the objective

Responsibility

- The Cross Functional Team (CFT)
  - Develops documented objectives for management consideration and approval
  - Includes resource needs
- Top Management (ex., facility manager)
  - Authorizes objectives (and targets)
  - Provides adequate resources
  - Monitors progress
  - Uses normal business planning process to set and track environmental objectives and targets

Example 12-1: Worksheet for Linking SEAs to Operational Controls, Measurement

Environmental, material handling

Environment, chemical handling

Chemical inventory procedures

Example 7-1: Improvement Objectives and Targets Organized by Category

Objectives

Reduce occurrence of spills
Reduce spill occurrence by 10% by January 2004 by a sub-team of the

Example 6-1: Improvement Objectives and Targets Organized by Category

Objectives

Improve storm water discharge quality
Minimize chemical treatment
Reduce air emissions
Point Source and Fugitive Air Emissions
Reduce energy and water use

Example 7-3: EMP for Process Wastewater Treatment

Objectives

Reduce plastic and foam waste by weight by 10% relative to a 2002 baseline by January 2005
Reduce hazardous filter waste by weight by 5% relative to 2002 values by January 2005
Reduce hazardous chemical use by volume by 10% relative to 2002 baseline by January 2005
Investigate effectiveness of additional best management practices

Example 6-2: Identification of Objectives and Targets for Drydock Painting

Objectives

Complete study by December 2004
Reduce permitted air emissions by 10% by January 2005, relative to the 2002 baseline
Reduce water use per 100 man-hours from 2002 levels by January 2005
Increase use of suppliers that provide alternative chemicals by 20% by January 2005

Example 7-4: EMP for Hazardous and Non-hazardous Waste

Objectives

Reduce water use per 100 man-hours from 2002 levels by January 2005
Increase use of suppliers that provide alternative chemicals by 20% by January 2005

Example 7-5: EMP for PCB Elimination

Training:
CFT conducting a root cause analysis of spills during 2003 that will be
Spill control training for all production personnel by August 2004
In-depth spill prevention training for all raw material handling

Example 6-3: Identification of Objectives and Targets for Benzene Emission Reduction

Objectives

Remove all remaining PCB-containing debris (Pro-13)
Clothes, Masking Tape
Paint Stirrers, Drop Brushes, Filter Masks,

Example 6-4: Identification of Objectives and Targets for Four-Stroke Engine Emissions

Objectives

Reduce fugitive air emissions
Reduce particulates
Reduce VOCs, HAPs, and ozone precursors
Reduce water use per 100 man-hours from 2002 levels by January 2005
Increase use of suppliers that provide alternative chemicals by 20% by January 2005

Example 6-5: Identification of Objectives and Targets for Four-Stroke Engine Emissions

Objectives

Reduce fugitive air emissions
Reduce particulates
Reduce VOCs, HAPs, and ozone precursors

Example 6-6: Identification of Objectives and Targets for Vehicle Emissions

Objectives

Reduce-fugitive air emissions
Reduce particulates
Reduce VOCs, HAPs, and ozone precursors

Example 6-7: Identification of Objectives and Targets for Vehicle Emissions

Objectives

Reduce-fugitive air emissions
Reduce particulates
Reduce VOCs, HAPs, and ozone precursors
Your EMS Checklist for O&T

- Do you have a procedure for O&T (optional)?
- Are your O&T consistent with your environmental policy?
- Do your O&T consider (1) legal and other requirements, (2) technological options, (3) financial, operational, and business requirements and (4) the views of interested parties?
- Have you documented your O&T and assigned responsibility for meeting them?

