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Environmental Management System

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Achieving Environmental Excellence: An Environmental Management Systems (EMS) Handbook for Wastewater Utilities



August 2004



Environmental Management Systems (EMS) Handbook for Wastewater Utilities

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EMS Handbook for Wastewater Organizations

Foreword

Dear Colleagues:

Water and wastewater utility managers are facing unprecedented challenges today as they address a wide array of issues ranging from increased public expectations for service levels, improved environmental performance and compliance, sustainable infrastructure expectations/needs, changing work force demographics, and more stringent regulatory standards. To help them address these challenges on an ongoing basis, a number of utilities are developing environmental management systems (EMS) for their operations.

Environmental management systems, first used in the private sector, provide organizations of all types with a structured framework for 1) assessing the organization's environmental impacts, 2) establishing policies along with measurable, goals, objectives, and programs for reducing these impacts, 3) checking and taking corrective action to ensure the EMS is meeting its goals, and 4) periodically having top management review the system to ensure continual improvement. An EMS is not a substitute for meeting regulatory requirements, but can enable an organization to both perform at levels beyond the minimum levels established for compliance and address environmental impacts, such as noise and odor, that may not be regulated. Finally, an EMS provides a way for an organization to continually manage and integrate its environmental obligations for all its programs and projects.

Development of this Wastewater EMS Handbook was funded through a cooperative agreement between the Office of Wastewater Management (OWM) at the U.S. Environmental Protection Agency (EPA) and the Global Environment and Technology Foundation (GETF). In order to reflect the real life experiences of wastewater organizations that have implemented

EMSs, EPA and GETF asked a small group of utilities and other professionals to serve on a Steering Committee for this project.

Throughout the Handbook, you will see numerous examples from our organizations that we hope will make it easier for you to develop your own EMS. We are also providing sample documents from all phases of the EMS process, including information on the time and cost of developing an EMS.

Based on our own experiences as well as those of many other public agencies, it is clear that EMSs work. They can and do provide a wide array of benefits to organizations. Our agencies have seen reduced costs, improved environmental performance, significantly enhanced internal communication, and better relations with our communities and regulators. Examples of these benefits and advice based on our experiences are included throughout the Handbook. Successfully implementing an EMS requires both a sustained commitment of time and resources and sustained top management support. However, we believe the benefits of the system far outweigh the costs.

EMSs also provide an excellent framework for integrating other important utility management programs like asset management, CMOM, the Balanced Scorecard, QualServe, and others. Many of us have used our EMSs in conjunction with these other programs. In conclusion, we appreciate the opportunity to help produce this Handbook and share our experiences with our colleagues. It fills an important need for our industry and will hopefully encourage an increasing number of utilities to develop their own EMSs and realize the benefits we have witnessed.

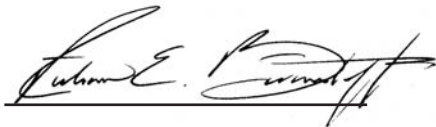
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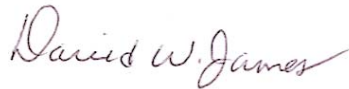
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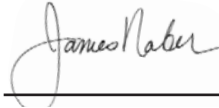
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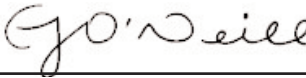
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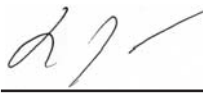
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Where Did the Idea for an EMS Wastewater Handbook Begin?

On September 23, 2003, the U.S. Environmental Protection Agency and the Global Environment & Technology Foundation (GETF) brought together an informal Environmental Management Systems (EMS) Wastewater Steering Committee comprised of wastewater facility managers with expertise and “hands on” experience in developing and maintaining EMSs for wastewater operations. Five members of this Steering Committee manage ISO 14001 registered EMSs within their respective organizations.

Each had the same thought after reflecting on their individual EMS implementation experiences: "There's so much we wish we had known before we began our EMS implementation. Let's capture that information in a handbook to help our colleagues in the wastewater industry demystify EMS implementation, provide step-by-step guidance, relate our lessons learned, and provide case study examples, implementation tools and materials that come from real wastewater facilities." Since the number of wastewater utilities implementing an EMS has grown considerably over the last several years, the committee felt that the time was right for a wastewater specific EMS handbook. And so, with the support and assistance of U.S. EPA's Office of Wastewater Management, this handbook was developed.

The Steering Committee agreed to assist GETF and U.S. EPA in developing a Wastewater EMS Handbook that specifically focuses on EMS implementation by public wastewater utilities. Each Steering Committee member provided their respective EMS document samples, implementation cost data, resource savings, case studies and EMS shortcuts, and agreed to be actively involved throughout the development process to ensure that the document would meet the needs of wastewater facility employees tasked with EMS implementation.

How is this Handbook Different from Others?

The EMS Handbook for Wastewater Organizations (referred to hereinafter as the “Wastewater EMS Handbook” or “Handbook”) is written for wastewater facility operators and managers interested in or already in the process of implementing an EMS based on the ISO 14001 international standard (ANSI/ISO 14001 - 1996) and looking for guidance from wastewater colleagues who have implemented and maintained EMSs at their own wastewater treatment facilities. While the implementation guidance could very well serve other public or private sector facilities, all of the material comes from real life wastewater operations and is intended to benefit wastewater operators interested in enhancing their own understanding of EMS through the successful approaches and practical lessons of their wastewater industry peers.

Wastewater facilities have taken a leadership role in public sector EMS implementation since the adoption of the ISO 14001 EMS in 1996, so there is a wealth of data and information available. In fact, the guidance, information and materials collected here come from well over a dozen wastewater facilities. In addition, care has been taken to ensure representation from a range of facility sizes (daily average flows from 13 MGD to 180 MGD) across the United States in order to meet the diverse needs of the wastewater sector.

The Wastewater EMS Handbook builds on a number of excellent EMS implementation guidance documents that preceded it (see additional EMS information). These guides are well worth noting as information resources; they provide excellent contact

information, document samples, web links, and additional information resources across a wide variety of public sector operations. You will find that their implementation strategies are reasonably consistent with those in this Handbook. However, this Handbook focuses exclusively on information, data, tools and materials that come directly from the wastewater sector, and reflects the most up-to-date information possible about implementing EMSs in wastewater facilities. As you become involved in your own EMS implementation, we hope that you will consider sharing your best EMS practices to keep this Handbook current.

How this Handbook is Organized

This Wastewater EMS Handbook guides you through EMS implementation based on the Plan-Do-Check-Act model of the ISO 14001 Environmental Management System. The Handbook is designed primarily for EMS implementers, so the heart of it is a step-by-step guide that shows you how to build your EMS one element at a time. We have also added helpful sections to assist you in getting your organization ready to build its EMS, in understanding more about third-party registration of your EMS, and in accessing a number of appendices of additional tools, materials, and information resources.

The Wastewater EMS Handbook is organized into 5 sections:

1. What is an EMS and Why Do I Want One
2. Getting My Facility Ready to Implement an EMS
3. Step-by-Step Implementation Guide
4. Third-Party EMS Registration
5. Appendices

In each of the sections you'll find a list of EMS milestones to complete and a suggested timeframe for completing them. As you work to complete each of these EMS milestones, you'll be accomplishing an important step in building your EMS, using an implementation strategy that has been successful with dozens of utilities over the past seven years.

This implementation strategy is sequenced so that you can build your EMS one piece or element at a time. We strongly urge you to focus only on the activities and milestones described in the section you are working on. You do not have to do everything at once so there is no need to get ahead of yourself or worry about what is coming next. In each section and through each milestone, you will be guided and supported by helpful hints and up-to-date methods from your colleagues in wastewater facilities who have successfully implemented an EMS in organizations just like yours. These helpful hints include:

- ▶ An explanation of the intent of each EMS requirement.
- ▶ Step-by-Step guidance on how to complete each EMS requirement.
- ▶ An EMS dictionary that explains the EMS language and terms used in that section.
- ▶ Sample EMS procedures, policies, and other documents.
- ▶ Information about who might perform the tasks and the level of effort required from EMS leadership, front-line employees, and management.
- ▶ Lessons learned and keys to success from wastewater utilities who have implemented an EMS in facilities like yours.
- ▶ Case study data and information.
- ▶ How to involve contractors and temporary staff in your EMS activities.
- ▶ Pitfalls to avoid.

Icons will lead you to the hints, key concepts and tips. You'll find the following icon symbols in each section:



Coach's Corner emphasizes important concepts and key EMS requirements or responsibilities.



Keys to Success indicates keys to successful EMS implementation, as identified by the wastewater practitioners.



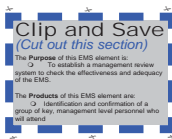
Notes highlight a point or concept important to EMS implementation.



Reminders are key points to keep in mind as you implement your EMS.



Stop Signs underscore the things to avoid during your EMS implementation.



Grey Cutout Boxes are put at the end of each step-by-step implementation section to reference key information, especially for Environmental Management Representatives. Think of the cutouts as quick reference summary sheets for each EMS element.



Documentation Pyramids are placed in the sidebars of specific EMS step-by-step implementation sections to designate that a documented (written) procedure is a requirement for the element.

Here's an overview of the sections in this Wastewater EMS Handbook:

Section 1 - What is an EMS and Why Would a Wastewater Facility Want One?

This section explains what an environmental management system is, describes the basic elements of an EMS, and provides an overview of the typical costs, roles & responsibilities and the average timeframe for EMS implementation at wastewater facilities. It also includes benefits, keys to success, lessons learned, and the drivers wastewater facilities experience when implementing EMSs at their facilities. It lists

associations and regulators that support EMSs, plus resources and points of contact that wastewater practitioners have found useful. Finally, it discusses the opportunities and how well an EMS integrates with other management systems that wastewater facilities may have in place.

Section 2 - Getting My Facility Ready to Implement an EMS

This section identifies the organizational goals that lead wastewater facilities to implement an EMS. It provides an overview of the phased approach to an EMS, a sample EMS timeline, and a list of the tools (e.g., document samples, matrices, checklists, etc.) that wastewater facilities used during EMS implementation. It discusses the keys to success in choosing effective EMS leaders and managers and their roles and responsibilities to drive and communicate the EMS throughout the organization. Section 2 describes how to conduct a preliminary review of what an organization already has in place to meet EMS requirements (the Gap Analysis) and the keys to success, lessons learned and the potential barriers for wastewater organizations as they prepare to implement an EMS. Section 2 ends by discussing how wastewater organizations overcame the issues of new EMS language/jargon.

Section 3 - Step-by-Step Implementation Guide

This section describes the sequence of activities or "roadmap" for implementing the key elements of an EMS and explains why certain elements might need to be implemented in a certain order. The section also provides detailed guidance on how each element of an EMS could be designed and implemented and discusses each of the key elements of an EMS and suggests how to put them in place. Section 3 includes the experiences and relevant tools wastewater facilities used during their EMS step-by-step implementation.

Section 4 - Third-Party EMS Registration

This section discusses the process of third party registration under the ISO 14001 Standard and includes a discussion of what to look for in selecting a third party to conduct EMS registration. Section 4 includes the keys, lessons learned and things to avoid when considering a third party to review an EMS and provides the costs, typical timeline and third party registration points-of-contact from wastewater organizations that have chosen to third party register.

Section 5 - Conclusion

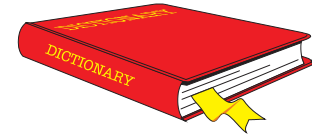
This section provides a brief review and point-of-contact information for wastewater facility personnel who have experience in implementing EMSs, and are willing to share their knowledge with other wastewater organizations.

Section 6 - Appendices

This section describes sources of EMS information and provides sample EMS policies, procedures, and other tools that organizations can tailor to fit its EMS needs. The sample procedures, checklists, tools, etc. are from EMS wastewater facilities that have implemented EMSs. In addition, Appendix D contains an EMS Glossary with the terms used throughout the Handbook.

Section 1: What is an EMS and Why Would a Wastewater Facility Want One?

Key Section Terms



ISO 14001 – One of the Environmental Management Standards developed by the International Organization for Standardization in Geneva, Switzerland. It is the requirements document that specifies the 17 elements of an EMS.

Continual Improvement – One of the three main commitments of the EMS. After checking their EMS through monitoring and measuring, and find, fix, and prevent audits, organizations apply the lessons they have learned to improve their environmental management.

Environmental Management System (EMS) – A system for identifying environmental and organizational issues and implementing improvements based on Deming's Plan-Do-Check-Act model. The EMS has 17 elements that help organizations achieve environmental policy commitments and environmental performance improvements.

Environmental Management Representative (EMR) – The clearly-identified EMS team leader who has the responsibility and management authority for implementing the EMS from start to finish.

EMS Core Team – A cross-functional team made up of individuals within the organization that helps facilitate EMS implementation across the organization. They are the EMS experts and cheerleaders.

What this Section Will Cover:

- ⇒ What is an Environmental Management System (EMS)?
- ⇒ The Drivers and Benefits of Implementing an EMS - Why Do I Want One?
- ⇒ Support for EMSs from Regulators and Associations
- ⇒ EMS Integration with Other Management Systems
- ⇒ FAQs

What is an Environmental Management System (EMS)?

An Environmental Management System (EMS) is a set of management processes and procedures that allows an organization to analyze, control and reduce the environmental impact of its activities, products and services, and operate with greater efficiency and control. An EMS is appropriate for all kinds of organizations of varying sizes in both the public and private sectors.

This Wastewater EMS Handbook uses the ISO 14001 Standard (1996) as the EMS model for implementation. The EMS is built on ISO 14001's Plan-Do-Check-Act (P-D-C-A) model and is designed to help you systematically identify, control and monitor your environmental issues.

An Environmental Management System includes:

- Defining roles and responsibilities
- Identifying and prioritizing environmental impacts
- Setting measurable objectives and targets
- Verifying and establishing operational controls
- Monitoring and measuring activities and progress
- Seeking continual improvement as part of a review cycle

You will probably find that an EMS does not involve a drastic change from the way you are conducting business now. In fact, most organizations find that they have many of the pieces of an EMS already in place. The EMS builds on what you are doing well now, and provides a structured approach to improve what you want to do better.

An EMS:

☞ Does not direct an organization to meet certain discharge or emission limits. It does describe the internal framework that should be in place (e.g., policies, procedures, training, communication, documentation) to have a proactive system to manage environmental issues.

☞ Does not tell an organization how or what to manage. That is up to the organization. An EMS defines the critical management elements and operational controls that must be in place and followed to control the impact an organization has on the environment.

☞ Is designed to be applicable to all types of organizations and facilities: large and small private companies and public organizations such as municipalities, federal facilities and wastewater treatment plants.

COACH'S CORNER



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

COACH'S CORNER



An EMS should integrate environmental management into your day-to-day operations as well as into your strategic organizational decisions by providing a systematic ("find, fix, and prevent") approach to managing your responsibilities. Also, because an EMS is not a traditional top down management approach, the environment becomes the responsibility of *everyone* by providing *everyone* with a voice on the best way to manage their areas and impacts.

An EMS is made up of 17 elements that are common to most models. Here's a brief snapshot of what's needed under each one:

Environmental policy — Develop a statement of your organization'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 impact on the environment.

Legal and other requirements — Identify and ensure access to relevant laws and regulations, as well as other requirements (trade association, local government initiatives, etc.) that your organization must meet and follow.

Objectives and targets — Establish environmental goals for your facility, consistent with your policy, environmental impacts, and the views of interested parties.

Environmental management program — Create plans of action necessary to achieve your objectives and targets.

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

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

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

EMS documentation (EMS Manual) — Maintain information on your organization's EMS. Define, be consistent, and provide an overview of your EMS's key policies, procedures, and related documents.

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

Operational control — Identify, plan and manage your operations and services in line with your policy, priority environmental issues, and objectives and targets.

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

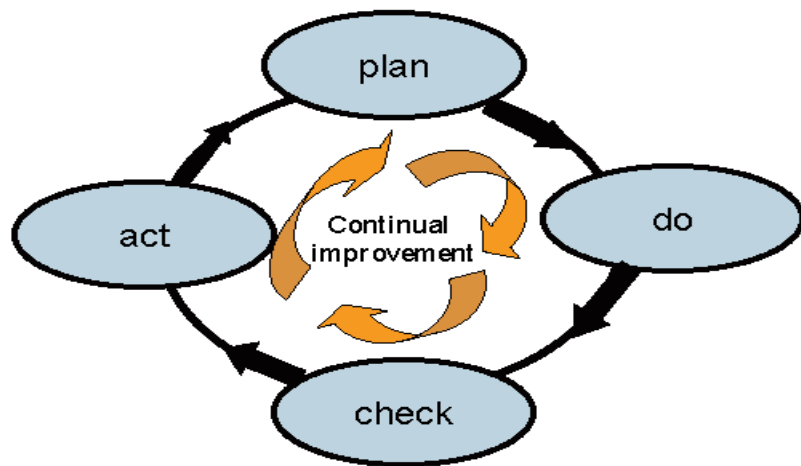
Monitoring and measurement — Monitor your key activities and track performance.

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

Records — Maintain and manage (access, retention, disposition) EMS records (training, audits, performance, etc.).

EMS audit — Periodically verify, internally and/or through a third-party, that your EMS is operating as intended.

Management review — Assess your organization's EMS with an eye toward continual improvement.¹



This P-D-C-A model will lead to continual improvement based upon:

Planning: identifying the environmental impacts (“footprint”) of your organization’s operations and services, tracking and following legal requirements, setting environmental goals, and establishing programs (i.e., action plans) to achieve your goals.

Implementing or “Do”: defining and communicating EMS roles and responsibilities, developing operating procedures and written programs to manage significant environmental aspects, training contractors and staff, developing methods to manage documents and records, and establishing emergency response procedures to prevent and respond to environmental incidents.

The Benefits of Implementing an EMS: What Wastewater Utilities are Saying

Managing a Changing Workforce

A formal system of documentation will help sustain an EMS as staff turns over and will help diffuse knowledge about changes as they occur. The standard operating procedures (SOPs) provide ‘present-tense’ guides to employees; the records created to track various activities signify ‘past-tense’ activities and the evidence that certain activities have actually occurred.

Ellen Barrett
The Barrett Group

Systematically Managing Environmental Issues

Our planning has improved considerably. Prior to EMS establishment, no formal, consistent structure was available for planning. Also, our planning is much more focused, with drivers in place, and our associates (employees) have a better understanding of the reasons behind the planning initiatives. Additionally, knowledge of our company’s impact on the environment has been heightened.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

¹ Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, 2nd Edition, NSF International, January 2001.

What Wastewater Utilities are Saying

Communicating Better

In the City of San Diego, Metropolitan Wastewater Department's (MWW) Wastewater Collection Division (WWCD), major improvements have been made in communication, clarification of organizational goals, and tracking of these goals. The WWCD currently has 343 budgeted full-time positions and an annual operating budget of \$63 million. The actual planning and implementation of an EMS has resulted in section leaders within the WWCD communicating between sections in a more organized and frequent manner.