Environmental Management Programs

Objectives and Targets Established (Module 5)

Environmental Management Programs Defined (Module 7)

Monitoring and Measurement (Module 14)

EMS Audits (Module 17)

CHECKING AND CORRECTIVE ACTION

Environmental Management Programs (cont)

- Should address:
  - Responsibilities (who will do it)
  - Tasks (what will they do?)
  - Schedules (when will they do it?)
  - Resources (what do they need to do it?)
  - Work Products (Proof that it is done)
- Should be:
  - Dynamic and revised on a regular basis

Environmental Management Programs (cont)

Action plans necessary to achieve your objectives and targets:
- Designate responsibility for achieving objectives and targets at each relevant function and level
- Establish the means and timeframe by which they are to be achieved
- EMPs can include sub-objectives and targets
- EMPs serve as “operational controls” for objectives and targets

Environmental Management Programs (cont)

Suggestion for EMPs:
- For every objective of the improvement and investigate type, have a corresponding EMP
- Keep the EMPs simple and up-to-date
EMP Tools in Guide

- Form 7-1: Sample Form for EMPs (and examples 7-1 and 7-2)
- Tool 7-2: Sample Procedure for Review for New Purchases, Processes and Products
- Form 7-2: Sample form to Use with Tool 7-2

Example 7-1: EMP for Reduction of Fugitive VOC, HAP, and Particulate Emissions

- **Area/Department(s):** Construction and Repair (see Example 5-1) — Painting
- **Process:** Drydock Painting
- **Significant Environmental Aspect:** Fugitive VOCs, HAPs, and particulates
- **Legal & Regulatory Requirement:** Marine Coating Rule, permits to operate, toxic air emissions rule

**No. 1 Action Plan:** Substitution of Raw Materials

<table>
<thead>
<tr>
<th>Task/Action Items</th>
<th>Responsible Party</th>
<th>Resources Needed</th>
<th>Project Start Date</th>
<th>Project Completion Date</th>
<th>Comments/Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify list of suitable vendors that supply low VOCs paint</td>
<td>John Smith, Environmental Manager</td>
<td>MSDS, Paint Mfg. Assoc</td>
<td>March 1, 2002</td>
<td>April 1, 2002</td>
<td>D— List of potential vendors of low-VOC paint</td>
</tr>
<tr>
<td>Develop evaluation of technical feasibility and cost effectiveness of select paint products</td>
<td>Cross Functional Team, Testing by paint personnel, customer approval</td>
<td>May 1, 2002</td>
<td>July 1, 2002</td>
<td>D— Comparative cost analysis of select low-VOC paint application</td>
<td></td>
</tr>
</tbody>
</table>

**Objective:** Reduce Fugitive VOC, HAP, and particulate emissions

<table>
<thead>
<tr>
<th>Category</th>
<th>Control/Maintain</th>
<th>Improve</th>
<th>Study or Investigate</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**No. 2 Action Plan:** Process Modification

<table>
<thead>
<tr>
<th>Task/Action Items</th>
<th>Responsible Party</th>
<th>Resources Needed</th>
<th>Project Start Date</th>
<th>Project Completion Date</th>
<th>Comments/Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify process modification that can be done to reduce emissions of VOCs, HAPs, and particulates</td>
<td>John Smith, Environmental Manager</td>
<td>Eng. Dept, vendor proposals</td>
<td>August 1, 2002</td>
<td>August 31, 2002</td>
<td>D— List of potential process modification</td>
</tr>
<tr>
<td>Develop preliminary evaluation on technical feasibility and cost effectiveness of process modification alternatives</td>
<td>Vendor quotes, est. of reductions from support agency</td>
<td>September 1, 2002</td>
<td>September 30, 2002</td>
<td>D— Technical feasibility report of process modification alternatives</td>
<td></td>
</tr>
<tr>
<td>Conduct pilot test of the preferred alternative of process modification</td>
<td>Kim Weinstein, Environmental Department</td>
<td>Process and eng. dept.</td>
<td>October 1, 2002</td>
<td>January 1, 2003</td>
<td>D— Workplan of the pilot test</td>
</tr>
<tr>
<td>Full scale implementation</td>
<td>John Smith and Will Gibson (Paint Department)</td>
<td>Training by vendor, testing</td>
<td>February 2003</td>
<td></td>
<td>D— Quarterly progress and performance report</td>
</tr>
</tbody>
</table>

Your EMS Checklist for EMPs

- Have you established and maintained EMPs to achieve objectives and targets?
- Does your EMS manual provide a road map to, or include, the EMPs?
- Do you periodically review your EMPs?
- Do you have defined roles and responsibilities for environmental review of new projects or products? (example procedure in Guide)

EMS Implementation & Operation

- Module 2: Structure and responsibility
- Module 8: Training, awareness, and competence
- Module 9: Communication
- Module 10: EMS documentation
- Module 11: Document control
- Module 12: Operational control
- Module 13: Emergency preparedness and response

Other Modules 8 to 18

- Implementation & Operation (8 to 14)
- Checking & Corrective Action (14 to 18)
- Management Review (18)
Example 7-1: EMP for Energy and Water Use Reductions

<table>
<thead>
<tr>
<th>Area/Department(s)</th>
<th>Total Facility</th>
<th>Process</th>
<th>All</th>
</tr>
</thead>
</table>

**Significant Environmental Aspect:** Energy and water use

**Task/Action Items**

<table>
<thead>
<tr>
<th>Resources Needed</th>
<th>Responsible Party</th>
<th>Project Start Date</th>
<th>Project Completion Date</th>
<th>Comments/Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1/2004</td>
<td>Ongoing</td>
<td></td>
</tr>
</tbody>
</table>

**Objective:** Reduce energy and water use

**Target:**
1. Energy – 10% per 100 man-hours from 2002 levels by January 2006
2. Water – 5% per 100 man-hours from 2002 levels by January 2005

**Module 9: Communication**

- Establish procedures to report environmental activities internally and externally
- Communicate results of EMS audits and management reviews to all employees
- Create a system for receiving and responding to concerns (internal and external)
- Be proactive

**Module 10 & 11: EMS Documentation & Document Control**

- Shall establish and maintain information
- Describe the core elements of the EMS and their interaction
- Provide direction to related documents

**Communication**

- Establish procedures to report environmental activities internally and externally
- Communicate results of EMS audits and management reviews to all employees
- Create a system for receiving and responding to concerns (internal and external)
- Be proactive

**EMS Documentation**

- Shall establish and maintain information
- Describe the core elements of the EMS and their interaction
- Provide direction to related documents
**EMS Documentation Pyramid**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EMS Road Map</td>
</tr>
<tr>
<td>2</td>
<td>Operational/Management Procedures</td>
</tr>
<tr>
<td>3</td>
<td>Working Instructions (Specific how-to Procedures)</td>
</tr>
</tbody>
</table>

**Effective Use of Words**

<table>
<thead>
<tr>
<th>Document</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lord's Prayer</td>
<td>54</td>
</tr>
<tr>
<td>The Gettysburg Address</td>
<td>286</td>
</tr>
<tr>
<td>Ten Commandments</td>
<td>297</td>
</tr>
<tr>
<td>American Declaration of Independence</td>
<td>300</td>
</tr>
<tr>
<td>The Declaration of Independence</td>
<td>1,322</td>
</tr>
<tr>
<td>EEC Directive on Export of Duck Eggs</td>
<td>26,911</td>
</tr>
<tr>
<td>Government regulations on sale of cabbage</td>
<td>27,000</td>
</tr>
</tbody>
</table>

**Module 12: Operational Controls**

- Should be associated with significant environmental aspects and stipulate operating criteria
- Are documented procedures to cover situations where their absence could lead to a deviation from the environmental policy and the objectives and targets

**Operational Control Example**

For storage of materials and wastes, prevent releases by having defined procedures and work instructions for:

- Loading and unloading
- Container integrity
- Material compatibility
- Secondary containment
- Prevention of storm water contact

**What EMS Documents Need To Be Controlled?**

- ISO 14001 documents
- Emergency Preparedness and Response Documents
- Operational Controls
- Significant Environmental Aspects
- Which internal documents?
- Which external documents?
Operational Control Example

See handout for example of an Environmental Operating Procedure/Work Instruction for Hazardous Waste Satellite Accumulation Areas that is in addition to one in the Implementation Guide for Control of Coating and Thinner Use.

Example 12-2: Operational Control for Container Labeling (EWI -001)

0.0 Purpose
To maintain safety on site and ensure that, in the event of a spill of a hazardous or non-hazardous substance, the Emergency Coordinator follows the correct procedure.