Chris Toth
City of San Diego
Wastewater Collection Division

Improving Employee Understanding of Environmental Issues

Throughout the wastewater organization, there is a better understanding of the purpose of the EMS, our legal requirements, environmental impacts, and each person's role within these areas. There is improved organization and tracking of requirements, training, and related paperwork. All personnel are more proactive with looking for and making suggestions of better ways to do certain tasks. In addition, staff now have a better understanding of what is expected of them and management has confidence that their expectations have been communicated to staff through the training process and documented procedures.

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

Checking and Corrective Action: monitoring and measuring key environmental parameters and your EMS objectives to assess environmental performance, conducting internal reviews of your EMS, and ensuring that specified practices are followed.

Management Review and Act: review by top management to ensure that your EMS is working as intended and is effective in meeting your environmental goals. Making critical course corrections, resource allocation, and strategic planning to ensure that your organization remains on the path to continual improvement. ²

PHASE 1: Getting Ready

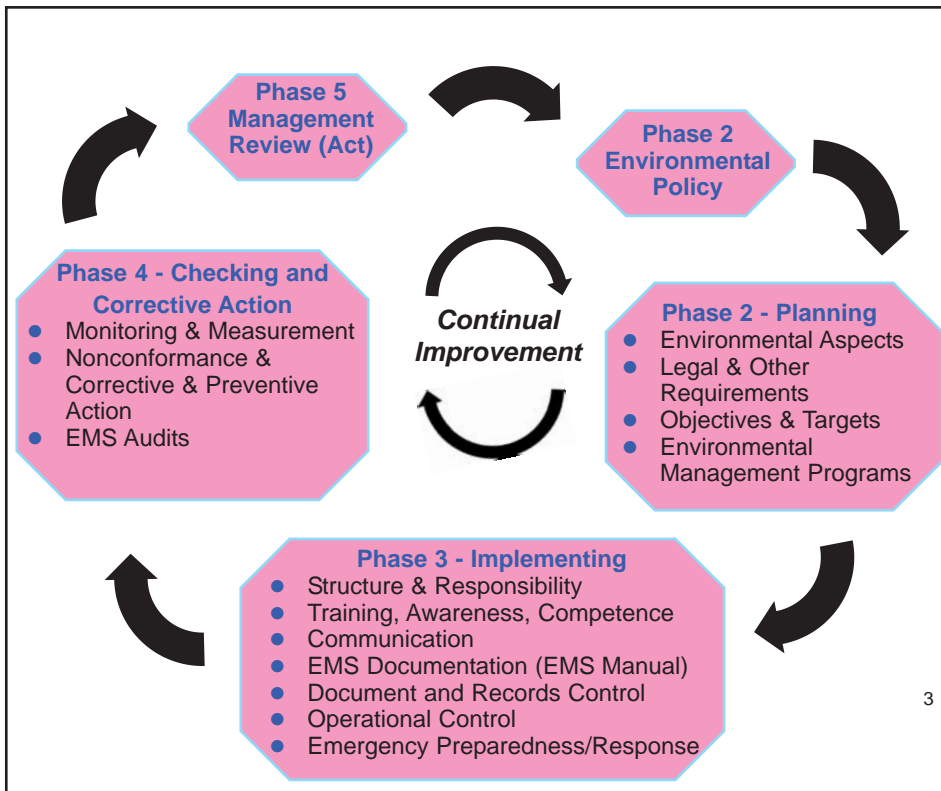
Activities in the Getting Ready Phase focus on adequately preparing your organization for the task of implementing an EMS. Before diving head first into implementation, it is critical that your team understands the EMS implementation strategy and that fundamental building blocks are in place to position your organization for successful implementation.

Activities for Phase 1 include:

- Select your EMS “fenceline” or implementation focus area(s).
- Confirm commitment and support throughout the organization, especially from top management.
- Designate an EMS leader and form EMS implementation teams.
- Conduct a preliminary review of your EMS components in place (i.e., a “gap” analysis).



² Adapted from Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, 2nd Edition, NSF International, January 2001.



3

PHASE 2: Planning

Activities in the Planning Phase lay out the foundation for your EMS with the development of specific EMS elements. Your team will work to identify how your organization can affect the environment and then prioritize these issues to focus EMS efforts. Once you have identified and prioritized your environmental issues or aspects, you will determine in which areas (your choice!) you want to improve by setting objectives and targets. You will manage your objectives and targets with environmental management programs (action plans), that will define **who** on your staff will help in accomplishing your EMS goals, **what** tasks will be accomplished, **when** (timeframes) the tasks will be accomplished, and the **resources** required.

³ Adapted from Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, 2nd Edition, NSF International, January 2001.

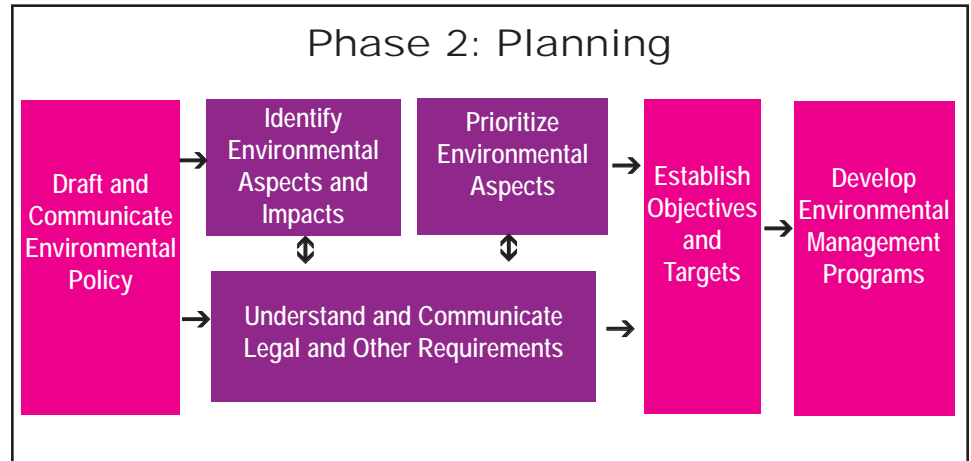
NOTE



An EMS is not intended to replace regulations or an organization's compliance system. In fact, a commitment to compliance is a fundamental principle of an ISO 14001-based EMS. An effective EMS will help your facility meet environmental commitments and allow you to avoid the reactive approach to regulatory compliance.

Activities for Phase 2:

- Draft and communicate your environmental policy.
- Create a procedure for understanding and communicating your legal and other requirements.
- Identify the environmental issues (both regulated and non-regulated) of your operations and services.
- Develop a method for prioritizing your environmental aspects.
- Set realistic objectives and targets based on your significant issues and environmental policy.
- Develop action plans (i.e., environmental management programs) that will help you go from the start to finish line in meeting your objectives and targets.



PHASE 3: Implementing or “Do”

The Implementation Phase of an EMS has two major activities: 1) managing significant aspects that were defined in the Planning Phase; and 2) establishing performance indicators for each of your environmental targets. Begin by focusing specifically on how you can best manage and address the significant environmental issues within your organization. Manage these significant environmental issues by refining, and in some cases creating, standard operating procedures and work instructions. Phase 3 includes defining implementation team roles and responsibilities and establishing internal and external lines of communication. This is an opportunity to take a more focused look at the specific operations and services that you decided were most significant for your wastewater facility.

In Phase 3 you will also define how your organization will achieve better environmental performance in relation to your defined objectives and targets. To accomplish this, you will need to define a series of performance indicators to assess and promote improvement. Many of these indicators will be obvious (e.g., environmental regulations), whereas others, especially those involving your organization's objectives and targets, may be a little more challenging to define at first.

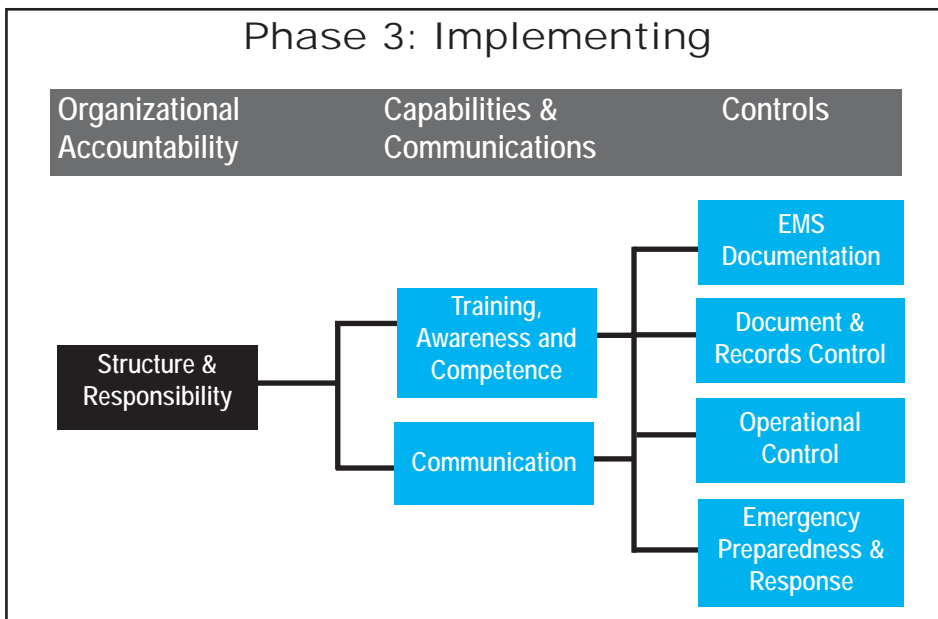
Activities for Phase 3:

- Clearly define roles and responsibilities, particularly in regard to significant environmental issues.
- Identify EMS training and awareness needs for all staff.
- Establish effective internal communication methods for information to flow top-down, bottom-up, and across your entire operational fence-line.
- Establish ways to communicate effectively with external stakeholders about your EMS.
- Establish operational controls, including a review of existing standard operating procedures and other documentation (e.g., work instructions, manuals, etc.) for your operations that you determined were significant.
- Establish a system ensuring documents and records are current, accessible, and archived when appropriate.
- Identify potential emergency situations that could arise from day-to-day activities and operations, and review or create procedures or plans to address potential incidents.
- Establish normalized baseline data for operations with environmental targets so that the targets can be measured and goals met or improved on.

COACH'S CORNER



Don't get discouraged if you need to work some bugs out of your EMS at first. It does not have to be perfect—the focus is on continual improvement!



COACH'S CORNER



Keep your EMS internal audits positive. Remember, this is a “find, fix, and prevent” approach that looks at your system and not a review of a particular employee’s performance. For example, if someone does not know that you have an environmental policy during your initial EMS internal audit, make sure you let them know that it was a training failure of the system and not their lack of knowledge. Also make sure to note what you are doing well when you conduct your EMS internal audits.

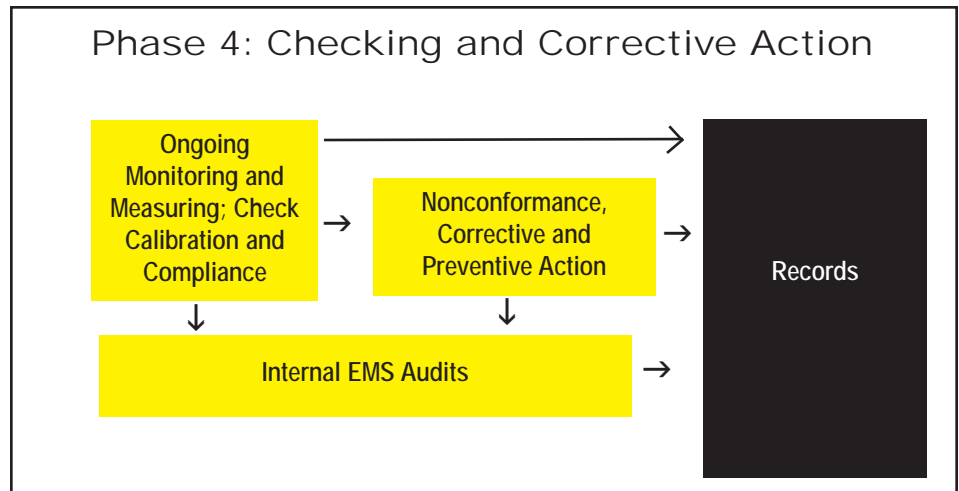
Remember, this is a team effort— your facility is trying to continually improve as an organization.

PHASE 4: Checking and Corrective Action

In Phase 4 you will define and document methods that your organization will use to verify that your EMS is effective and functioning as you intended. The check, an EMS audit or review, is a tool that you will use to periodically use to identify any flaws or weaknesses in your EMS. Remember, this is a “find, fix, and prevent” system, and this information can help you assess how well your EMS is functioning and put you on the road to continual improvement. As part of the audit process, your organization will take corrective actions on any “findings” (nonconformances— concerns or deviations from planned activities) to make sure that non-conformances are examined for their root cause, corrected, and prevented from reoccurring.

Activities for Phase 4:

- Monitor and measure key characteristics of your management system.
- Determine compliance status.
- Ensure that instruments used for monitoring and measuring are calibrated.
- Develop and implementing procedures for handling EMS non-conformances.
- Conduct internal EMS audits.
- Maintain EMS records.

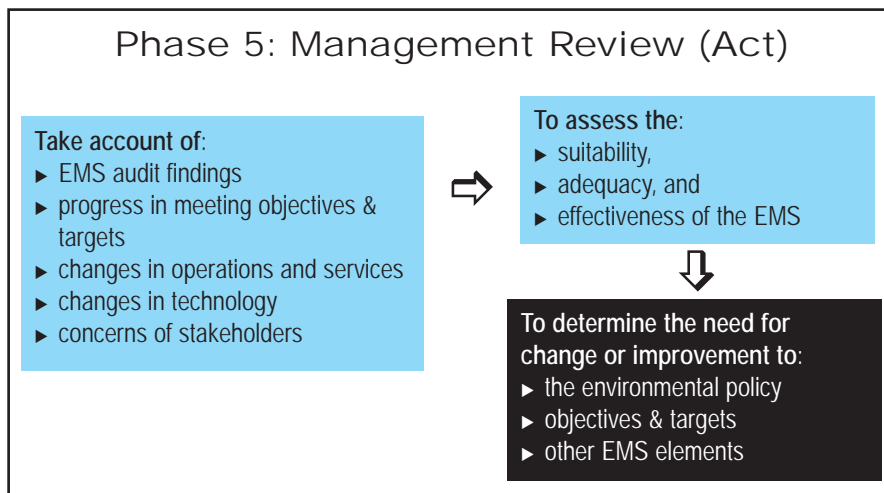


PHASE 5: Management Review (Act)

The Management Review is the final element in the EMS cycle. It's an opportunity for top management to review and fine-tune your EMS and make course corrections, if needed. Top management will determine whether the EMS is functioning as you intended, where additional resources may need to be allocated, if your environmental policy is appropriate or needs to be revised, and if your organization's objectives and targets are on track.

Activities for Phase 5:

- Judge the suitability, adequacy, and effectiveness of the EMS.
- Consider new organizational goals.
- Apply lessons learned for continual improvement.



Why Do I Want an EMS?

As public entities, wastewater utilities serve the public well-being, and public interest in environmental health and safety is high. Wastewater utilities have increasingly begun turning to Environmental Management Systems to improve their environmental performance and operational control and efficiency. These improvements usually mean avoided costs and dollars saved. In fact, over 50 wastewater utilities are in the process of implementing an EMS under the National Biosolids Partnerships program, with many more having implemented, or are in the process of implementing, an EMS through federal, state and local government sponsored programs.

What about your organization? Can an EMS bring you benefits?

Here's a quick survey that may help you:

- Is your organization required to comply with environmental laws and regulations?
- Would you appreciate opportunities to improve how you manage your environmental responsibilities?

NOTE

It's important to keep your managers updated frequently on your EMS and its progress. Don't wait until the Management Review to involve top management and to report on the performance and status of your objectives and targets and the overall progress of your EMS.



Why Implement an EMS?

Organizational Drivers from Wastewater Facilities

“Improved teamwork, communication, understanding, and awareness across divisional functions.”

Buncombe County, North Carolina

“Improved relationships with the local community and regulators.”

Charleston, South Carolina

“A better response to sewer overflows through enhanced operational controls.”

Kent County, Delaware

“Ensured management involvement and clarified organizational goals.”

Eugene, Oregon

“Increased efficiency in managing environmental obligations.”

Gastonia, North Carolina

- Are you concerned that large portions of your workforce are retiring and taking undocumented operational knowledge with them?
- Would you like to improve your environmental performance?
- Would you like to identify and manage your risks effectively and efficiently?
- Are you concerned about your public image?
- Do you need better communication channels to capture good ideas from the frontline for improving your operations?
- Would you welcome the opportunity to reduce inefficiencies and save money?
- Would improved teamwork, communication and environmental understanding be useful in your daily operations?
- Would you like to improve competitiveness and reduce the risk of privatization?

If your answer was yes to any of these questions, then an EMS will benefit your organization. Wastewater facilities across the country have success stories about the improvement that resulted from implementing and maintaining an EMS.

From the United States Environmental Protection Agency Position Statement on Environmental Management Systems



(EMSs), signed on May 15, 2002 by EPA Administrator Whitman: “EPA will foster continual learning by supporting research and public dialogue on EMSs that help improve our understanding of circumstances where EMSs can advance the Nation’s environmental policy goals. We will strive to collect better information on the application of EMSs, including how well EMSs meet environmental performance expectations; and the costs and benefits to organizations and the environment.”

Federal, State and Association Support for EMS

Regulatory agencies, facing increasingly limited financial and human resources, are recognizing that the promotion of EMS concepts is a way to further their goals of environmental protection. There are numerous state and federal programs that support the implementation of EMSs in the regulated community.



The U.S. Environmental Protection Agency’s (U.S. EPA) support for the voluntary adoption of EMSs has been evident since the mid-1990s. The Office of Water (OW) has been the leader in promoting EMS adoption with public agencies. OW, working with the Global Environment and Technology Foundation (GETF), has sponsored over 30 public agencies as they have adopted EMSs since 1997. More recently, OW designated seven organizations around the country as EMS Local Resource Centers (i.e., PEER Centers) to meet the EMS needs of public agencies around the country through training, education, and other forms of technical assistance. Finally, a national clearinghouse of EMS information geared to the needs of public agencies has been established. Information on all of these efforts can be found at www.peercenter.net.

Federal support for EMSs is also demonstrated through U.S. EPA's Performance Track Program. Performance Track encourages and recognizes top environmental performance by private and public facilities across the United States. Performance Track facilities exceed compliance with regulatory requirements and achieve environmental improvement and excellence by utilizing an EMS as a fundamental mechanism. To encourage environmental achievement and continuous environmental improvement, U.S. EPA offers incentives to Performance Track members, including:

Recognition – Recognition of member accomplishments by the U.S. EPA Administrator and other top officials through national and regional press releases, meetings and other vehicles.

Networking – Promoting exchange of information and creating a “learning network” for members.

Lower Priority for Routine Inspections – Establishing Performance Track members as a lower inspection priority since a performance- and compliance-focused EMS, coupled with periodic auditing, should prevent non-compliance at Performance Track facilities.

Regulatory and Administrative Incentives – Regulatory and administrative actions that only apply to participating Performance Track facilities (e.g., flexible permits that will reduce permitting costs and uncertainty).

As of November 2003, there were more than 300 members in Performance Track from around the United States, including numerous municipalities and 15 federal facilities participating in the program. For more information about Performance Track, go to <http://www.epa.gov/performancetrack>.

State Support for EMSs

States are increasingly strong supporters of EMSs. For example, Virginia's Department of Environmental Quality's (DEQ) Environmental Excellence Program (VEEP) (<http://www.deq.state.va.us/veep/>) will grant regulatory incentives in exchange for “actions that are shown to provide greater environmental protection than are provided through current practices” (e.g., those that exist under the current regulatory requirements or program structure). Additional information on state EMS programs and regulatory incentives can be found on the Multi-State Working Group's Website (<http://www.mswg.org>). MSWG is an organization formed by several state representatives who have successfully formed an alliance with U.S. EPA to encourage implementation of EMSs. Also check the National Technical Assistance Providers (TAP) Directory (www.peercenter.net/taps) and your own states policies and incentives on EMSs.

Increased Community Confidence and Willingness to Pay

We are integrating and implementing environmental management systems based upon strategic planning and continual improvement. This has increased our customer's understanding, support, and willingness to invest more community money into an aged and obsolete infrastructure and has increased customer confidence that the Department can provide economical and high quality services.

Diane Taniguchi-Dennis, P.E.
Director of Public Works
City of Albany, Oregon

Increased Investor Confidence

Our organization's achievement of independent standards of excellence, through our EMS based on ISO 14001, has provided a level of confidence to credit rating agencies that the utility is being run as a business and as efficiently as possible. When we went to the market for a bond needed to rehabilitate decaying tunnels, this helped our utility to receive a favorable credit rating.

John Cook
Assistant General Manager
City of Charleston
Commissioners of Public Works

A benefit of implementing an EMS is the capability to incorporate other initiatives, such as asset management and CMOM.

Jim Newton, P.E., DEE
Kent County, Delaware
Levy Court Public Works

Association Support for EMSs

A number of associations that interact with wastewater organizations support EMSs, including the American Water Works Association (AWWA) - <http://www.awwa.org>, the Environmental Council of the States (ECOS) - <http://www.sso.org/ecos>, the International City/County Management Association (ICMA) - <http://www1.icma.org>, the National Association of Counties (NACO) - <http://www.naco.org>, and the Water Environment Federation (WEF) - <http://www.wef.org>, among others. Many of these organizations have funded specific EMS initiatives and research. For more information on the association above and their support of EMS, visit their Websites.

EMSs Are an Ideal Tool to Integrate Other Important Utility Management Programs

Wastewater utilities are facing a number of pressing management challenges and there are many different programs to help them improve in a variety of areas. EMSs do not in any way detract from these other management tools. Rather, an EMS is one of the best ways to integrate many other utility management programs.

In fact, effective asset management can be an essential part of a wastewater EMS. For example, effective asset management could be reflected in an organization's policy statement, and should be an important consideration as wastewater organizations determine their significant environmental aspects, objectives and targets, and develop environmental management programs to help achieve their objectives and targets.

Asset management is one of the most important challenges facing wastewater utilities. Improperly managed and maintained capital assets not only have major negative impacts on the environment, but can substantially increase the cost of providing basic wastewater services. For more information on managing wastewater assets, the Association of Metropolitan Sewerage Agencies (AMSA) developed a guidebook titled "Managing Public Infrastructure Assets."

Implementing an EMS can also prepare utilities to face new or expanded regulatory requirements. For example, many utilities are now being asked to implement Capacity, Management, Operations, and Maintenance (CMOM) programs to better manage their wastewater collection systems. Developing an EMS forces a utility to consider many of the more specific requirements of an effective CMOM program. The Charleston, South Carolina Commissioners of Public Works (CPW) found that having an EMS in place made it much easier to implement an effective CMOM program because many of the steps for doing so had already been taken as part of developing their EMS.

Finally, an increasing number of utilities are realizing the need to develop a comprehensive management system that will help address many different outcomes including, but not limited to, environmental outcomes. To address this need, EPA, the Water Environment Federation (WEF), and AMSA cooperated on an important guide to help utilities understand how to integrate various management initiatives under the umbrella of a comprehensive management system. This guide, titled “Continual Improvement in Utility Management: A Framework for Integration,” can be found at www.epa.gov/ems, www.peercenter.net, www.amsa-cleanwater.org, and www.wef.orgcan.

This Handbook contains several useful case studies from existing utilities, most of which used their EMS as the starting point for developing a more comprehensive system.

For those agencies that wish to implement an EMS that initially focuses only on biosolids, the National Biosolids Partnership (NBP), has developed an EMS program that is similar in structure to ISO 14001. The NBP program requires a more proactive public participation program, along with regular public reporting. Also, participating agencies must undergo an independent 3rd party audit before receiving a certificate from the NBP. This auditing program is similar to the 3rd party auditing program under ISO described later in this document. More information on the NBP program can be found at www.biosolids.org.

Frequently Asked Questions about Environmental Management Systems

Q. We already have a compliance program—why do we need an EMS?

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

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

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

Q. Will an EMS help us to prevent pollution and to minimize wastes?

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

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

A. An EMS will not result in more or less stringent legal compliance obligations. But an EMS should improve your efforts to comply with legal obligations, and, in some cases, may lead to more flexible compliance requirements.

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

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

Q. What is ISO 14001?

A. ISO 14001 is an internationally recognized standard for the environment. It provides a systems approach patterned after a model of plan, do, check and act. ISO 14001 is one of a series of Environmental Standards developed by the

International Organization for Standardization.

The ISO 14001 standard includes all of the elements needed to develop an environmental management system in an organization.

Q. What are the benefits of an EMS?

A. An EMS provides tools to help manage your organization's environmental impacts efficiently and effectively and to improve the impact of an organization's environmental “footprint.” Public organizations who have implemented an EMS have realized the following benefits:

- Cost savings
- Reduced risk to the environment and employee
- Increased operational efficiency
- Positive external relations and public image
- Improved communication
- Improved public relations

Q. What are the hurdles to implementing an EMS?

A. It is important to realize that developing and implementing an EMS requires an investment of time and effort. Along the way there can be hurdles such as: difficulty managing organizational change, lack of top management visibility and involvement, lack of public awareness and understanding, maintaining momentum (especially at the frontline), and political uncertainties.

Q. Is EMS compatible with other management system approaches?

A. Yes. Whether you have a quality management system, asset management system, or participate in the National Biosolids Partnership, an EMS is compatible and can be integrated with any systems type approach. For example, procedural methods for handling operational and environmental records and providing training are universal and should integrate well. Furthermore, the process of identifying environmental and operational priorities, setting targets and checking progress on those targets will be very similar in any management systems approach.

Section 2: Getting My Facility Ready to Implement an EMS

In previous sections, we've reviewed the benefits you can expect from your EMS, briefly described the 17 key elements in the EMS, and graphed and explained the five phases of EMS implementation. You're probably eager to plunge directly into building your EMS, but before you do, it's critical that you prepare your organization for the task—what's been called the warm-up and soak-in period. The Getting Ready Phase should take your organization about three months, and its importance cannot be overstated.

What this Section Will Cover:

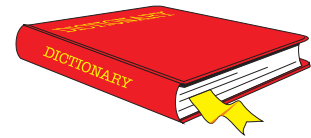
- ⇒ Choosing Your EMS “Fenceline”
- ⇒ Understanding Your Organizational Goals
- ⇒ Top Management Commitment, Involvement, and Visibility
- ⇒ EMS Program Leadership
- ⇒ Securing and Maintaining Employee Buy-in
- ⇒ Conducting an EMS Gap Analysis or Preliminary Review
- ⇒ Managing Change
- ⇒ Understanding the Implementation Strategy
- ⇒ EMS Information Sources and Resources
- ⇒ FAQs

Choosing Your EMS Fenceline

When you decide to implement an EMS, one of the first decisions will be where it will apply. Where you apply your EMS is commonly referred to as the EMS “fenceline.” An EMS can be applied to any operation or activity, to an entire division or within one department.

Experience from public organizations has shown that starting small is the way to go. Select one operation or department as a pilot, gaining confidence and experience as you build your EMS. Consider starting with a smaller or more manageable operation, then expanding and transferring the lessons learned and knowledge to other departments. Personnel in the original fencelines can then be EMS mentors, trainers or champions as new areas of the organization are added. Five out of six of our wastewater practitioners used an incremental approach for EMS implementation, choosing a manageable pilot operation or division first. These EMSs were then expanded out to include other departments and/or divisions.

Key Section Terms



Environmental Management System (EMS) – A system for identifying environmental and organizational issues and implementing organizational improvements based on Deming's Plan-Do-Check-Act model. The EMS has 17 elements that help organizations achieve environmental policy commitments and environmental performance improvements.

Environmental Management Representative (EMR) – The clearly-identified EMS team leader who has the responsibility and management authority for implementing the EMS from start to finish.

EMS Core Team – A cross-functional team made up of individuals within the organization that help to facilitate EMS implementation across the organization. These are the EMS experts and cheerleaders.

EMS Implementation Team – Individuals within the organization who are closest to the actual workflow and who assist the Core Team and the EMR in better understanding operational activities. Implementation Teams are generally very involved in designing operational controls, testing emergency preparedness and response plans, and identifying the environmental aspects of their daily activities.

EMS Fenceline – Operational area or areas within an organization where the EMS is implemented.

Gap Analysis – Preliminary assessment of an organization's environmental programs and management practices to see where they match up with EMS requirements.

Top Management – Person or group with executive responsibility for the organization and the EMS.

Questions to Consider When Selecting Your Fenceline:

- 1) Which of our operations has the most environmental hot-spots? Which operations give us more headaches?
- 2) Where do we use the most natural resources? Energy? Hazardous materials?
- 3) Which operations offer the most transferability and replication to other wastewater operations?
- 4) Which of our operations has the most receptive management? Line Supervisors? Employees?
- 5) Which of our operations are NOT in the middle of a capitol improvement project or being restructured or reorganized?

Here are some examples of EMS fencelines in wastewater organizations across the United States:

Wastewater Organization	Fenceline
Buncombe County, North Carolina Metropolitan Sewer District	Wastewater Treatment Plant; Operations Department; Electrical Maintenance; Structural Maintenance; Mechanical Maintenance; and WWTP Administration
Charleston, South Carolina Commissioners of Public Works	Water Distribution Department Wastewater Collection Department
Eugene, Oregon Public Works	All Wastewater Operations
Gastonia, North Carolina Public Works	Wastewater Treatment Division: 2 WWTPs; a laboratory; pretreatment; biosolids; and a resource recovery farm
Kent County, Delaware Public Works	Wastewater Collections, Wastewater Treatment, and Biosolids Treatment
San Diego, California Metropolitan Sewer District	Operations & Maintenance Division (pilot); Wastewater Collection Division; Water Operations Divisions (3 of the 6 Divisions within San Diego's MWWDD)

Once top management has confirmed the fenceline selection, it's time to pay a visit to the managers and supervisors in the fenceline divisions. You'll certainly want to include all types of employees (i.e., union stewards, contractors, temporary staff) in your discussions right from the start. You'll want to think about how best to prepare them all for the EMS implementation experience. It's a fact that the time you invest now in promoting awareness, understanding, receiving buy-in, especially among managers and supervisors, will be time saved later in the process.

One point repeated by wastewater facilities that have implemented EMSs is to spend extra time with managers and supervisors. One-on-one conversations can identify their needs, concerns, and problem areas. The more middle managers involved in the initial stages of the EMS, the more support and buy-in you will get. An EMS involves all employees in the fenceline at appropriate points in the implementation process, including support services like H.R.—so get out there and start the discussions!

There are a number of keys to success for getting buy-in at the fenceline areas that are worth noting, including:

- Invite the fenceline staff to a short EMS awareness meeting. Senior management should be highly visible and involved in making the case for EMS and endorsing it as a priority. It needs to be perfectly clear to everyone that the EMS is a management commitment.

(Note: An EMS presentations from a wastewater organization is included in Appendix B).

- Drop by for brief informal discussions with supervisors, and managers and union stewards. Ask them what is going really well in their operation. Ask them where there might be some opportunities for improvement. It's probable that the EMS can facilitate some of the improvements in later implementation activities.
- Hang EMS posters and other informal awareness information on bulletin boards and in lunch rooms. One example of an interactive, fun tool, produced by MGMT Alliance, Inc., is available at <http://www.mgmt14k.com/014kpizza.htm>.

We'll be talking more about employee buy-in in later sections of the Handbook.

Understanding Your Organizational Goals

It's clear that implementing an EMS can lead to better environmental performance in your fenceline areas, as well as other important business benefits. Here are some of the organizational goals described by wastewater facilities we've talked to:

- Improve documentation and communications
- Develop and/or update standard operating procedures for field activities
- Improve morale and teamwork
- Increase efficiency of operations
- Reduce energy consumption
- Enhance the public image of the City or Agency
- Develop a process that would put us into a proactive role with regard to compliance instead of reactive
- Become more competitive
- Become "best in class" for wastewater

While there are some remarkable similarities among wastewater facilities, no two are exactly alike. An important first step in EMS readiness is understanding why your organization is implementing an EMS. Are you concerned about environmental performance? Do you want to improve your public image? Are you planning for succession issues as portions of your staff retire and new personnel must be trained and ready? Do you want better communication across your organization? Are you interested in green purchasing and product substitution options? Are you having problems meeting the expectations of the public?

Top managers should attend training sessions on EMS implementation. A facility EMS Steering Committee was formed with top management involvement. This committee was instrumental in developing and approving the EMS Policy and EMS level-one procedures.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

Senior management, as represented by the Public Works Director, has been directly involved with the EMS process by participating on the Core Team in the development of the EMS. In addition, he has kept the County Commissioners and the Sewer Advisory Board informed of the EMS progress with periodic briefings. He has attended EMS workshops and training and has reviewed all EMS documents, as they have been prepared and has talked to plant employees about the EMS.

Jim Newton, P.E., DEE
Kent County, Delaware
Levy Court Public Works

Division management directed that an ISO-14001 EMS be established and provided the economic resources to obtain necessary consultant support. Management created an environmental management representative position within the division and made the position comparable to other senior staff positions. Management heads up the EMS Steering Committee which meets on a regular (quarterly) basis and directs the production of a monthly division-wide activity report which highlights EMS activities. Management tracked the progress of EMS development on a continual basis over a two-year period until the EMS became registered.

Chris Toth
City of San Diego
Wastewater Collection Division

NOTE



Write your goals down and refer back to them frequently as you move forward.

REMEMBER



The goals of management and the frontline employees may be different, and therefore, the way you obtain support and buy-in from management and employees may be different.

The General Manager introduced the concept of the EMS at a MSD board meeting. From there, the General Manager held organizational team meetings to discuss the goals of the organization (EMS was one of the goals discussed). During these meetings, the General Manager, along with the EMR, introduced the EMS and how it will merge into the business plan of the organization. The General Manager also approved a Steering Committee which consists of top management. Each member of the Steering Committee meets with their staff on a regular basis and reviews the concept and focus of the EMS.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

It's extremely useful and informative to spend some time with various levels of staff and functions in your organization, particularly in your fenceline divisions, discussing what improvements each would like to realize in its respective areas of responsibility. The responses you get from senior management will be considerably different than those from the frontline folks, but all are important. Keep track of these organizational goals. Document them, and refer to them often as you build your EMS. Frequently ask yourself whether your EMS plans include activities that will help you reach your goals.

You'll secure enthusiasm and buy-in at all levels in your fenceline areas as employees across your organization see that the EMS is accomplishing improvements they have suggested. You'll also encourage employees to communicate fresh ideas about how your operations might continue to be improved.

Here are some examples of goals that managers from wastewater facilities considered important:

- ◆ Establish your organization as a leader within the wastewater sector
- ◆ Instill a proactive instead of reactive culture
- ◆ Improve communications internally and externally
- ◆ Enhance public image
- ◆ Capture and document institutional knowledge

Here are some examples of goals that frontline employees from wastewater facilities considered important:

- Enhance the environmental impact of operations by doing something good for the environment in everyday work
- Improve communication between divisions and across functions
- Increase the use of best practices—performing activities better than industry standards
- Ensure that the organization is doing the right thing (i.e., complying with the law, etc.)
- Standardize procedures so that everyone is consistent and working together

As we've discussed in a previous section, the EMS integrates well with, and is also an excellent delivery vehicle for, other voluntary and required systems (e.g. Asset Management, CMOM, ISO 9000, Balanced Scorecard, QualServe, NBP, etc.) that your organization already endorses, so if your organization intends to adopt one or more of them, be sure to include that in your organizational goals as well.

Management Commitment, Involvement, and Visibility

One of the most important steps in the planning process is to gain top management's commitment and support to EMS development and implementation. It is critical that EMS commitment and support comes from both local (municipal) leadership and your organization's top management. In fact, experience has shown that public organizations who attempt to implement an EMS without top management support are unsuccessful.

Don't assume that top managers know all they need to know about an EMS. Just like the rest of your employees, senior managers need training. Short, frequent sessions that address managers' concerns and goals have been the most successful ways to keep management up to date on your EMS.

If your city managers or your wastewater management do not understand the potential benefits of an EMS, they probably will not have the incentive to follow through with implementation. During your preliminary discussions about the EMS, you'll want them to clarify management's specific goals for the EMS at your facility. You'll want to confirm that they understand the EMS implementation strategy and schedule you are using, the estimated direct labor commitment involved, and when, how, and what to communicate to employees on a regular basis. Every organization implementing an EMS has come to the same conclusion about management—**visibility, commitment, and involvement** are the **#1 keys to success**. Be sure your EMS plans include regular and frequent dialogue with management.

NOTE



On the political side, top management could include: the mayor, city manager, town board, city council or city commissioners. Top management on the facility side could include the division director, department head, or frontline managers.

Employees will react to management's actions far more than their words, so be sure that management understands their role in EMS development and implementation and that it involves being visible and involved, particularly in the beginning stages. Here's what wastewater facilities reported as management's most important roles and responsibilities:

- Providing input and approving the environmental policy statement
- Appointing the EMS Management Representative
- Approving EMS plans and programs
- Tracking EMS performance
- Being visible and involved in the EMS (e.g., showing up at team meetings and employee presentations)
- Communicating support of the EMS across the organization
- Regularly meeting with the Environmental Management Representative

CASE STUDY

Top Management from the City of Lowell, Massachusetts showed its support for EMS implementation by providing a financial incentive to employees within the wastewater facility when they successfully completed their EMS.