1.0 References
1.1 RCRA Subtitle C (40 CFR 262)

2.0 Responsibility
2.1 The Environmental Engineer or designee shall assure that [Facility’s Name] makes available labels for container labeling and ensures that employees who handle and dispose of hazardous and nonhazardous wastes understand the labeling procedures outlined here.

2.2 Managers of each department are responsible for providing the Environmental Engineer with a list of employees who handle or may potentially handle hazardous and nonhazardous wastes.

3.0 Procedure for Labeling Containers:
3.1 All containers of hazardous and non-hazardous substances should have a label. The label should include, at a minimum:

   3.1.1 Chemical name
   3.1.2 Hazard warning
   3.1.3 Date
   3.1.4 User department

3.2 All labels must be legible and written with a permanent marker.

3.3 Labels that have been damaged or removed must be replaced.

3.4 If a chemical is transferred to a portable or temporary container, then that container must also have a label.

3.5 If a chemical is flammable, an additional “DANGER/FLAMMABLE” label is required.

Approved by:

[Facility’s Name] Environmental Management Representative

Checking and Corrective Action

Module 14: Monitoring and measurement
Module 15: Non-conformance and corrective and preventive action
Module 16: Records
Module 17: EMS audit

Module 13: Emergency Preparedness and Response

Establish a procedure and controls to respond to unexpected or accidental incidents
Should address:
- Accidental emissions to the atmosphere
- Accidental discharges to water and land
- Specific environmental and ecosystem impacts from accidental releases

Link Between SEAs and Operational Controls

<table>
<thead>
<tr>
<th>Indicator (Input)</th>
<th>Objective</th>
<th>Target</th>
<th>Operational Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air monitoring equipment</td>
<td>Improve equipment longevity</td>
<td>10% by January 2023</td>
<td>Meet applicability threshold (10%) and use equipment as designed</td>
</tr>
<tr>
<td>Waste generated</td>
<td>Increase</td>
<td>10%</td>
<td>Meet applicability threshold (10%) and use equipment as designed</td>
</tr>
</tbody>
</table>

Checking and Corrective Action Module 13: Emergency Preparedness and Response

- Establish a procedure and controls to respond to unexpected or accidental incidents
- Should address:
  - Accidental emissions to the atmosphere
  - Accidental discharges to water and land
  - Specific environmental and ecosystem impacts from accidental releases

Module 14: Monitoring and measurement
Module 15: Non-conformance and corrective and preventive action
Module 16: Records
Module 17: EMS audit

Appendix E — 21
Module 14: EMS Monitoring and Measurement

"What gets measured gets managed; and what gets managed gets done"?

Monitoring and Measurement
- Monitor and measure actual performance
- Compare against objectives and targets
- Determine areas of success
- Identify activities requiring corrective action and improvement

Monitoring and Measuring Improvements

Measuring pollution discharges → Measuring efficiency at process or production level

Example 14-1: Example of Links Between Aspects, Objectives and Targets, Operational Controls, and Monitoring and Measurement

<table>
<thead>
<tr>
<th>Significant Aspect</th>
<th>Objective</th>
<th>Target</th>
<th>Operational Control</th>
<th>Monitoring and Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point Source</td>
<td>Maintain</td>
<td>Compliance</td>
<td>Title V Permit</td>
<td>Compliance audit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Centrifugal Collector O&amp;M</td>
<td>Pressure drop monitoring log</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EMS audits</td>
</tr>
<tr>
<td>Hazardous Waste I</td>
<td>Reduce</td>
<td>10% by January 2005</td>
<td>Hazardous Waste reduction EMP</td>
<td>Waste reduction tracking metric</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EMS audits</td>
</tr>
<tr>
<td>High Volume - Low Toxicity Waste</td>
<td>Investigate potential for reduction</td>
<td>Complete study by January 2005</td>
<td>Waste reduction EMP</td>
<td>Waste reduction tracking metric</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EMS audits</td>
</tr>
</tbody>
</table>

Goals for Monitoring and Measurement
- Tie to the business goals
- Make the metrics meaningful to top management
- Make the metrics understandable to the non-environmental audiences, both inside and outside of the company
- Tie to existing business metrics
- Use data already collected

Module 15: Corrective and Preventive Action and Records

- Establish procedures for handling non-conformance, mitigating any impacts caused, and initiating corrective action
- Establish procedures for maintaining records of training, audits, and reviews
EMS Audits and Corrective Actions

Module 17: EMS Audit

The Three C's of Auditing an EMS to 14001 Conformance

- **Conformance**
  - Meets the requirements (implements the "shall")

- **Consistency**
  - Various elements inter-related (i.e., significant aspects reflected in emergency planning, etc.)

- **Continual Improvement**
  - Mechanisms in place to improve (including fixing non-conformances and improving performance)

* You must audit the EMS for ALL three C's!

EMS Audits

- Use audits to identify performance improvement opportunities
- Select prescriptive, descriptive, and TQM approaches
- Schedule audit during production
- Talk to production/process staff

Continual Improvement

- Continual evaluation of the environmental performance of the EMS against:
  - Objectives and targets
  - The Policy
    - for the purpose of identifying opportunities for improvement

Module 18: Management Review

- Top management should regularly review the EMS
  - Determine suitability, adequacy, and effectiveness
  - Evaluate EMS in terms of financial performance and competitive position
  - Address possible need for changes to policy, objectives, and other elements of EMS
- Goal is to improve overall environmental (and business) performance!
SECTION 2

LAUNCH AND IMPLEMENTATION TOOLS

This section of the workbook contains documents useful in launching ISO 14001 activities. In particular the following documents are included:

- Launch Guidance Document
- EMS Development & Implementation Flowchart
- EMS Development & Implementation Schedule
- EMS Management Review Meeting forms

The Launch Guidance Document provides information and tools to those responsible for obtaining management commitment at the facility level to implement ISO 14001. Prior knowledge of ISO 14001 requirements by those using this document is assumed.

The EMS Development & Implementation Flowchart and Schedule are complementary documents that can be used to describe the path for implementing ISO 14001 and the main activities necessary for successful implementation. The schedule assumes a ten (10) month period to develop & implement ISO 14001 prior to registration.

The EMS Management Review Meeting forms are templates that can be used by facility management to periodically review development & implementation activities prior to registration. It is important that all management review meetings be documented to demonstrate management involvement in the system.
ISO 14001 Environmental Management System

Launch Guidance Document

This document pertains to those responsible for obtaining management commitment to implement an ISO 14001-based environmental management system.
Table of Contents

1. Management meeting launch guidance

2. Management review meeting generic agenda

3. Management meeting announcement

4. Sample memorandum on the implementation of a new environmental management system based on ISO 14001

5. Sample Cross Functional Team roles and responsibilities
Management Meeting Launch Guidance

• Meeting will be conducted by those responsible for obtaining management commitment to implement an ISO 14001-based system
• Schedule meeting when all members of the Management Team can attend, especially the Facility/Plant Manager
• Coordinate meeting so that appropriate Corporate and Division representatives can attend
• Schedule meeting for at least one hour to allow sufficient time to cover all the material

Scheduling
• Review Management Team schedule's to ensure full attendance
• Distribute meeting announcement if necessary (see attached)

Meeting Room Setup
• Overhead projector
• Podium and microphone if required or available
• Flip chart and markers

Meeting Material - presentation material provided by presenters
• Power point presentation materials
• Environmental management system development & implementation flowchart
• Management review meeting #1 agenda
• Draft commitment memorandum
Facility/Plant Name Environmental Management System  
Management Review Meeting #1

Date: ______________________  
Location: ___________________  
Attendees: __See sign-in sheet__

<table>
<thead>
<tr>
<th>Agenda Topics</th>
<th>Time</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduce ISO 14001 Elements and Management Responsibilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Review Development &amp; Implementation Flowchart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Designate Environmental Management Representative &amp; establish Cross Functional Team (CFT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Review Draft Commitment Memorandum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agenda Topics</th>
<th>Discussion Topic</th>
<th>Required Documentation</th>
</tr>
</thead>
</table>
| 1. Introduce ISO 14001 Elements and Management Responsibilities | • ISO 14001 background including similarities to ISO 9001/2 & QS 9000  
• Review presentation overheads & explain management responsibilities | • Attendance sign-in sheet |
| 2. Review Development & Implementation Flowchart | • Discuss the implementation strategy | • Meeting minutes reflecting endorsement of implementation plan |
| 3. Designate Environmental Management Representative & establish Cross Functional Team (CFT) | • Roles & responsibilities of environmental management representative  
• Selection of EMR | • Meeting minutes identifying EMR |
| 4. Review Draft Commitment Memorandum | • Issuance of memorandum from facility/plant manager committing implementation of ISO 14001 and announcing EMR | • Signed memorandum |