Initial commitment was by the Assistant Superintendent of Wastewater Treatment and the Director of Public Works and Utilities. They saw the potential benefits to the organization and asked staff to investigate the program and then to begin development and implementation. Support also came through approval of the time for staff to develop and implement the program and then by the City Council through approval of the policy. The City Council and City Manager approve the EMS policy each year if the Management Review Board determines that a change is needed.

Beth Eckert
Gastonia, North Carolina



NOTE

It is critical to select the right EMR.

Not everyone can do the job ...

- Frequently asking employees at various levels and functions how the EMS is going
- Expressing personal goals for the EMS to the EMS leadership
- Using the “bully pulpit” carefully and only when needed to move the program forward
- Providing human as well as financial resources
- Helping your EMS teams to manage change
- Rewarding, acknowledging, and reinforcing the benefits that the EMS brings and the people who are making it happen

Another management key to success is to send three or four "good news" bullets to senior management on a monthly basis. This keeps the EMS on their agenda, and provides information for them to report at their management meetings and through other outreach activities (e.g., conferences, newsletters, civic meetings, etc.).

EMS Program Leadership: the EMR, Core and Site (Implementation) Teams

As you've probably gathered by now, the EMS is not a program that one person can put into place. In fact, every employee in your fenceline will be involved in some way in building and maintaining your EMS. One of the first responsibilities that you as top management face is to appoint an EMS champion. That person is the EMS program manager and in EMS terms is called the Environmental Management Representative, or EMR. The EMR, sometimes with recommendations from top management, will appoint a cross-functional team of EMS program leaders called the Core Team. These are the employees from various levels and functions in the fenceline who will become additional EMS experts, and assist the EMR in designing, delegating, and evaluating EMS activities. A third level of EMS leadership are the Implementation Teams. These are the employees and staff who are closest to the actual work in the operations of your fenceline. They have a huge amount of institutional know how and operational experience that is critical to a strong EMS.

In some cases, organizations decide to add a Steering Committee. Members of the Steering Committee often include City Commissioners, City Managers, Mayors, Council Members, and Directors of other municipal utilities and services. The Steering Committee's job is to ensure that the EMS plans are consistent with the strategic vision of the city and to ensure that appropriate resources are allocated for the EMS.

Selecting an EMS Champion:

The Environmental Management Representative
The Environmental Management Representative (EMR) is the clearly-identified EMS team leader who has responsibility and authority for implementing and maintaining the EMS. The EMR has the designated authority from management to get the job done and is pivotal to the success of your program. The fact that the EMR represents top management and speaks with its authority should be clearly stated and



NOTE

All of the wastewater facilities consulted for this Handbook have successfully implemented an EMS by using a full-time EMR or designated an EMR with other organizational responsibilities. The decision you make for an EMR will depend on the size of your facility and available resources.

regularly repeated throughout the EMS implementation, particularly in organizations where the EMS hierarchy doesn't mesh with the organizational hierarchy.

It's a good idea to make sure that your EMR gets sufficient EMS training before beginning to build your EMS. This Handbook will be extremely useful for making contact with other wastewater facilities (or any relevant organization for that matter) who have implemented an EMS—EMRs are always happy to share their experience and keys to success.

To locate additional information, or contact any of the Steering Committee members that contributed to this Handbook, visit www.peercenter.net.

In addition to being the EMS expert and champion, it's also useful if the EMR has a good knowledge of the overall operations, strong project management and organizational skills, and is a good communicator up and down the organizational hierarchy. The most successful EMRs are enthusiastic team players who are trusted and respected by all levels of staff. A sense of humor is always an added bonus.

The EMR typically assumes the new EMS responsibilities in addition to their existing responsibilities. In four out of the six wastewater facilities contributing to this Handbook this was the case. Be sure management understands the number of hours involved and is willing at times to redistribute some responsibilities to others in the organization. Charts have been included within this section for the EMS roles and number of hours the wastewater facilities that consulted for this guide spent in implementing their EMSs.

Typical EMR Responsibilities

The EMR is the project leader for the EMS and is essential to successful implementation as the EMS driver and key communicator. In addition to typical project manager responsibilities, the EMR can anticipate the following activities:

- Build and lead the EMS Core Team
- Plan the EMS project and implementation schedule
- Gather, organize, and disseminate information
- Delegate tasks and establish deadlines
- Facilitate top management visibility and involvement
- Obtain cross-functional support and buy-in
- Regularly meet and communicate with top management about the benefits and status of implementation

EMR Qualifications

- ❖ Knowledge of organization's business and management practices and core operations
- ❖ Environmental background
- ❖ Leadership and project management skills—team builder
- ❖ Systems thinker
- ❖ Good communicator up and down the ladder—relates to all levels of staff

NOTE



Experience with public organizations that have implemented an EMS has shown that EMS Core Teams have 2-12 members, with an average of 7 people. Consider including contractors, suppliers or other external parties as part of the Team, as appropriate.

The Teams definitely need to be cross-functional, have buy-in into the program, and have the time to perform the tasks that were assigned to them. I think if we had to do it over again, and what we have done since initial development, is to create an EMS Team that is composed of a more diverse level of staff. Initially, all members were supervisors and now our group includes laboratory technicians, operators, assistant managers, and supervisory level staff. The buy-in from the frontline employees comes easier the more they are involved in the process.

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

NOTE

Of the six wastewater facilities that assisted with this Handbook, four had Core or Site Team members that were not supportive of their EMSs (at least at first).



Do you have any potential EMS saboteurs in your organization? Many public organizations that have implemented EMSs have included saboteurs on their Core and Site Teams and turned them into supporters of the EMS.



COACH'S CORNER

An EMS Core Team should include cross-functional (e.g., engineering, finance, human resources, operations, etc.) representation and include members from top to bottom of the organization (i.e., management to the frontline). Members can even be pulled in from operations outside the scope of the EMS fenceline.

A cross-functional team can help to ensure that procedures are practical and effective and can build commitment to and “ownership” of the EMS.

The Core Team

The **EMS Core Team** plays an important leadership role in planning the EMS project, delegating the tasks, establishing deadlines, collecting and evaluating work, and providing training, guidance and assistance as needed. The EMR heads the Core Team, and its members are an organization’s EMS experts and champions.

Some organizations enlist volunteers for their team; others delegate and assign members to the Core Team. Keep in mind that the Core Team also needs the authority as well as responsibility to drive the EMS.

If your organization cannot get enough volunteers on the Core Team, consider making membership on the Team a prestigious honor. Get Top Management to recognize your EMS Core Team members.

“Congratulations, you’ve just been selected to our EMS Core Team!”

Wastewater Organization	Establish a Core Team?	# of Members *
Buncombe County, North Carolina Metropolitan Sewer District	Yes	7
Gastonia, North Carolina Public Works	Yes	8
San Diego, California Metropolitan Sewer District	Yes	10
Kent County, Delaware Public Works	Yes	8
Eugene, Oregon Public Works	Yes	8
Charleston, South Carolina Public Works	Yes	12

* *The size of your Core Team will depend on your organizational structure, specific employee skills and expertise, and your organization’s available resources.*

CASE STUDY

Charleston, South Carolina Public Works adopted a two-pronged approach. They first assembled a 12-person Steering Committee consisting of all department heads to obtain management buy-in. Second, they established local in-house EMS committees for functional areas, such as a local team for wastewater collection, one for wastewater treatment, etc.

REMEMBER



It takes time for the EMS Core Team to develop a team dynamic. Give yourselves time to “gel” and work together as a team. At first, have team meetings with some simple and non-threatening EMS activities. For example, work together on issues such as clarifying the meaning of key EMS terms and EMS jargon.

EMS Core Team Qualifications:

- “In the know” in their operational and functional areas
- Good communicators and listeners
- Enthusiastic and committed
- Respected and trusted by employees and managers

Implementation or Site Team(s)

The majority of public organizations that have implemented an EMS have also chosen to assemble an EMS implementation or site team—or several teams—to help with the development of various EMS elements. The make-up of the implementation teams typically consists of personnel from the frontline—personnel that are responsible for the activities and operations that generate potential significant environmental impacts.

View the establishment of an Site Team as an opportunity to secure buy-in at all levels of your organization. By involving staff in the EMS Implementation Team activities (e.g., environmental analysis), you can have greater assurance of their support and assistance.

Wastewater Organization	Establish a Site Team?	# of Members
Buncombe County, North Carolina Metropolitan Sewer District	Same as the Core Team	
Gastonia, North Carolina Public Works	Yes	8
San Diego, California Metropolitan Sewer District	No	--
Kent County, Delaware Public Works	Same as the Core Team	
Eugene, Oregon Public Works	Same as the Core Team	
Charleston, South Carolina Public Works	Yes	8

Typical Site Team Responsibilities:

- Documenting the organizational activities/operations as process flow diagrams
- Assisting with the identification of environmental impacts
- Providing input on environmental objectives
- Developing work instructions and/or standard operating procedures for activities or operations that were identified as significant
- Disseminating information and good news about the EMS effort—acting as EMS champions for their area of operation

It was definitely a plus to have a cross-sectional representation involved on EMS Team(s). The EMS Team members selected brought forth knowledge and expertise from their departments. The members were willing to learn and grow, and they also wanted to be involved with and be part of creating a culture shift (TQM, EMS) affecting the organization.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

EMS Core and Site Team Keys to Success



- ◆ Ask for volunteers—if there are none, have section managers make appointments. They know the leaders.
- ◆ Make responsibilities clear to employees and to their managers.
- ◆ Reward/recognize their involvement.
- ◆ Secure their time commitment from management—be aware of peak operational times.
- ◆ Sometimes include the “bad apples” on the implementation team as a way to alleviate dissension at the pass.



NOTE

Based on your wastewater facility size, you may not need both an EMS Core and Site Team. For three of the six of the wastewater facilities that consulted for this Handbook, the Core and Site Teams were the same.

COACH'S CORNER



Conduct basic EMS training for employees up front. This will contribute to the EMR's ability to facilitate and direct the EMS development effort.

Initially, frontline employees were not involved. They slowly became involved as the EMS implementation moved along. Based on initial discussions with many of these staff members, their initial reaction to the program was that it be put up on a shelf and forgotten about. However, discussions with staff as the implementation progressed revealed that many of the employees were seeing potential benefits to personally and professionally and discovering how they can use the program to help them do their job better.

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

CASE STUDY

An Associate Recognition Program is in place for employees at the Charleston, South Carolina CPW. Under the Program, employees are nominated by other employees and management, based on productivity, contributing to goals, and being team-oriented and positive. Awards include peer recognition, cash, and parking privileges. A copy of Charleston's Associate Recognition Program is attached in Appendix B.

Lessons Learned Regarding Core and Site Teams

(from wastewater facilities):

- ◆ Don't pressure anyone not willing to serve.
- ◆ Be clear that each team member understands their role.
- ◆ LISTEN to concerns and try to address, don't dismiss, concerns early—catch and try to alleviate these concerns before they get back to the frontline.
- ◆ Let team members know that their opinions matter.
- ◆ Conduct team-building exercises to build a team dynamic.

Securing and Maintaining Employee Buy-in

The same concepts that you used for enlisting the support of your fenceline managers, supervisors, and union stewards can be applied to getting employee buy-in. Some employees may view an EMS as bureaucracy, the “flavor of the month,” or added work or expense. There also may be resistance to change or fear of new responsibilities. To overcome these potential barriers, make sure that everyone understands why the organization needs an effective EMS, what their role is and how an EMS will help to control environmental (and safety) impacts in their areas and in day-to-day operations.

Get key employees involved in the EMS early and often. While the EMS is not technically challenging, the introduction of new ideas can be threatening for employees. Therefore it's important to get employee support from the beginning through ongoing, consistent, open dialogue on your EMS. Employees should understand what the organization wants the EMS to accomplish. This can go a long way toward gaining that support and answering the question of “what's in it for me?”

CASE STUDY

An EMS Commitment Statement was prepared and signed by all employees at the Charleston, South Carolina CPW (a copy is attached in Appendix B).

Communicate and ask employees for their EMS goals during the planning stages and throughout EMS implementation. Open employee dialogue, buy-in, and involvement will help ensure that the EMS is realistic, practical and adds value.



NOTE

3 of 5 = number of wastewater treatment facilities from the Wastewater Steering Committee that involved frontline employees during the initial stages of EMS planning and development.

EMS implementation requires participation by more than a single individual to be successful. Ultimately, your organization will want to institutionalize the EMS and create an atmosphere or culture where environmental management becomes business as usual across all day-to-day activities. Therefore, involving cross-sectional employees early in the planning of the EMS is the best way to promote short- and long-term commitment throughout the organization. Plus, it's a great way to gain support and ensure buy-in for the EMS.

Ideas for building a team approach to the EMS and involving employees from the very beginning include:

- Holding a kick-off meeting and invite top management; this helps everyone see the EMS as a priority.
- Talking the EMS up with employees, union stewards, middle managers, 2nd shifters, etc.
- Spending time talking with middle management and line supervisors. One-on-one conversations can identify their needs, concerns, and problem areas. The more your middle managers are involved in the initial stages of the EMS, the more support and buy-in you will get.
- Asking employees on the front-line what changes they would like to see in their operations as a result of the EMS (See Appendix B for a list of questions that a public works organization used in getting support and buy-in from frontline employees). However, don't overwhelm them with EMS "jargon."
- Posting EMS signs on bulletin boards, lunch-rooms, and near coffee and copy machines to familiarize staff with EMS words and the ideas.
- Advertising early successes to keep management and employees aware of EMS efforts.

"We worked to provide employees with the necessary tools (e.g., standard operating procedures) to successfully and consistently complete their work. With communication and documentation in place, change became easier and smoother. Allow time for employees to absorb information and adapt to change."

Chris Toth
City of San Diego
Wastewater Collection Division

CASE STUDY

At the Buncombe County, North Carolina MSD, employees from the very beginning were asked for their operational expertise and what they wanted to get from an EMS. Buncombe employees soon realized their ideas and efforts could make a difference.

Conducting an EMS Gap Analysis

Of all of the activities in the Getting Ready Phase, the Gap Analysis is your EMS leadership team's first foray into the actual world of EMS jargon and the requirements of a formal EMS. The Gap Analysis provides a current baseline assessment of the degree of conformance of existing policies, procedures and practices to standard EMS requirements.

Your EMS Gap Analysis will probably show that you have a number of EMS elements in place. Remember—you don't have to start from scratch!

COACH'S CORNER



Use your EMS Gap Analysis as a project planning and a communication tool. The Analysis will allow you to scope and budget the EMS effort by identifying your EMS gaps and by providing a preliminary level of effort to fill the gaps. Since this is typically the first exposure personnel have to the EMS, the EMR and Core Team, use the Gap Analysis to increase employee EMS awareness, communicate useful information about environmental issues to top management and frontline employees, and teach everyone about the basic EMS elements.

COACH'S CORNER



A few things to keep in mind as you implement your EMS:

- Help is available from your wastewater peers and from other public organizations— don't hesitate to use it. (See Appendix C for a list of your wastewater peers and other EMS resources.)

- Pace yourselves and do not stall in your EMS planning and implementation. Move quickly enough that your employees stay interested and engaged, but not so fast that those involved are overloaded.

- Don't re-invent the wheel— existing environmental programs and management practices should help you meet EMS requirements.

- Consultants can help you evaluate your EMS and suggest approaches used successfully elsewhere, but use them as facilitators. Your organization must manage the EMS, not the consultants.

NOTE

Personnel that conduct the gap analysis should have a basic understanding of your EMS. The EMR and EMS Core Team members are typically responsible for conducting the analysis. It involves reviewing documentation and interviewing personnel, through an established protocol.



It's recommended that the EMR, and some members of the Core and Implementation Teams conduct the Gap Analysis, and that these team members have a basic understanding of the EMS before they begin. It's also a good idea for top management to communicate to managers, directors, union stewards and supervisors—well in advance—what the gap analysis is, the reasons for doing it, and when it will take place. Schedule the Gap Analysis at a time convenient to fenceline managers if possible.

Conducting the Gap Analysis in-house rather than hiring an outside consultant is preferable for several reasons. First, it's a great tool to familiarize your Core Team and your EMR with the language of the EMS and the 17 requirements that make up the Plan-Do-Check-Act cycle. Second, it's an activity that allows the EMR to delegate some of the responsibility to several Core Team members, and to evaluate the skill set of the Core Team. Third, it's a good opportunity for the Core Team to work together for the first time to accomplish an important EMS milestone; and fourth, it's a great tool to open a dialogue between the Core Team and the Implementation Teams about the plans, procedures, SOPs, and records that currently exist in operational areas.

Finally, once you have completed your Gap Analysis, you'll have a good idea of how much work your organization needs to do to complete the EMS, and that will help you to allocate human and financial resources appropriately.

At the end of the Gap Analysis you'll have improved your Core Team dynamic, increased employee EMS awareness, communicated useful information about environmental issues to your senior management, and learned a lot about EMS elements and the scale of the implementation effort.

Wastewater Organization	Was a Gap Analysis Conducted?	Did you Use a Checklist?	% of EMS Elements in Place	Typical EMS Elements that were in Place
Buncombe County, North Carolina Metropolitan Sewer District	No	No	20%	> Legal & Other Requirements > Monitoring and Measurement
Charleston, South Carolina Public Works	Yes	Yes	40%	> Operational Controls
Eugene, Oregon Public Works	Yes	Yes	40%	> Standard Operating Procedures
Gastonia, North Carolina Public Works	Yes	Yes	15%	> Environmental, Health & Safety (EH&S) Training
Kent County, Delaware Public Works	Yes	Yes	60%	> Emergency Response
San Diego, California Metropolitan Sewer District	Yes	Yes	10%	Various EH&S Records > Management Review

What to Look for in the Gap Analysis

The protocol (or checklist) that you can use for the Gap Analysis will direct you in your efforts. You will review documentation, interview personnel, and assess whether you have documented procedures for internal and external communication, training, and management review, etc.

See Appendix B for an example EMS Gap Analysis Checklist.

The information you capture from the gap analysis will save you time further down the road and eliminate duplicating what already exists. Develop a gap report based on your findings and report to top management.

Managing Change: It's NOT Easy!

As you move forward with your EMS, you'll begin to realize that the challenge is not with technical issues but rather with organizational change. Most organizations don't like change. Managers, directors, and employees all are quite comfortable with the status quo.

“Change is good...but you go first!”

Managing change is an important factor in EMS implementation, and the entire EMS leadership must be involved. The Steering Committee and top management facilitate change by clearly showing through frequent communication and through their involvement early on in EMS awareness activities that the EMS is a priority for the organization and one that has their personal attention. The EMR, Core Team, and Implementation Teams are the change agents that are closest to the workforce. They must be ready to listen and respond to concerns and fears that the workforce expresses, for these issues are not ones to be swept aside or discounted. Ideally the EMS teams that you have selected will be staffed by people who have earned the trust and respect of their peers and colleagues. That is an important key to success in change management.