Meeting Announcement
Announcement
A Management Team meeting has been scheduled to review and discuss the ISO 14001 Environmental Management System standard, and to obtain your commitment for implementing this system. ISO 14001 is a voluntary international standard that will help establish a common environmental baseline across all our facilities. It will also help improve our overall environmental performance, thus assuring a safe environment for our children and future generations.

Meeting Agenda
1. Introduce ISO 14001 Elements and Management Responsibilities
2. Review Development & Implementation Flowchart
3. Designate Environmental Management Representative & Establish Cross Functional Team
4. Review Draft Commitment Memorandum
Memorandum

Date: (Date)

To: (Facility/Plant Management)

From: (Facility/Plant Manager Name)

Subject: Implementation of a New Environmental Management System Based on ISO 14001

Over the next several months the (Facility/Plant Name) will be implementing a new Environmental Management System (EMS) based on the ISO 14001 international environmental standard. The fundamental goal of this voluntary international standard is continual improvement in our environmental performance as measured by the types and amounts of wastes and discharges we create. This increased environmental stewardship will help ensure a safe environment for our children and future generations.

In order to support this new initiative, I am designating (named individual) as the Environmental Management Representative for the (Facility/Plant Name). In this capacity, (named individual) will be responsible for coordinating the actions needed to meet the environmental requirements of the ISO 14001 standard, as well as those of the company. (named individual) will also periodically report implementation progress to Plant Management.

To ensure adequate resources for developing and implementing the new EMS, I have asked (named individual) to assemble and direct a standing cross-functional team. This team will have representatives from most plant functions and activities. Team responsibilities may include evaluating current systems and documents for potential inclusion in the EMS, developing an environmental policy, identifying wastes and discharges associated with our operations and determining appropriate tracking metrics, assuring that regulatory compliance requirements are met, and, in general, creating all required system documents and processes.

We will be obtaining certification to the ISO 14001 standard by an independent, accredited Registrar. I would like our new EMS be fully implemented in sufficient time to allow the certification process to begin by (Date). I, therefore, request your full support in attaining this goal.
CROSS FUNCTIONAL TEAM
Roles & Responsibilities

Team Membership

The Cross Functional Team (CFT) should include representation from most functional and process/work areas. In addition to the Environmental Management Representative, typical representation may include:

- Production
- Maintenance
- Human Resources
- Safety
- Engineering
- Material Handling
- Quality
- Controller's Office
- Environmental Engineers
- Training

Environmental Management Representative Roles & Responsibilities

The Environmental Management Representative is a member of the Management Team and has the primary direct responsibility and authority to develop and implement the Environmental Management System, including managing the overall project, reporting progress to the facility manager, scheduling periodic reviews by the Management Team and chairing the Cross Functional Team.

Team Member Roles & Responsibilities

CFT members must be motivated and willing to undertake the responsibilities, time commitment and opportunities involved in developing and implementing the EMS at the facility. They should also have access to their respective Area or Department Manager to assure that:

- area/department environmental aspects are identified,
- objectives and targets are consistent area/department goals,
- area/department procedures and work instructions are complete, accurate and implemented, and
- employee awareness and job specific training are completed

 Due to the linkages between ISO 14001 and ISO 9001/2 including Document Control, Records, Structure and Responsibility, Management Review, Internal Audits, etc., it is strongly recommended that the Cross Functional Team include representation from the Quality Department as well as others closely involved in the development and implementation of the ISO 9001/2 system.

The Cross Functional Team will have responsibility for EMS development including:
• Developing a facility specific environmental policy
• Identifying environmental aspects
• Evaluating aspect significance
• Developing objectives and targets
• Creating environmental management programs
• Detailing operational control requirements
• Directing training resources
• Implementing an internal auditing system

The Cross Functional Team will also be the primary ISO 14001 communications link to area and department personnel. CFT members will need support from areas and departments in developing procedures and work instructions, maintaining documents and records, and training all facility employees.

There will be frequent CFT meetings of 1-3 hour's duration and assignment of responsibilities between meetings, continuing until the certification audit. The CFT is to document its meetings with agendas, attendance sign-in lists and minutes indicating decisions and recommendations concerning environmental management system development and implementation.

**Typical Area/Department Activities and Assignments**

**Facility/Plant Manager**

• Overall responsibility for development and implementation of the environmental management system.
• Allocation of resources for implementation and training.

**Controller's Office**

• Assure financial considerations are addressed in preparing projects, in reviewing projects, and planning.

**Department/Area Manufacturing Areas**

• Develop and implement area specific procedures and/or work instructions to minimize environmental releases and comply with regulatory requirements.
• Develop procedures and/or work instructions for start-up, shut-down and other non-routine operating conditions.
• Support resource availability for awareness training and job specific training.
Materials Handling

- Develop and implement procedures and/or work instructions to reduce the risk of spills or releases to the environment.
- Develop and implement internal waste management procedures and/or work instructions.

Employee Relations/Human Resources -- Training, Security & Safety

- Develop training needs analyses and plans.
- Implement employee awareness and job specific training.
- Maintain environmental training records.
- Coordinate development and implementation of emergency procedures including procedures to control spills and releases.

Maintenance Operations

- Develop and implement procedures and/or work instructions to assure proper calibration of control and monitoring instrumentation.
- Develop and implement procedures and/or work instructions to maintain environmental control equipment.

Engineering/Environmental Coordinator

- Assure technological and technical options reviewed and considered in establishing objectives and targets.
- Develop and implement procedures and/or work instructions to assure that necessary permit, license and other regulatory approvals are identified during project development.
- Facilitate CFT meetings on behalf of EMR when appropriate.
- Manage and maintain facility compliance assurance program.
Facility/Plant Name Environmental Management System
Management Review Meeting #2

Date: ____________________

Location: ____________________

Attendees: See sign-in sheet

<table>
<thead>
<tr>
<th>Agenda Topics</th>
<th>Time</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cross Functional Team Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Environmental Aspects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Significant Aspects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Objectives &amp; Targets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Environmental Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Environmental Management Programs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Agenda Topics**

1. Cross Functional Team Training
   • Status of CFT training
   • Agreement on roles & responsibilities for development & implementation of EMS

2. Environmental Aspects
   • Review aspects identified for the facility

3. Significant Aspects
   • Review significant aspects and rationale for decision
   • Discuss external communications for significant environmental aspects

4. Objectives & Targets
   • Review objectives & targets for significant aspects that have been identified

5. Environmental Policy
   • Review environmental policy

6. Environmental Management Programs
   • Review programs to ensure linkage with objectives & targets

**Discussion Topic**

- Meeting minutes reflect current status of training
- Meeting minutes reflect agreement for roles and responsibilities for development & implementation
- Meeting minutes reflect concurrence by management of the identified aspects
- Meeting minutes reflect decision by management on external communication of significant aspects
- Meeting minutes reflect concurrence by management of identified objectives & targets
- Meeting minutes reflect a commitment of resources (human and economic) by management to meet objectives by the targeted dates
- Meeting minutes reflect policy approval
- Meeting minutes reflect approval of programs and corresponding resources & time frames