NOTE



As new elected officials (e.g., City Managers or Council) or senior managers at your facility come on board, there may be the perception that the EMS is not “their” initiative. This can result in reduced support and resources for the implementation effort. It's very important to educate the new leaders early on about the associated benefits of your EMS to secure their buy-in and support.

Brainstorm with your Core Team and Site Teams about the times when change went really well in your organization. What lessons can you learn from that experience that you can apply to the EMS program? Then recall a time when change went really badly in your organization. Apply these lessons to the EMS program as well.

Wastewater and Other Public Organizations' Keys to Success for Managing Change



- ◆ Secure active support/interaction from management
- ◆ Establish early dialogue and lines of communication
- ◆ Define opportunities for ownership and empowerment (e.g., incentive programs, etc.)
- ◆ Maintain consistency—keep EMS on the radar/visible
- ◆ Promote activity and involvement (e.g., an EMS comment box)

“Our organization learned that change could be a good thing and not something to be afraid of. We also learned that communication (two-way communication) with all relevant levels of staff can help to make changes smoother and more positive. It is amazing the different perspectives the various levels of staff have about what management may consider to be the most minor change and that if given the opportunity to be heard, how eager staff is to share their opinion.”

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

A Few Words About EMS Language/Jargon

The language/jargon of an EMS is typically a hurdle at the beginning of the EMS process. Words like “aspect,” “significance,” “target,” etc. have a specific meaning that is not necessarily intuitive or consistent when you begin your EMS implementation.

REMEMBER



Spend time with your EMS Core Team unlocking the meaning of certain EMS terms—this will save you hours down the road. Also, pass these language lessons on to managers and employees while conducting the gap analysis or during monthly all-hands meetings, etc.

You've conducted your Gap Analysis, obtained commitment and support from management, formed your EMS leadership teams, and given some thought to change management. Your Getting Ready Phase of EMS implementation is almost completed. Two more tasks await you: becoming acquainted with the strategy you'll use to implement the EMS and finding information resources and materials that will help you prepare your organization to build the EMS.

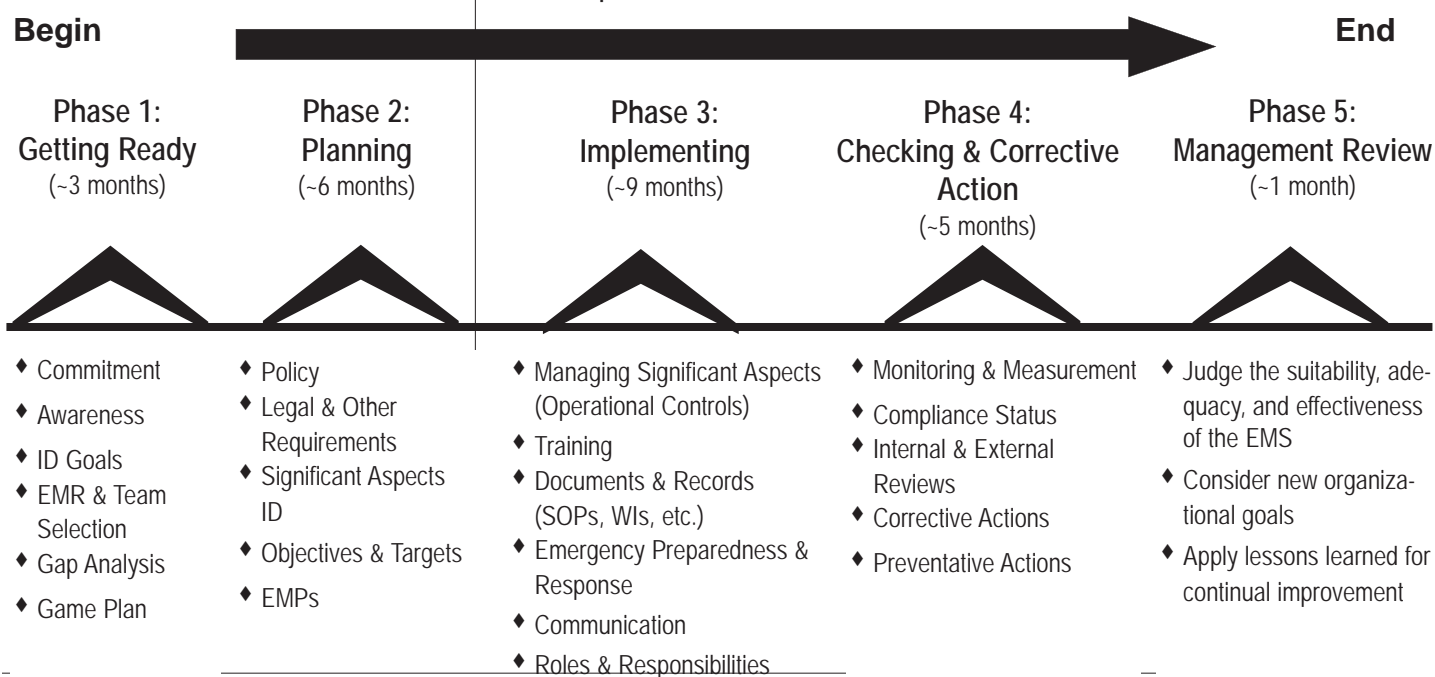
Understanding the EMS Implementation Strategy

The strategy used in this Wastewater EMS Handbook is one used successfully by over 50 organizations across the United States. It's a dynamic strategy, because it reflects the most current lessons learned, improvements, tools and materials that many different public agencies have gathered from the experiences of wastewater utilities and other public facilities like yours.

One way to describe the strategy is "just-in-time" implementation. As previously mentioned, when you are involved in a particular phase of EMS activity, there is no need to look ahead to what will happen in the next phase. We urge you to stay focused on the EMS milestones in the current phase. As you complete each milestone, you are one step closer to a complete and thorough EMS. The activities in each phase are designed to sequentially build a strong and thorough EMS.


While the EMS that you are building can certainly apply to any EMS based on the Plan-Do-Check-Act approach, this Handbook and implementation strategy are based on the ISO 14001 Environmental Management System. Should you determine at a later date that 3rd-party verification of your EMS is a sound business decision, you will have addressed all the elements described in the ISO 14001 EMS.

Here's an example program plan that describes the five phases of EMS implementation:



One question often asked is how long the implementation will take and how much direct labor and other resources your organization will commit. The timeline for waste utilities that have successfully implemented an EMS has averaged 12 - 24 months. Less time than that for implementation would require a huge amount of resources; longer than that detracts from the motivation and energy of the process. The time it takes your facility to implement an EMS will vary, depending on the length of the time for each phase of activity, operational and business realities that intrude on your normal workflow, and many other change issues that wastewater facilities are faced with each day. The timeline provides an average time of each phase. Here's some additional information from wastewater facilities around the country:

REMEMBER



Implementing an EMS is not a race to see who gets there first. Make sure that you devote sufficient time and resources to the EMS and get employee buy-in and support early and often.

Wastewater Organization	Size of Facility (in Millions of Gallons/Day = MGD)	Time in Months (from EMS Project Start to 1st Management Review)
Buncombe, North Carolina Wastewater Plant	40 MGD	22 Months
Buncombe County, North Carolina Metropolitan Sewer District	20 MGD	13 Months
Charleston, South Carolina Wastewater Collection System Department	40 - 74 MGD	18 Months
Charleston, South Carolina Environmental Resources	< 40 MGD	24 Months
City of Eugene, Oregon Wastewater	49 - 75 MGD	18 Months
Gastonia, North Carolina Wastewater - 2 treatment plants (includes a laboratory, the pretreatment program and a biosolids program)	6 MGD 16 MGD	18 Months
Kent County, Delaware Wastewater	15 MGD	Currently implementing an EMS
San Diego, California Operation & Maintenance Division	> 75 MGD	18 Months
San Diego, California Metropolitan Wastewater Collection Division	> 75 MGD	30 Months

These implementation averages will help you guide your organization through the EMS process. While they are specific to each organization, they should help you plan your program structure and prevent you from spending too much time on any one phase.

Another question asked by top management concerns the amount of direct labor support the EMS implementation will require. A rough average is 12 hours of time per year for each employee in your organization. Certainly your receptionist will probably not spend as much time on the EMS as your EMR or Core Team members, but over each year the total hours expended has held to this average. Direct labor costs to maintain your EMS will shrink considerably as the EMS becomes business as usual.

Here's some information about the resource commitment of wastewater facilities interviewed for this Handbook:

Wastewater Organization	Total Labor Cost	Total Consultant Cost (if applicable)	Total Cost to Implement (Labor, travel, materials, and consultants)	Wastewater Average Staff Time (EMS Project Start to 1st Management Review)
Buncombe, North Carolina Wastewater Plant	\$50,000	\$35,000	\$94,000	3,300 hours
Charleston, South Carolina Wastewater Collection System Department	Not Available	Not Available	Not Available	1,675 hours
Charleston, South Carolina Environmental Resources	Not Available	Not Available	Not Available	1,675 hours
City of Eugene, Oregon Wastewater	\$85,000	\$21,000	\$120,000	4,300 hours
Gastonia, North Carolina Wastewater (2 treatment plants, a laboratory, the pretreatment program and a biosolids program)	\$51,800	Not Applicable	\$53,800	Not Available
San Diego, California Metropolitan Wastewater Collection Division	\$211,000	\$90,000	\$308,000	6,200 hours
San Diego, California Operation & Maintenance Division	\$200,000	\$160,000	\$365,000	Not Available

Discuss with your management, your Core Team, and your Implementation Team a timeline that you feel is appropriate for your organization. Refer to your Gap Analysis to get a general sense of how much work needs to be done and the anticipated size of the program.

A list of key EMS implementation activities and the month they were completed by the wastewater facilities that contributed to this Handbook is attached at the end of this section.

EMS Roles and Hours Dedicated to EMS Implementation

Roles	Hours (from project start to completion of first management review)
Environmental Management Representative (EMR)	Average hours = 2,100 Range of hours = 1,000 to 3,000
Senior Management	Average hours = 30 Range of hours = 8 to 100
EMS Core Team	Average hours = 2,050 Range of hours = 1,800 to 2,500
Consultant(s)	Average hours = 315 Range of hours = 100 to 500

EMS Information Sources and Resources

The Getting Ready Phase involves educating many levels of employees in your facility: managers, the EMR, EMS leadership teams, and employees. This process of learning more about an EMS doesn't end in this phase, but continues throughout each of the subsequent phases. Assembled in this Handbook are excellent lists of information resources, some of which are contained in Appendix C of this Handbook; others are available on the Internet.

Some additional EMS Implementation Guides that have served wastewater utilities and other public entities over the past seven years include:

EMS: An Implementation Guide Small and Medium-Sized Organizations, Second Edition, NSF International, Ann Arbor, Michigan, January 2001.

An EMS Troubleshooters' Guide for Local Governments, Global Environment & Technology Foundation, Arlington, Virginia, October 2002.

The Internet is an excellent source of EMS information. One site that caters specifically to public entities implementing an EMS is the Public Entity EMS Resource Center—the PEER Center—Website at www.peercenter.net. Linked from the PEER Center are seven Local Resource Centers across the United States. Each has experience and expertise in facilitating EMSs in public entities.

Moving to the Next Phase

Congratulations! You have brought your organization through its first phase of EMS implementation. Here's a checklist of the EMS Milestones you've accomplished:

- ✓ Choosing your EMS "fenceline"
- ✓ Understanding your organizational goals
- ✓ Confirming top management commitment, involvement, visibility
- ✓ Selecting an EMS champion
- ✓ Building EMS teams
- ✓ Securing employee buy-in
- ✓ Conducting a Gap Analysis
- ✓ Managing change
- ✓ Understanding the implementation strategy
- ✓ Accessing EMS tools and information



Things to Avoid

1. Overburdening employees with EMS implementation tasks during peak operational periods.
2. Using EMS "jargon" when communicating with employees (e.g., instead of environmental aspect/impact, try cause/affect).
3. Waiting until the EMS management review to involve management in the EMS. Provide brief monthly reports/updates on the status of implementation to get management involved early on.
4. Stalling during your EMS planning—stick to a regular pace so that your employees remain engaged and interested in the EMS process.
5. Establishing implementation time frames that are unreasonable—don't bite off more than you can chew.

NOTE



Additional sources of EMS information that the Wastewater Steering Committee found useful are in Appendix C.

COACH'S CORNER



To increase your chances of continued management support for the EMS:

- ☛ Enlist the aid of top management frequently, and ask them to regularly be visible, provide resources, and make the EMS a priority (i.e., “wave the flag”). If your managers take a hands-on part in the EMS you will have an easier time with change and also have greater success in your EMS implementation.
- ☛ Clearly define who your top management is for the EMS and what goals are driving their interest in the EMS.
- ☛ Provide management at all levels with specifically designed training to help them understand EMS activities and milestones, the scope and timeframe of the program, and their role in the EMS process.
- ☛ Collect and record EMS performance and benefits throughout your EMS implementation. How are you improving your efficiency, saving money, avoiding accidents and spills, increasing environmental awareness and understanding, reaching out to stakeholders, etc. This information needs to be passed on to employees and to management (in the Management Review). In other words, document and celebrate your EMS successes as you go along!

As you complete this phase, it might be useful to document the lessons your EMR, Core Team and Implementation Teams have learned. What barriers did you experience? What benefits have you seen?

Some of the documents that you will have generated in the Getting Ready Phase include:

An EMS organizational chart showing the functions of those who serve as your EMR, your Core Team and Implementation Teams and, on your Steering Committee, if you have one.

A gap analysis showing what you already have in place that conforms to an EMS, and the areas that provide opportunities for improvement.

A list of **organizational goals** at the various levels and functions of your fenceline.

A tentative **timeline of EMS implementation** that is appropriate for your organization.

A list of **wastewater facility contacts** who have implemented an EMS in their own organizations.

A list of **public and private organization contacts** in your area who have implemented an EMS.

Your favorite **Websites** for EMS tools, materials, and information.

Barriers you have experienced in this phase.

Benefits you have experienced in this phase.

Lessons learned about implementing an EMS in your organization.

In the next Section of this Wastewater EMS Handbook, you'll find step-by-step guidance to help you and your EMS Leadership Teams accomplish the EMS milestones in each of the subsequent EMS phases. We hope you will take the time to share your experiences, data, case studies, lessons learned and keys to success with other wastewater facilities who will consider EMS implementation in the future.

Best of luck!

“It was learned early on that a phased approach to our EMS implementation was attainable and suitable to the needs of our organization. We didn't want to bite off more than we could chew.”

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

COACH'S CORNER



Methods used by other EMS Wastewater Practitioners to Promote Familiarity/Awareness of their EMSs—Let's borrow from their EMS Playbook!

1. Post EMS awareness signs and aspect/impact lists, objectives and targets, etc. on bulletin boards and throughout buildings, access areas, lunchrooms, and break rooms.
2. Use brochures, EMS videos, and EMS awareness reference cards.
3. Conduct EMS awareness training and hold face-to-face meetings.
4. Develop an EMS newsletter and monthly activity reports.
5. Create EMS information Websites.
6. Send emails on EMS basics that go out to all employees.
7. Hold an EMS slogan contest with a day of vacation as a prize to the winner.
8. Create an EMS character, catchy EMS acronym, and a simple message to inform employees about the EMS.
9. Develop creative and fun ways to present the EMS—kitchen magnets, screen savers, etc. with the EMS logo/character/acronym.

Lessons Learned

1. Keep EMS staff and core team meetings focused and efficient (provide food as an incentive!).
2. Implement a document control system for your procedures, documents and records early on in the EMS implementation process.
3. Contact other wastewater treatment facilities and other public organizations that have implemented an EMS to benefit from their knowledge. They are eager to share their insights.
4. Communicate implementation successes early on to help motivate management and all employees to the benefits of an EMS.
5. Make the EMS "system" dependent and not "person" dependent.

Frequently Asked Questions about Environmental Management Systems

Q. Where in my operations would an EMS be appropriate?

A. An EMS can be applied in one or more departments or operations across an organization. You should examine the organization's activities and services and determine where the EMS would best serve needs and organizational goals. The department(s) or facility(ies) to which you apply the EMS is called the "fenceline".

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

A. Much of what you have in place now for environmental management probably can be incorporated into an EMS. There is no need to "start over" and re-invent the wheel for environmental and other organizational programs that are in place. A gap analysis is a great way to determine what parts of an EMS may already exist. *See Appendix B for a Gap Analysis Checklist.*

Q. What is the purpose of an EMS Gap Analysis?

A. The requirements of an EMS are compared to an organization's current management and environmental programs. The gap analysis is used to determine EMS program priorities and for planning the path ahead for implementation.

Q. What is it going to cost to implement an EMS at my wastewater facility?

A. The cost of implementing your wastewater EMS will vary depending on the size of your facility (fenceline), if you use consultants, and the number of policies, procedures, work instructions, etc. you already have in place that meet the requirements of an EMS. Note the dollar and human resources spent on EMS implementation from wastewater facilities on page 36 of this Section. Use the lessons learned and keys to success from other wastewater organizations that have implemented an EMS and to use this Handbook as a resource.

Q. Can I implement an EMS without consultants?

A. Yes—although your current consultants can be a valuable resource for reviewing environmental compliance and assisting with other EMS tasks, we recommend you use them only as needed for the EMS. Remember, this is **your** EMS. Take ownership of your EMS by involving your own management and staff in implementation activities.

Q. Where can I find additional help on EMSs, especially in the wastewater sector?

A. The Wastewater Steering Committee that contributed their knowledge to this Handbook are providing you with a support network as you implement an EMS at your wastewater facility. Their POC information is listed in the front of this Handbook.

Appendix C contains EMS Websites and other excellent resources, some specifically tailored for wastewater and/or public organizations.

In addition, the Peer Center Website (www.peercenter.net) is specifically customized for the public wastewater industry, and therefore, will contain EMS tools, case studies, references, POCs, etc... for wastewater managers.

Phase II: PLANNING

You are now ready to begin the Planning phase of the EMS cycle. Each section of this Handbook will guide you step-by-step through each of the EMS activities. Refer to the icons for case studies, sample documents, keys to success and other implementation assistance. At the end of each section, two handy reference sheets review the **Purpose** of each requirement, describe the **Results** you'll be developing, discuss how to **Prepare** to do the work, and show how the element links to other EMS requirements.



In this phase, you will be developing a formal environmental policy, essentially a vision and mission statement that describes your organization's commitment to the environment and is the foundation for your EMS planning and action.

Next you'll conduct a thorough assessment of how the operations in your fence-line impact the environment, and identify which of those impacts is most significant. You will review how you stay current with the laws and other requirements that guide your operations and how you communicate this information to the employees who need the information to do their jobs effectively. Finally, you will be setting environmental performance improvement objectives and measurable targets, and then establishing programs to accomplish your goals. If you are using a two-year implementation strategy, the activities in this phase can be comfortably accomplished in about six months.

Here's a checklist of requirements in this Phase:

Phase II EMS Requirements (6 months)	
Environmental Policy	✓
Legal and Other Requirements	✓
Aspects and Impacts	✓
Objectives and Targets	✓
Environmental Management Programs	✓

Section 3: Environmental Policy: Setting the Stage

An environmental policy is your organization's statement of its commitment to the environment. It is signed by top management and serves as a foundation document for your EMS and provides a vision for your entire organization. Everyone in the organization should understand the policy and what is expected of them in order to achieve your environmental goals. Use your policy as a framework for planning, action, and continual improvement—all else that follows will be based on your policy.

As you develop your EMS policy, it is critically important that the policy be consistent with other strategic environmental priorities you may have established through organization-wide strategic plans or other similar efforts. Don't make the mistake of having your EMS policy "exist in a vacuum." For example, you may have already embarked on major effort to improve the management of your capital assets through a formal assets management program. Make sure this commitment is reflected in your EMS policy and made part of your EMS throughout.

ISO 14001 Environmental Policy Commitments:

- Continual Improvement
- Pollution Prevention
- Compliance with Relevant Laws and Regulations

Step-by-Step Guide to Developing an Environmental Policy

- Step 1) Review Current Policies
- Step 2) Draft an Environmental Policy
- Step 3) Check Your Environmental Policy for EMS Conformance
- Step 4) Finalize Your Environmental Policy
- Step 5) Communicate Your Policy
- Step 6) Review Your Environmental Policy for Effectiveness

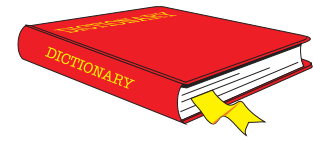


Step 1) Review Current Policies

You probably have some type of environmental or other organizational policies in place, even if they are not written down. For example, your organization is most likely committed to complying with environmental laws. Document what you have in place as a starting point. Leverage your current policies, build on them, and develop your environmental policy.

If no policy or language exists, you will need to draft a policy from scratch. There are plenty of examples your team can review to get

Key Section Terms



Continual Improvement – The process of enhancing an organization's EMS to achieve improvement in overall environmental performance in line with the organization's environmental policy. The basic principle of the plan, do, check, act approach.

EMS Core Team – A cross-functional team made up of individuals within the organization that helps facilitate EMS implementation across the organization. Team members are the EMS experts and cheerleaders.

Environmental Management Representative (EMR) – The clearly identified EMS team leader who has the responsibility and management authority for implementing the EMS from start to finish.

Environmental Performance – Measurable results of the EMS related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets.

Environmental Policy – An organization's formal statement defining its intentions and principles in relation to its overall environmental performance. It provides a framework for action and setting environmental objectives and targets.

Pollution Prevention – The development, implementation, and evaluation of efforts to avoid, eliminate, or reduce pollution at the source. Any activity that reduces or eliminates pollutants prior to recycling, treatment, control or disposal.

Methods Used to Internally Communicate Environmental Policies:

- ▶ Posting the policy at various sites throughout the work place (e.g., in lunchrooms) so there is a visual reminder of the statement and its importance
- ▶ Using paycheck stuffers, identification badges, wallet cards, etc. so that employees can carry the environmental policy with them
- ▶ Incorporating the policy into training classes and materials
- ▶ Referring to the policy at staff or all-hands meetings
- ▶ Posting the environmental policy on the facility's Internet

“Pull together a representative, cross-functional group from your organization when developing the policy and you'll have more buy-in of your EMS policy from every level.”

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

Involving Contractors and Temporary Staff

Contractors and temporary staff that work within your EMS fenceline are required to be trained on and understand your environmental policy. Most wastewater facilities that have an EMS conduct a shorter version of their EMS awareness training for their contractors and temporary staff that includes a site safety review and an overview of the EMS and the environmental policy.

started, including an example policy at the end of this section and examples from wastewater organizations are included in Appendix A. Avoid developing a policy that is vague or could apply to any organization. Your policy should be specific to the goals you want to accomplish.

Step 2) Draft an Environmental Policy

Once you have your EMR and EMS Core Team in place, create a draft environmental policy based on any current business commitments and/or organizational and environmental goals. Remember that conformance to ISO 14001 must include statements regarding the three key commitments noted above.

Designate a couple of EMS Core Team members to be responsible for your draft policy. Get input from top management and seek input from employees. It is important that your policy reflect your organizational culture and that it is appropriate to all levels of your operations and services.

A sample Environmental Policy is attached at the end of this section. Additional sample policies from wastewater facilities are attached in Appendix A.

NOTE



Before you finalize your environmental policy, consider sitting down and brainstorming how your facility impacts the environment (your “footprint”) and draft a few goals that you would like to achieve with your EMS. Identifying a few environmental goals before you finalize your policy will allow you to see how your wastewater facility considers environmental goals in line with business objectives. This approach will result in a policy that is specific to your organization and what you want to accomplish, rather than a “cookie cutter” policy.

Step 3) Check Your Environmental Policy for EMS Conformance

Check ✓

1. Is there top management support and a signature/date?
2. Is there a commitment to legal requirements, continual improvement & pollution prevention?
3. Is the policy communicated to employees? How?
4. Has the communication to employees been effective? (i.e., do employees understand the policy and their roles and responsibilities in the EMS)?
5. Is the policy available to the public? How?

Step 4) Finalize Your Environmental Policy

Once you have considered what you want to accomplish environmentally as an organization and checked your policy for conformance, finalize your policy by having top management sign, date, post, and communicate it. This shows commitment from the top.



COACH'S CORNER

Keep your environmental policy simple, understandable, and to the point. One quick test: Could your employees describe your policy statement in a few words?

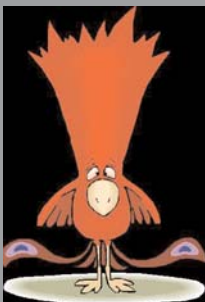
Step 5) Communicate Your Policy

Once your policy is signed and approved, communicate it to your employees. Make sure that all employees understand the policy and how it relates to their work.

Conduct training to introduce the environmental policy to your employees, explain its purpose, and answer any questions. This can be done in separate training sessions and/or by incorporating training on the policy into other ongoing training (e.g., health & safety, environmental refreshers, etc.).

Case Study

Kent County Levy Court Public Works Wastewater wrote their policy to reflect an acronym that all employees could remember. They also added a symbol to help remember the acronym. In addition, they gave every fenceline employee a kitchen magnet with the policy information on it, and are considering placing the information on insulated mugs and mouse pads made from recycled materials. Kent County's Policy mascot, abbreviated policy, and acronym (CHIRP) are:



Environmental/Biosolids Policy

- ▶ Comply with regulations and NBP Code of Good Practice
- ▶ Have an environmental/biosolids vision
- ▶ Improve continuously
- ▶ Readily share information
- ▶ Practise pollution prevention

Three Lessons Learned

(from wastewater facilities):

- 1. Keep your policy simple.** A simple policy written with specific expectations provides employees with a straight-forward and realistic view of your environmental and EMS purpose.
- 2. Include employees from across your wastewater facility when drafting your policy.** Have a couple of Core Team members and management representatives draft your statement, then refine and finalize your policy based on feedback from the entire Core Team and staff at all levels. This will help secure employee buy-in.
- 3. Make sure your policy uses key words from the ISO 14001 Standard** (e.g., pollution prevention, continual improvement, and compliance), especially if you are working toward third-party certification.



Three Things to Avoid

(from wastewater facilities):

- 1. Creating a policy that is too long.** A lengthy policy makes it difficult for employees to identify the most important points. Make it one page or less.
- 2. Not defining your wastewater fenceline** (core operations and services) before drafting your environmental policy.
- 3. Rushing your drafting process.** Spend time drafting your policy since it really defines management's commitment to the EMS and sets the framework for development of your EMS.

Three Keys to Success

(from wastewater facilities):



1. Don't start from scratch. Use existing policies and organizational goals to document and expand your environmental policy. This will lead to positive, organization-wide acceptance.

2. When training your employees on the basics of the EMS policy, make sure they understand they do not have to memorize the policy. They do need to understand what your environmental commitments are related to the policy and be able to express that in their own words. Consider laminating and using badge/wallet size policy cards that employees can keep with them and that contain the basics of your wastewater environmental policy.

3. When developing your environmental policy (and your EMS), it is critical that top management listen to the working conditions and concerns of all employees.

Common Questions to Ask Employees about Your Environmental Policy Include:

- Can you describe the environmental policy in your own words?
- What does the environmental policy mean to you?
- How does your job contribute to your organization achieving the goals of the environmental policy?

The policy also needs to be **communicated externally** and made available to the public. Some options for external communications include placing your policy on business cards, in newspaper advertisements, in annual reports, and posting it on your organization's public Internet site.

Step 6) Review Your Environmental Policy for Effectiveness

Once your policy is in place, consider how you will demonstrate that your organization is implementing the commitments you laid out in the policy. This is a good test of whether or not the policy is a "living," working document and not just a hard copy document that will collect dust.




Review your policy during EMS Management Reviews (See the Management Review section later in this Handbook). These meetings are times when management, the EMR and other staff can determine whether the EMS is functioning consistent with your policy commitments, and that your environmental goals are being met.

Have your Environmental Policy readily available to the public. Provide the front office with copies of the policy so they can hand it out to inquirers. Also consider posting it on your Internet and at the local library and/or local public offices.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

Development of our Environmental Policy enhanced Senior Management's ability to have open dialogue and constructed a message that coincided across the entire Metropolitan Wastewater District's mission.

Chris Toth
City of San Diego
Wastewater Collection Division



Environmental Policy

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Ensure that your organization's management establishes an environmental policy that defines your wastewater facility's environmental vision and goals, and that the policy is communicated and understood by all employees and applicable contractors and vendors.

The **Results** of this EMS element are:

- An approved environmental policy (EMS Document) that is implemented and understood throughout your organization.
- Firm management commitment to EMS implementation.
- Communication of the environmental policy throughout your wastewater organization, and its availability to the public.

Before you Begin this EMS element:

- Determine where your EMS will be applied (“fenceline”).
 - Consider defining your organization’s impact on the environment and setting your environmental goals before finalizing your environmental policy.
- 
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ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Environmental Policy</i></p> <p>Top management shall define the organization's environmental policy and ensure that it:</p> <p>a) Is appropriate to the nature, scale and environmental impacts of its activities, products or services;</p> <p>b) Includes a commitment to continual improvement and prevention of pollution;</p> <p>c) Includes a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organization subscribes;</p> <p>d) Provides the framework for setting and reviewing environmental objectives and targets;</p> <p>e) Is documented, implemented, maintained, and communicated to all employees;</p> <p>f) Is available to the public.</p>	<p>Environmental Aspects - Conduct your aspect/impact analysis to determine environmental management priorities in order to finalize your environmental policy.</p> <p>Objectives & Targets - Consider setting goals before you finalize your environmental policy. This will set the framework and vision for environmental improvement.</p> <p>Training & Awareness - Every employee within the EMS fenceline needs to understand the basics and purpose of the EMS and the environmental policy, especially as it relates to their job.</p> <p>Communication - Communicate the environmental policy throughout your organization and make it available to the public.</p> <p>Management Review - Regularly review the effectiveness of the policy with top management.</p>	<p>A Documented Environmental Policy</p>	<p>Other Environmental Commitments (e.g., EPA's Green Lights, etc.)</p> <p>City/County Environmental Policies</p> <p>Business/Technical Objectives</p>



Commissioners of Public Works

4.2 - Environmental Management System - Environmental Policy Statement

The Charleston Commissioners of Public Works (CPW) is committed to the improvement of the environment for present and future generations through:

- The treatment and delivery of safe potable water.
- The collection, treatment, and proper disposal of wastewater.
- The responsible impact of its activities, products and services on the environment.
- The continual environmental improvement and the prevention of pollution.
- Compliance with all applicable federal, state, and local laws, regulations, statutes and other environmentally related requirements to which the organization subscribes.
- The establishment of environmental objectives and targets that are periodically reviewed to ensure success.
- And communication of its Environmental Management System to CPW associates and to other interested parties.

CPW will establish and maintain an Environmental Management System (EMS) that corresponds to the ISO 14001 Standard and the mission, vision, strategic business plan and core values adopted by CPW.

William Koopman, Jr.,
General Manager

John Cook, PE,
Assistant General Manger

Kin Hill, PE,
Director of Operations

Dorothy G. Harrison,
Director of Administrative Services

Section 3: Legal and Other Requirements

Due to its potential impacts on the environment and public health, wastewater utilities are heavily regulated. A key requirement of the EMS and your environmental policy is a commitment to legal (regulatory) and other compliance requirements. To fulfill those commitments, you need to be up-to-date on the local, state, and federal requirements that apply to your operations, activities and services as well as any other relevant requirements. How these regulations and other commitments affect what you can do within your organization is a critical part of managing your environmental issues. Additionally, you'll want to verify that these requirements are communicated to employees whose work function is governed by these regulations in language that they can understand.

LEGAL Requirements Typically Include:

- *Federal requirements*
(e.g., Emergency Release Notification—EPCRA; Clean Water Act—CWA; Spill Prevention, Control and Countermeasure, SPCC Rule, etc.)
- *State and local requirements*
(e.g., Coastal Zone Management; Resource Conservation and Recovery Act—RCRA; Pretreatment Requirements; Biosolids Land Application)

OTHER Requirements Might Include:

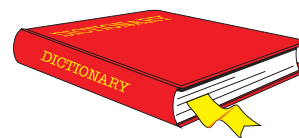
- *Trade Association commitments or agreements*
(e.g., American Water Works Association Standards, National Biosolids Partnership Code of Good Practice, APWA Management Accreditation Guidelines)
- *Local/regional environmental and community initiatives*
(e.g., Regional Stormwater Education Partnership)
- *Voluntarily programs in which your organization participates*
(e.g., EPA's Performance Track, Energy Star)

Step-by-Step Guide to Legal and Other Requirements

- Step 1) Identify and Maintain Compliance with Your Legal and Other Requirements
- Step 2) Develop a System Procedure for Identifying Your Legal and Other Requirements
- Step 3) Check the Legal and Other Requirements Procedure for EMS Conformance
- Step 4) Communicate Your Legal and Other Requirements



Key Section Terms



EMS Fenceline – Project scope and/or operational areas within an organization in which the EMS is implemented.

Legal Requirements – The set of rules and legal regulations that apply to the operations and services of an organization, including local, state, and federal laws.

Other requirements – The rules and guidelines an organization follows that are not legally binding under existing environmental laws, but to which an organization is committed (e.g., industry standards or voluntary guidelines). Under an EMS, these requirements require the same commitment as legally binding requirements.

System Procedure – An EMS (ISO 14001) required document that establishes purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

REMEMBER



A commitment to compliance with legal requirements is one of the three commitments of your environmental policy.

Three Keys to Success

(from wastewater facilities):



1. Document a summary of all your legal and other requirements in one easy-to-follow database or spreadsheet—showing the requirements and to which operation or area they apply.
2. Inform regulators of your efforts to implement an EMS at your wastewater facility in order to encourage an active dialogue about the value of an EMS approach.
3. Provide training and communicate your requirements to employees in regulated areas—in language they can easily understand.

NOTE

EMS software and/or a database tracking tool and an e-mail notification system can help your organization comply with legal and other requirements.

Research has shown that a large number of a public organization's environmental violations result from missing permit reporting deadlines. An easy and proactive way to manage these compliance obligations (and to manage your EMS project) is to consider using a software tool. See Appendix B for a review of available EMS software tools.

Step 1) Identify and Maintain Your Legal and Other Requirements

A good place to start is to review how your organization currently identifies and maintains its legal and other requirements. Ask yourself:

- ◆ Who on your staff is responsible for this? Perhaps you outsource it.
- ◆ What information sources do you find most useful and user-friendly?
- ◆ If outsourcing, you need to be confident that regulatory updates and requirements are updated and current.
- ◆ Where do you store the information and in what form?
- ◆ Is there an electronic database of your laws and other requirements? Perhaps it's a paper copy?
- ◆ Do your employees know how to access the information as necessary?
- ◆ How often do you check to see whether information is current?
- ◆ Who on your staff is responsible for communicating legal and other requirements clearly and simply to employees?

Case Study

In King County, Washington, the EMS Team surveyed their EMS fenceline (Solid Waste Operations) to identify their current regulations and permits that affect that area. King County started by putting together a list of the environmental regulations and then creating one clear, manageable reference document and list. The EMS Team identified the current and outdated regulations during the review.

Perhaps your current system is working well and your review confirms that your process is complete, current and efficient. Most importantly, you have verified roles and responsibilities, including communicating information to employees whose work is governed by the requirements.

In either case, once you've identified any gaps between what the EMS requires and what you currently do, you and your Core Team can plan ways to implement any necessary changes to make your process for determining legal and other requirements conform to the EMS requirements.

During our EMS development process we hired an external consultant to conduct an environmental requirements baseline which included an assessment of facility operations to determine which rules and regulations and other relevant industry standards applied to our wastewater facilities.

Donna Adams
Eugene, Oregon
Wastewater Division

REMEMBER



You may find that an informal process for identifying and tracking information on your legal and other requirements exists already. Now it is simply a matter of developing a formal procedure.

Sources for Legal and Other Requirements

There are many sources of information to identify and track your environmental regulations and other requirements, including: federal, state, and local regulatory agencies; trade groups/associations; environmental journals; consultants; and commercial services (e.g., legal reports on CD-ROM). Identify the sources that suit your needs and incorporate them into your legal and other requirements procedure.

Many wastewater facilities have found it useful to collect a common list of information sources and key contacts and to post this list in their EMS documents. In many cases this activity has brought some duplication of effort and inefficiencies to light and expedited the process of staying current with legal requirements.



One legal information source that many wastewater and public organizations have found very useful is the [Local Government Environmental Assistance Network \(LGEAN\)](#), which provides environmental management, planning, funding, and regulatory information for local governments. LGEAN enables local officials to interact with their peers and others online.

The International City/County Management Association (ICMA) is responsible for the management of LGEAN, but the strength of the LGEAN network is in the partnership that has been formed by the various organizations that comprise it, including trade associations, regional and state non-profits such as the Environmental Council of the States (ECOS), and government agencies, such as the U.S. EPA. Through the membership of these partners, the network is able to reach more than 100,000 local government officials and environmental professionals.

NOTE



Many organizations use a consultant to do a compliance status check of the entire fence line. At the same time the consultant can help develop a list or database of the local, state, and federal laws that apply to your facility.