**Required Documentation**
Facility/Plant Name Environmental Management System  
Management Review Meeting #3

Date: ______________________

Location: ____________________

Attendees: See sign-in sheet

<table>
<thead>
<tr>
<th>Agenda Topics</th>
<th>Time</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Facility Procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Work Practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Training Needs Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Roles &amp; Responsibilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. System Documentation</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Agenda Topic</th>
<th>Discussion Topic</th>
<th>Required Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Facility Procedures</td>
<td>Review that system procedures have been developed to conform to ISO 14001</td>
<td>• Meeting minutes reflect that management has concurred on the development of system procedures</td>
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<td>2. Work Practices</td>
<td>Review that work practices have been developed for specific activities or processes</td>
<td>• Meeting minutes reflect that management has concurred on the development of work practices</td>
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<td>3. Training Needs Analysis</td>
<td>Review training requirements for individuals whose job functions affect the operation of the EMS</td>
<td>• Meeting minutes reflect management concurrence with training needs analysis</td>
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<td>4. Roles &amp; Responsibilities</td>
<td>Review roles &amp; responsibilities of those required to maintain and improve the system</td>
<td>• Meeting minutes reflect management concurrence</td>
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<tr>
<td>5. System Documentation</td>
<td>Review EMS manual to verify system documents linked to ISO 14001 elements</td>
<td>• Meeting minutes reflect management’s approval of EMS manual</td>
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Facility/Plant Name Environmental Management System
Management Review Meeting #4

Date: __________________________

Location: ________________________

Attendees: ____ See sign-in sheet ____

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<tr>
<th>Agenda Topics</th>
<th>Time</th>
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<tr>
<td>1. System Training</td>
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<td>2. Internal Audits</td>
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<td>3. Corrective and Preventive Actions</td>
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<td>4. System Management Review</td>
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**Agenda Topics**

1. **System Training**
2. **Internal Audits**
3. **Corrective and Preventive Actions**
4. **System Management Review**

**Discussion Topic**

- Status of employee awareness training
- Status of procedure/work practice training
- Status of internal auditor training
- Review internal audit schedule
- Status of internal audit observations
- Status report on corrective and preventive action plans
- Review total status of Environmental Management System to ensure continuing suitability, adequacy and effectiveness

**Required Documentation**

- Meeting minutes reflect current status of training
- Meeting minutes reflect current status of internal audits
- Meeting minutes reflect concurrence by management on corrective and preventive action plans
- Meeting minutes reflect details of environmental management system review and materials or information presented
Environmental Management System Development & Implementation

**SYMBOl KEY . . .**
- Implementation
- Activity
- Associated Task
- Required Action
- Management
- Review Meetings

1. **Management Commitment**
   - Launch Meeting
   - Env. Management Representative

2. **ISO 14001 Implementation Training**
   - CFT Project Plan
   - Cross-Functional Team

3. **Work Practices**
   - System & Operational Procedures
   - Develop Procedures
   - Develop Training Needs Matrix
   - Structure and Responsibilities

4. **Develop Evidence Materials**
   - System Documentation
   - Develop EMS Manual

5. **Operational Controls**
   - Program Responsibilities
   - Develop Environmental Management Programs

6. **Monitoring & Measuring**
   - Develop Internal Audits
   - Conduct Internal Audits
   - Internal Audit Schedule

7. **Management System Review**
   - Internal Auditor Training
   - Internal Audit Checklist & Scope
   - Procedure Specific Training
   - Employee Awareness Training

8. **Surveillance Reviews**
   - Management System Review

9. **Determine Significant Aspects**
   - Legal & Other Requirements
   - Identify Aspects
   - Aspects & Significance

10. **Operational Controls**
    - Develop Facility Environmental Policy
    - Develop Objectives & Targets

11. **Develop EMS Manual**
    - Develop Training Needs Matrix

12. **Management Review Meetings**
    - Cross-Functional Team

13. **Internal Audits**
    - Conduct Internal Audits
    - Internal Audit Schedule

14. **Environmental Management**
    - Management System Review
    - Internal Auditor Training

15. **Structure and Responsibilities**
    - System & Operational Procedures
    - Develop Procedures
    - Develop Training Needs Matrix

16. **System Documentation**
    - Develop EMS Manual
    - Develop Evidence Materials

17. **Program Responsibilities**
    - Develop Environmental Management Programs
    - Operational Controls

18. **Identify Aspects**
    - Aspects & Significance
    - Determine Significant Aspects

19. **ISO 14001 Certification**
    - Pre-Assessment Review
    - Main Certification Review
    - Corrective Preventive Actions
    - Management System Review

20. **Management**
    - Review Meetings
    - Corrective Preventive Actions
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