Legal Sources

Wastewater facilities that were consulted for this Handbook considered the following sources of regulatory and other requirements information the most important and useful:

- 1) EPA Website (www.epa.gov)
- 2) Local Government Environmental Assistance Network (www.lgean.org)
- 3) Federal Register Notices
- 4) Trade Associations (e.g., The Association of Metropolitan Sewerage Agencies (AMSA), Water Environment Federation (WEF), National Rural Water Association (NRWA), etc.)
- 5) State Agency Internet sites and Information Sources

Involving Contractors and Temporary Staff

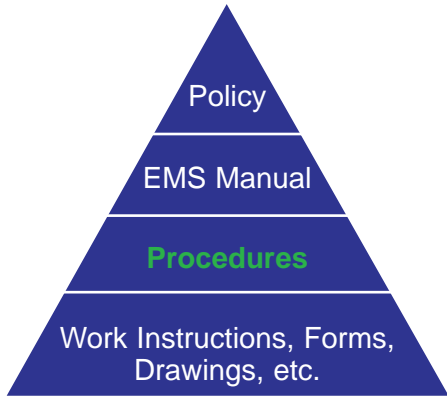
It is important to train and communicate legal and other requirements to your temporary employees if they work in areas that are regulated, have significant aspects, or are related to your objectives and targets.

Remember to communicate and provide training in language they can understand. For example, for temporary staff for whom English is not their primary language, consider using illustrations (e.g., a circle with a line through it to indicate no). For example you could create a sign to designate for employees to not throw their oily rags in the general trash.

If on-site contractors are within your EMS fence line, they also need to understand their responsibilities to comply with environmental, legal, and organizational requirements.

Review your legal and other requirements on a regular basis since Federal, State and local environmental laws and initiatives are continually revised and issued.

Jim Newton, P.E., DEE
 Kent County, Delaware
 Levy Court Public Works



A Legal and Other Requirements **system procedure** is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/ areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed.

The [Association of Metropolitan Sewerage Agencies \(AMSA\)](#), is another great legal resource for wastewater organizations. AMSA represents public wastewater agencies and organizations and works closely with federal regulatory agencies in the implementation of environmental programs.

Resources that wastewater facilities have used to identify and track environmental laws and regulations can be found in Appendix C. Also, see pages 3-68 through 3-97 in EPA's "Profile of Local Government Operations," for a list of relevant Federal environmental regulations for wastewater operations.

Step 2) Develop a System Procedure for Identifying Your Legal and Other Requirements

When you're satisfied that your process for determining legal and other requirements conforms to the EMS requirements, it's time to document the process in a system procedure. Your system procedure clearly defines what you'll do, roles and responsibilities, when you'll do it, how the information will be communicated, and where the information will be stored. This documented procedure should be a consistent, easily accessible, and clear guide for ensuring that this important element of your EMS is carried out according to plans.

For samples of Legal and Other Requirements procedures from wastewater facilities, see Appendix A.

Step 3) Check the Legal and Other Requirements Procedure for EMS Conformance

About two or three months after you have documented and implemented your Legal and Other Requirements procedure it's time to check to see if it's actually working according to the plan. Here are some questions to ask yourself and the organization:

Check ✓

1. Is there a list of all applicable legal and other requirements (your record that you have implemented the procedure)?
2. Can employees who need the information access it easily?
3. When is the next review date?
4. Have the requirements been communicated and understood by the employees and contractors that need to know?
5. Can employees whose work is governed by legal and other requirements describe how the law affects what they do in their daily jobs?

For an Evaluation Checklist example see Appendix B.

Step 4) Communicate Your Legal and Other Requirements

Identifying your legal and other requirements is an important first step. But what good is the information if it's not communicated to employees, on-site contractors, and others who need to understand it?

It's important that employees whose work is affected by these laws understand what the requirements mean, and how they affect their job. Communication about your legal and other requirements should be in plain English rather than "legalese."

- ▶ **NO!**—According to the Clean Water Act, section 5.3.3 and our Stormwater Management Plan, it is illegal to dump hazardous waste in anything other than its proper, labeled container.
- ▶ **YES!** —We should not dump our hazardous waste in the floor drain because the drain leads to the local stream where we like to fish.

REMEMBER



Not everyone in every area needs to know all the legal requirements that apply to your organization. Keep in mind that different people may have different informational needs.

Three Lessons Learned

(from wastewater facilities):

1. Include clearly-defined roles and responsibilities in your methods to track requirements.
2. Consider using a third-party to document your baseline of legal requirements.
3. Conduct more frequent reviews of your legal requirements than other EMS elements. The wastewater industry is heavily regulated and changes can occur often.



Three Things to Avoid

(from wastewater facilities):

1. Making your legal and other requirements review a one-time only activity. You must keep up-to-date with with changing requirements.
2. Overlooking the communication of applicable requirements to front-line floor employees.
3. Treating "other" requirements and voluntary initiatives as "minor" agreements.



Legal and Other Requirements

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Identify, track, and communicate your organization's legal and other requirements.

The **Results** of this EMS element are:

- A system procedure (EMS document) that identifies, tracks, and communicates your Legal and Other Requirements.
- A list (EMS record) of applicable environmental laws and other requirements.

Before you Begin this EMS element:

- Identify environmental regulatory information relevant to your organization.
 - Obtain information regarding other environmental requirements relevant to your organization.
- 
- 
- 

ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Legal and Other Requirements</i></p> <p>The organization shall establish and maintain a procedure to identify and have access to legal and other requirements to which the organization subscribes and that are applicable to the environmental aspects of its activities, products or services.</p>	<p>Environmental Policy - Your policy requires commitment to all applicable environmental laws and organizational requirements. Compliance with environmental laws is one of the three major policy commitments.</p> <p>Objectives & Targets - Consider your legal commitments and requirements as you identify possible areas for measurable environmental performance improvements.</p> <p>Training & Awareness - Employees whose work is governed by regulations need to understand the laws that affect their daily work and the operational controls that are needed to maintain compliance.</p> <p>Communication - Talk to employees about how environmental laws and other requirements affect their work, and how their roles and responsibilities ensure compliance.</p> <p>Operational Control - Procedures, work instructions, manuals, etc. need to be documented or established for environmental priority areas and regulated areas.</p>	<p>Legal and Other Requirements Procedure</p> <p>List of Legal and Other Requirements</p>	<p>Compliance Plans</p> <p>Relevant Code of Federal Regulations (CFRs), State and Local Regulations, Permits, etc.</p>

Section 3: Environmental Aspects and Impacts

(Defining the Impact Your Organization Has on the Environment)

Identifying how your organization's operations and services affect the environment is a critical element of your EMS. It is here that you will begin the first step of defining your organization's environmental "footprint" (i.e., how your operations and services affect the environment), leading to measurable goals for improving your environmental performance through your EMS.

The step-by-step tasks described in the following sections will guide your organization in identifying its environmental footprint. This process is one of the most challenging portions of EMS implementation and requires focus and teamwork. However, this is the opportunity for your organization to stop, take a hard look at your individual operations and activities, and identify how these positively and negatively affect the environment.

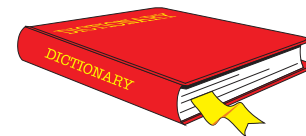
You are about to embark on a process of organizational "discovery" that will help everyone involved better understand your operations and the unique role that each of you, individually and collectively, play in managing your wastewater facility's environmental impacts. The result of this effort will be a list of environmental aspects and impacts, and the processes/activities that potentially create them. From this list, your team will develop a means to prioritize those that are most significant and those that require your organization's most immediate attention. This may seem daunting, but if you follow the step-by-step approach it will be manageable and you will quickly realize the benefits of this effort.

Step-by-Step Guide to Identify and Prioritize Environmental Aspects

- Step 1) Clarify EMS Jargon with Your Team
- Step 2) Determine Your Core Operations and Supporting Activities—Your EMS "Fenceline"
- Step 3) Construct Input/Process/Output Diagrams
- Step 4) Develop a List or Matrix of Environmental Aspects and Impacts
- Step 5) Prioritize Your Environmental Aspects and Impacts
 - a. What Criteria will you Use to Prioritize?
 - b. How Will the Criteria be Used?
- Step 6) Develop a System Procedure for Identifying Your Environmental Aspects/Impacts
- Step 7) Check Your Environmental Aspect Identification Procedure for EMS Conformance
- Step 8) Review and Revise Your Environmental Aspects/Impacts



Key Section Terms



EMS Core Team – A cross-functional team made up of individuals within the organization that helps facilitate EMS implementation across the organization. Team members are the EMS experts and cheerleaders.

Environment – Surroundings in which an organization or facility operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

Environmental Aspect – Element of an organization's activities, products or services that can interact with the environment. Aspects = Causes

Environmental Impact – Any change to the environment, whether adverse or beneficial, that results from an organization's activities, products or services. Impacts = Effects

EMS Fenceline – Project scope and/or operational areas in an organization in which the EMS is implemented. For example, for wastewater operations, this could include the pretreatment and the laboratory operations.

"Footprint" – The environmental impact of your facility; how your operations and services interact with the air, water, land, resources, local and regional community, etc.

Stakeholders – Groups and organizations having an interest or stake in an organization's EMS (e.g., regulators, shareholders, customers, suppliers, special interest groups, residents, etc.).

Test your Knowledge!

It's a good idea to be sure you have a clear understanding of the difference between activities, aspects, and impacts. Here's a short quiz to use with your EMS Core Team (the answers are below). Indicate which of the following terms is an activity, aspect, impact, or none?

Aspect, Impact, Activity, or None

- 1) Air pollution/degradation
- 2) Burning diesel fuel
- 3) Digester
- 4) (Electrical) energy consumption
- 5) Water consumption
- 6) Degradation of a stream/creek
- 7) Burning bio-diesel fuel
- 8) Spilled Solvent
- 9) Recycling Program
- 10) Cleaning Spills

Answers:

(1) Impact (2) Aspect – driving the truck is the activity (3) None (4) Aspect (5) Aspect (6) Impact (7) Aspect (8) Aspect – spill is an aspect; worker contamination and degradation to water/soil an impact (9) Activity (10) Activity

Before we jump directly into the next steps, the aspect/impact analysis presents a terrific opportunity for you to involve not only the Core Team, but also your front-line employees. In fact, their participation is often referred to as a fundamental key to successful EMS implementation. These are the employees who have hands-on knowledge and experience of all of the activities you are preparing to evaluate and who are the closest to the actual operations. Their involvement will also help instill an understanding and appreciation for the interaction between the environment and their daily work activities. Involve them early, because it will reap wonderful rewards throughout implementation. Talk about getting buy-in for your EMS!

Step 1) Clarify EMS Jargon with Your Team

One of the first hurdles that you will likely encounter is having your Team(s) achieve a comfort level with the EMS "jargon" involved in this phase of activities. Therefore, take a look at two terms that you or your employees may not have seen before—aspect and impact. Environmental aspects are the parts of your operations and activities that interact with the environment. Environmental impacts are the changes to the environment, positive or negative, resulting from your organization's operations and activities. Still a little unclear?

Well, try thinking about it this way: the aspects are the causes and the impacts are the effects.

Aspects = Causes and Impacts = Effects

For example, the burning of gasoline in your car can cause air emissions which affect the air quality.

Here are some examples from wastewater facilities:

Operation or Service Activity	Environmental Aspects	Potential Environmental Impacts (Effects)
Burning of Fuels	Air Emissions (CO)	Degradation of Air Quality
Transport of Diesel Fuel	Spills and Leaks	Soil and Groundwater Contamination
Maintenance of Fleet Vehicles	Used Oil Recycling	Conservation of Natural Resources
Equipment Maintenance	Solid Waste Generation	Reduction in Landfill Space
Facility Boilers	Electricity Use (Gas & Diesel)	Reduction in Natural Resources
Office/Administrative Activities	Recycled Paper	Conservation of Landfill Space

Why is this distinction so important? In order for your organization to build and grow a culture of continual improvement with regard to the environment, you first need to identify how your organization affects or impacts its surrounding environment. To ultimately manage the identified

impacts, you also need to identify the operations and/or activities that cause the impacts and the ways these occur. The more clearly your team can define this relationship, the better able they will be to understand what needs to be done to control and manage the most important impacts.

Step 2) Determine Your Core Operations and Supporting Activities—Your EMS “Fenceline”

Once your team has a solid understanding of the terms “aspect” and “impact,” work with your EMS Team(s) and management to define exactly what operations and supporting activities will be the initial focus of your EMS efforts. This area or operation is commonly referred to as the EMS “fenceline.” An EMS can be applied to any operation or activity within your wastewater facility, big or small—a department, division, operation or your entire facility. Remember, this is YOUR EMS and only you can decide what makes sense for your organization.

Other wastewater facilities and local organizations that have implemented EMSs advise: Think Big, Start Small! It may be tempting at first to include all of your operations and facilities within your EMS fenceline, but it is usually unrealistic for most organizations to launch and manage such a large-scale project, considering the human and financial resources involved. Consider starting with a small section of your organization, and then add more departments and facilities as your EMS experience and expertise grows. This way you develop a solid understanding of the EMS process and a group of internal experts that can act as mentors as your EMS grows.

Example Fencelines from Wastewater and Public Organizations that have Implemented EMSs:

Louisville and Jefferson County, KY Metropolitan Sewer District	Wastewater Treatment Facility and Purchasing Department
Oakland County, MI Drain Commissioner’s Office	Wastewater Treatment Plant—Engineering and Construction
Rivanna, VA Water and Sewer Authority Complex	Wastewater Treatment Plant
Kent County, DE Department of Public Works	Wastewater Treatment Facility and Biosolids Operation
City of Eugene, Oregon	Wastewater Division
Charleston, South Carolina	Entire Wastewater Operation
San Diego, California	Wastewater O&M Division

Three Lessons Learned

(from wastewater facilities):

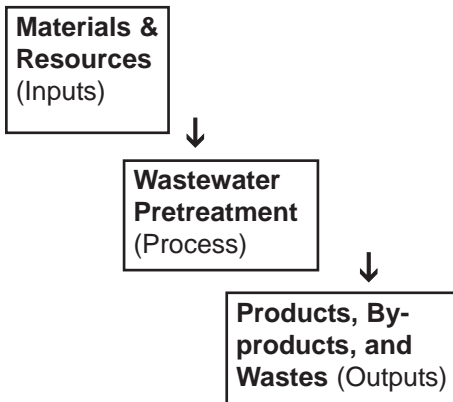
1. Ensure the activities you list for your aspects/impacts have potential or direct impacts on the environment. Do not list activities that have little or no impact on the environment (i.e., you do not have to list every single thing at your facility).
2. Make your aspect ranking method simple and easy to understand.
3. Keep your aspect analysis procedure flexible—remember, this process is not set in stone—if you do not feel your aspect analysis is working, change it! Remember, an EMS is about continual improvement.

Questions to Consider:

- ▶ What resources do you have at your disposal for EMS activities?
- ▶ Where will you get the most bang for your buck? What areas give you the most heartburn at the moment or are of greatest concern to your community?
- ▶ Where do you use the most natural resources? Energy? Hazardous materials?
- ▶ What areas have the most support and/or interest? Have receptive management? Line supervisors? Employees?

Inputs/Process/Outputs Overview

One way to visualize the environmental "footprint" of your operations and activities is to construct input/process/output diagrams. These diagrams will help you identify what materials and resources you use (inputs), where they are used (the process), and how they are turned into a product or service (output), re-used as by-products (output), or become wastes (output). A simple input/process/output diagram is provided below. As you will see in this section, these diagrams are helpful in identifying your environmental aspects.

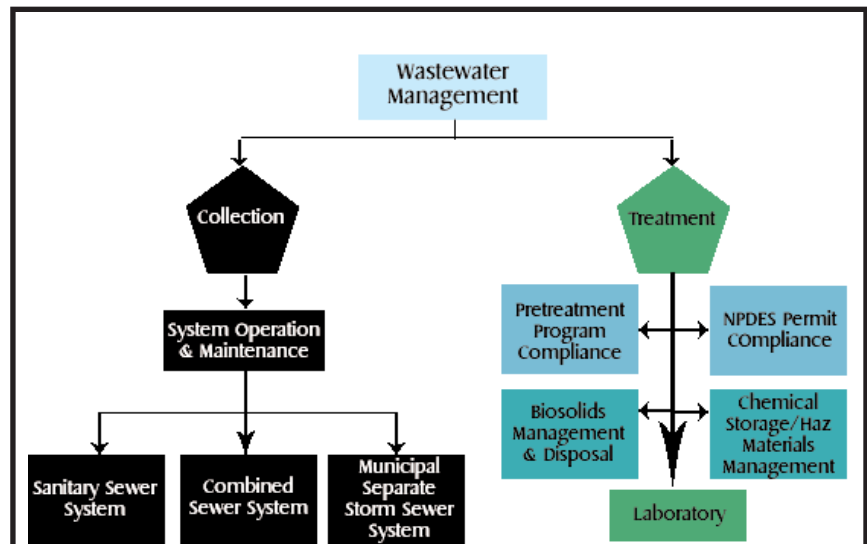


Step 3) Construct Input/Output Diagrams

Once you have defined which operations and activities fall within your EMS implementation scope, take a closer look inside your fence line. To understand your environmental aspects and impacts, it helps to understand the inputs/processes/outputs that are part of the operations and activities within your fence line. At this point you may be thinking, "okay I can do that, let's sit down and drum up a list. We pretty much know our impacts on the environment." Although your team could probably brainstorm a pretty good list, the EMS process helps you focus your efforts to ensure that you cover all bases and that nothing slips through the cracks.

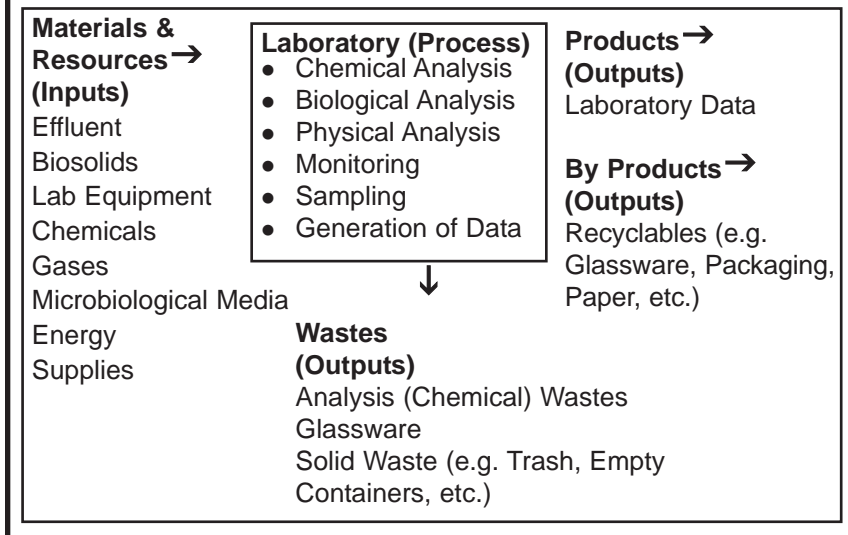
One common approach for conducting this assessment is to first create a flowchart of your EMS fence line with associated processes and operations.

A typical wastewater facility-level diagram is presented below as an example of the common format:



For example purposes, let's say that your organization selected "Treatment" as its EMS fence line. Based upon the above example you would then dig a little deeper to look at the individual operations/activities within this fence line. To accomplish this, organizations commonly utilize input/process/output diagrams (see sidebar) to help understand and visualize processes as well as how materials are used, re-used and disposed within each individual operation or activity. You are probably wondering why "Laboratory" is highlighted a little differently than the other operations/activities in the diagram above. The next few pages will walk through the basics of determining environmental impact for a laboratory operation.

The next step is to construct the input/process/output diagrams for each of the operations/activities within your fenceline and laboratory as selected in the sample diagram.



This process for developing input/process/output diagrams should now be continued for each of the other operations/activities within your defined fenceline. For example, if your EMS Team were working from the example flowchart presented above, you would proceed to develop diagrams for Chemical Storage/Haz Materials Management, Biosolids Management and Disposal, Pretreatment Program Compliance, and NPDES Permit Compliance. Remember, this is only an example. Your defined fenceline might entail very different operations/activities both in number and type.

By focusing on the creation of input/process/output diagrams first in the determination of our impacts and aspects, we were able to see the environmental consequences of our organization.

San Diego, California
 Refuse Disposal Division

REMEMBER



Keep in mind as you brainstorm and generate your aspect/impact list that you are not expected to manage environmental issues outside your influence or control. For example, while your organization probably has control over how much electricity it buys from a supplier, it likely does not control or influence the way in which that electricity is generated. Therefore, your focus as you develop your list should be on the environmental aspects of your own operations and services within the fenceline that you define.

COACH'S CORNER



Your EMS Site Team(s) are terrific at producing input/process/output diagrams in the areas in which they work. Along with the Site Team member(s), have a Core Team member and a person from your environmental staff when you develop your diagrams. This is a great opportunity for operational and environmental staff to discuss your facility and processes, perhaps for the first time.

COACH'S CORNER



When you identify your aspects and their impacts, you want to identify:

- 1) Regulated Aspects (e.g., Air Emissions, Water Discharges, etc.)
- 2) Non-Regulated Aspects (e.g., Electrical/Energy Use, Land Use, etc.)
- 3) Emergency Situations/ Conditions (e.g., Spills, Leaks, etc.)
- 4) Positive Impacts on the Environment (e.g., Recycling Paper, Re-Use of Water, Using Biogas as an Energy Source, etc.)

Don't beat your aspect analysis to death—do the evaluation the best you can and move on. It is very easy to get bogged down in this element and not make any progress. Don't be afraid to say, 'good enough for now, let's move on.'

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

Step 4) Develop a List or Matrix of Environmental Aspects and Impacts

Once you have identified your core fence-line operations and activities and created diagrams to “visualize” your processes, it’s time to create your list of environmental aspects and impacts. Get together with the employees from the areas where you have input/process/output diagrams to brainstorm and work together on your wastewater environmental aspect/impact list. Start with each process. For instance, look at the example diagram and text on the previous page and take a closer look at chemical analysis, then biological analysis, followed by physical analysis and so on.

The most common approach to developing this list of environmental aspects and impacts is to develop a matrix for each of your input/process/output areas to collect relevant information in an organized and manageable manner.

Referring back to the laboratory example, the first step is to add the various processes involved in laboratory operations/activities. The following is an example for the laboratory:

Operation/Activity
Chemical (Nutrient) Analysis
Biological Analysis
Physical Analysis
Sampling, Analysis & Monitoring
Laboratory/Biosolids Testing
Laboratory/Recycling Program

Next, add the various aspects related to each individual process. Remember, aspects are how these processes interact with the environment and are the causes of potential environmental impacts. Adding some aspects, the example matrix would now look like this:

Operation/Activity	Aspects
Chemical (Nutrient) Analysis	Hazardous Waste Disposal
Biological Analysis	Spills, Solid Wastes, Hazardous Waste
Physical Analysis	Solid Wastes
Sampling, Analysis & Monitoring	Energy Use
Laboratory/Biosolids Testing	Energy Use, Solid Wastes, Hazardous Waste
Laboratory/Recycling Program	Glassware Recycling (+)

Okay, at this point you have brainstormed with your team and with the help of your visual diagrams. You've identified the various processes involved and their associated aspects. Now, let's add the potential impacts to the environment of each process. Doing so would look like:

Operation/Activity	Aspects	Impacts
Chemical (Nutrient) Analysis	Hazardous Waste Disposal	Potential Land and Water Degradation, Landfill Use
Biological Analysis	Spills, Solid Wastes, Hazardous Waste	Depletion of Natural Resources, Landfill Use, Hazardous Waste Disposal
Physical Analysis	Solid Wastes	Landfill Use
Sampling, Analysis & Monitoring	Energy Use	Depletion of a Natural Resource
Laboratory/Biosolids Testing	Energy Use, Solid Wastes, Hazardous Waste	Depletion of Natural Resource, Landfill Use, Hazardous Waste Disposal
Laboratory/Recycling Program	Glassware Recycling (+) - see sidebar on positive aspects	Conserving Landfill Space (+) - see sidebar on positive aspects

Sample lists of aspects and impacts from wastewater facilities are provided in Appendix A.

NOTE



As a public organization, you may want to consider involving external stakeholders (neighbors, local community groups, etc.) in identifying potential environmental aspects and impacts that affect the local community. For example, you may want to consider effluent, odor, and light pollution issues.

Step 5) Prioritize Your Environmental Aspects and Impacts

Whew! At this point you probably have a large list or a number of individual operation/activity lists of environmental aspects and impacts. Don't worry! An EMS is structured so that you do not have to manage all of these aspects and impacts at once. The next step of the process is to whittle the list down, through a prioritization technique, to a manageable group of the most "significant" to your organization. So, how do you narrow your list to focus on what is most significant? First you need to develop a means to rank and differentiate, or "prioritize," the different aspects that you have identified, to determine which of them are most significant.

REMEMBER



Don't forget to include your positive aspects! Take a look at your pollution prevention plans, reuse and recycling initiatives, etc. Build momentum from how you are minimizing and preventing pollution already. For example, for disposal of glassware (the activity) used in your laboratory operations, your (positive) aspect would be recycling the glassware and the (positive) impact would be conserving landfill space.

COACH'S CORNER



Involving personnel from the frontline in identifying your inputs/processes/outputs and your aspects/impacts list is a good way to ensure buy-in to your EMS. Besides, employees who are involved day-to-day with the front-line operations are typically the best in identifying the environmental issues associated with activities (working with the environmental department).

“Don’t get too far down in the weeds”

Many wastewater facilities have reported getting caught up in too much detail and generating very large lists of environmental aspects and impacts. Remember that this is an iterative process—a process that stresses the importance of **continuous improvement**. If you do not catch every aspect/impact during your first review, it’s okay. You will most likely catch it during the next cycle as your EMS is refined and matures.

NOTE



When you prioritize the environmental impacts at your facility, consider what is regulated as one of your key scoring criteria.

Significant criteria to consider when prioritizing your environmental aspects:

- ⇒ Impact to Natural Resources
- ⇒ Impacts to Land, Water and Air
- ⇒ Cost
- ⇒ Probability of Occurrence
- ⇒ Volume
- ⇒ Toxicity
- ⇒ Regulated
- ⇒ Public (Stakeholder) Impact
- ⇒ Nuisance
- ⇒ Human Health Impacts

The basic process that you will use is to (1) define a group of selection criteria (e.g., air, water, land), (2) develop a scoring system, and (3) apply this criteria to each of the listed environmental aspects to achieve a total rank or number. For example, looking at the laboratory, the scores come out as follows:

Operation/Activity	Aspects	Impacts	Changes to Air	Changes to Land	Changes to Water
Chemical (Nutrient) Analysis	Hazardous Waste Disposal	Hazardous Waste Disposal	3	5	5
Biological Analysis	Spills, Solid Wastes, Hazardous Waste	Depletion of Natural Resources, Use of Landfill Space, Hazardous Waste Disposal	1	1	3
Physical Analysis	Solid Wastes	Use of Landfill Space	1	5	3
Sampling, Analysis & Monitoring	Energy Use	Depletion of a Natural Resource	1	1	1
Laboratory/ Biosolids Testing	Energy Use, Solid Wastes, Hazardous Waste	Depletion of Natural Resource, Use of Landfill Space, Hazardous Waste Disposal	1	3	1
Laboratory/ Recycling Program	Glassware Recycling (+)	Conserving Landfill Space (+)	1	3+	1

Step 5a) What Criteria will you Use to Prioritize?

As with every other part of the EMS, the Keep It Simple, Simple [KISS] rule applies here. Experience has shown that a simple system for prioritizing environmental aspects and impacts has generated the same results as a more complex one, but in a shorter period of time and with happier EMS team members. There is not a magic number here in terms of how many criteria you will utilize; it really depends on what factors are important within your organization and what allows your organization to simply and effectively rank your identified aspects. The criteria you use to determine significance will act as a filter to identify those environmental aspects that your organization will need to manage. Here’s some simple advice: Don’t have too many criteria. A very complicated grading system will confuse and discourage those involved and make this process much more difficult than necessary. Remember the KISS rule!

Step 5b) How Will the Criteria be Used?

Once you have selected your criteria for ranking your aspects and impacts, apply the criteria to each of the entries on your aspects & impacts list using a quantitative ranking method. A simple 1 – low; 3 – medium; and 5 – high impact rating system works well and avoids long discussions about the difference between a 2 and 3 or a 3 and 4.

However, if your team can't seem to decide if something should be a 3 or a 5, call it a 4 and move on! **Don't let the pursuit of the perfect become the enemy of the good!**

Refer back to the laboratory example, suppose that our teams selects the following three criteria for prioritizing aspects: Impact to Air, Land, and Water.

REMEMBER

The number of and criteria you use for your wastewater facility are up to you!



Involving Contractors and Temporary Staff

It is important to involve contractors and temporary employees in this phase of your EMS, particularly if they work in areas that can create a significant impact on the environment. The wastewater facilities that have EMSs in place that contributed to this Handbook involve them in the aspects/impacts analysis, as well as in the setting of objectives and targets if they work in areas that could have an environmental impact.



Three Things to Avoid


(from wastewater facilities):

1. Breaking aspects into too much detail. For example, hazardous waste use and disposal in the lab does not need to be broken down into each chemical's hazardous waste use and disposal as an aspect.
2. Making your significance threshold too low and thereby taking on too many significant aspects. Remember that for every significant aspect you name, you must have an operational control (i.e., procedures, manuals, work instructions, etc.) in place.
3. Getting bogged down when discussing applicable scores for an environmental aspect. Come to a consensus and move on.

Adding the criteria into our example table and applying our simplified scoring system, your team would end up with something like this:

Operation/Activity	Aspects	Impacts	Air Impact	Land Impact	Water Impact	Total Score
Chemical (Nutrient) Analysis	Hazardous Waste Disposal	Hazardous Waste Disposal	3	5	5	13
Physical Analysis	Solid Wastes	Use of Landfill Space	1	5	3	9
Biological Analysis	Spills, Solid Wastes, Hazardous Waste	Depletion of Natural Resources, Use of Landfill Space, Hazardous Waste Disposal	1	1	3	5
Laboratory/ Biosolids Testing	Energy Use, Solid Wastes, Hazardous Waste	Depletion of Natural Resource, Use of Landfill Space, Hazardous Waste Disposal	1	3	1	5
Laboratory/ Recycling Program	Glassware Recycling (+)	Conserving Landfill Space (+)	1	3+	1	5
Sampling, Analysis & Monitoring	Energy Use	Depletion of a Natural Resource	1	1	1	3

NOTE



Every environmental aspect you determine to be significant will require you to verify current controls (procedures, work instructions, etc.) or to implement new controls to show that you are managing your significant environmental issues *(for more information, see the Operational Control section later in this Handbook).*

REMEMBER



Your wastewater facility has the flexibility to determine the criteria and the method for determining significance. This is a subjective exercise that is not standard for every organization. Consider the approach that fits your organization and remember to consider technical, business and stakeholder issues.

Three Keys to Success

(from wastewater facilities):



1. Educate, Educate, Educate—the EMS Core Team and all employees on their roles and responsibilities in the environmental aspect/impact analysis.

2. Define your significant ranking criteria for all employees who participate in your ranking process so that they know what the terms mean as they score aspects.

3. Create cross-functional teams for your review. Include frontline employees from the applicable areas and the environmental department on the team(s) that conduct the aspects analysis.

To reinforce what we just learned, let's look at another wastewater example, this time looking at the environmental aspects/impacts from the collection and distribution of wastewater via a sanitary sewer system.

The activities, aspects, and impacts of operating and maintaining a wastewater sanitary sewer system could include:

Operation/Activity	Aspect	Impact
Repairing/Maintaining Manholes	Use of Oils and Lubricants	<ul style="list-style-type: none"> • Depletion of a Natural Resource • Contamination of Water/Land
Repair Leaking Sewer Lines	Energy Use	<ul style="list-style-type: none"> • Depletion of a Natural Resource • Employee H&S
Operate & Maintain Pump Stations	Sewer System Overflows (SSOs) – i.e., spills	<ul style="list-style-type: none"> • Degradation of Water/Land (Streams, Creeks, Soil, etc.) • Impact to Public Health

Brainstorming with the sanitary sewer and environmental staff, the EMS Core Team scores the sewer system overflow/sewage backup aspect for significance. Note that the criteria that scored the highest (land and water impact and health & safety), match the impact areas that came from your aspect/impact list.

Operation/Activity	Aspect	Impact	Land Impact	Air Impact	Water Impact	Health & Safety	Total Score
Operate & Maintain Pump Stations	Sewer System Overflows (SSOs)	<ul style="list-style-type: none"> • Degradation of Water/Land (Streams, Creeks, Soil, etc.) • Impact to Public Health 	5	1	5	5	16

So, you came up with a total score of 16 for this aspect. But what does this score mean? Once you've determined all your aspects and their associated impact scores for the operations/activities within your defined fenceline, you will need to establish a threshold for significance based on what your organization can reasonably manage (for instance anything over 15 could be considered significant in this last example).

Keep in mind that each organization has the flexibility, based on its business, technical, legal, operational, and interested party concerns and requirements, to set what it considers to be a significant threshold value. As mentioned previously, make sure that everyone realizes that each aspect that is identified as significant (i.e., a total score over your determined threshold) will require some kind of operational or

equipment control measure, training, recordkeeping and other relevant EMS required management practices to minimize or prevent the environmental impacts. Remember, this is a continuous process, so you don't need to save the world the first time around!

Now, compare how other aspects within the sanitary sewer operation and other wastewater operations scored against sewer system overflows. Conduct a reality check with the employees in sewer operations and maintenance and the environmental department to see if your environmental significance ranking makes sense. Did the aspects of your operations/activities that surfaced to the top make sense? If not, discuss this among your group and ensure that it wasn't a scoring error. Ensure that everyone understands how and why the aspects identified as significant became so and that they are committed to focusing on these areas in subsequent EMS tasks.

Step 6) Develop a System Procedure for Identifying Your Environmental Aspects/Impacts

When you're satisfied that your process for identifying and ranking your environmental aspects/impacts conforms to the EMS requirements, it's time to document the process in a written system procedure. Your system procedure clearly defines what you'll do, roles and responsibilities, when they'll do it, methods for communicating, and where the information will be stored. This documented procedure will be a consistent, easily accessible, and clear guide for ensuring that this important element of your EMS is carried out according to your plans.

For sample procedures on identifying environmental aspects from wastewater facilities, see Appendix A.

Step 7) Check Your Environmental Aspect Identification Procedure for EMS Conformance

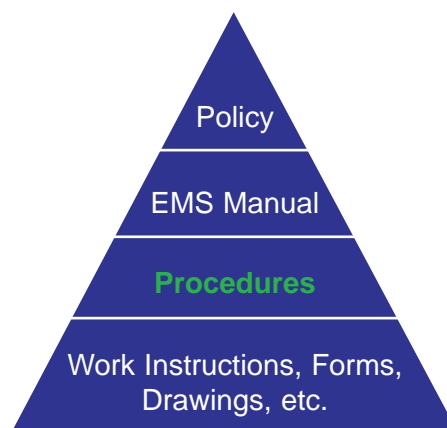
Once you have your Environmental Aspect Identification Procedure in place, review it for EMS conformance.

Check ✓

- 1) Have you conducted a sound methodology?
- 2) Have you included all core fenceline operations and activities?
- 3) Have you developed a list of significant environmental aspects and impacts?
- 4) Is the aspect/impact list reviewed at least annually?
- 5) Does your procedure account for changes to operations and activities?

“Once your original aspect/impact list is developed and you have controls in place, you need to come up with a process to deal with change and a way to capture any new activities and aspects and score them for significance.”

Donna Adams
Eugene, Oregon
Wastewater Division



An Environmental Aspect **system procedure** is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

Select volunteers to take part in the aspects analysis that have in-depth knowledge of the activities you are evaluating. Their knowledge is your system.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

Establish a simple aspect ranking system. A complicated ranking system will confuse and discourage those involved in prioritizing your environmental aspects.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

The input/process/output diagramming exercise was a great team building exercise between the Environmental Department and the frontline employees.

Laura Fiffick
Houston, Texas
Port of Houston Authority

Step 8) Review and Revise Your Environmental Aspects/Impacts

Once you have your aspect list in place and you have determined your significant environmental issues at your wastewater facility, keep the information up-to-date. Using the written procedure you have developed, review your aspect list at least once a year and complete an aspect/impact review when you have any new or changed operations or services coming on-line.



Environmental Aspects and Impacts

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Identify and rank the environmental aspects and impacts of your wastewater facility.

The **Results** of this EMS element are:

- A list/table (EMS record) of the activities, environmental aspects and environmental impacts of your wastewater facility.
- Significance criteria (EMS record) for ranking your priority environmental impacts.
- A system procedure (EMS document) for environmental aspect and impact identification and significance determination.

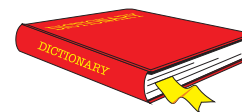
Before you Begin this EMS element:

- Draft your environmental policy.
 - Complete your wastewater legal and other requirements procedure and requirements list.
- 
- 
- 

ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Environmental Aspects</i></p> <p>The organization shall establish and maintain a procedure(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, to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects related to these significant impacts are considered in setting its environmental objectives. The organization shall keep this information up-to-date.</p>	<p>Objectives & Targets - In setting your environmental goals, remember to consider the significant aspects of your operations and services.</p> <p>Training & Awareness - Employees working in significant aspect operation and service areas need to understand their responsibilities in these priority areas.</p> <p>Communications - Communicate your significant aspects throughout your fenceline. Also, make a decision on whether you will communicate your significant aspects to the public.</p> <p>Operational Control - Control and manage (through procedures, work instructions, manuals, etc.) all your significant aspects.</p>	<p>Aspect and Impact Analysis Procedure</p> <p>A List of Significant Criteria</p> <p>A List of Significant Environmental Aspects</p>	<p>Activity/Aspect/Impact List</p> <p>Input/Output Diagrams</p>

Section 3: Objectives & Targets and Environmental Management Programs: (Establishing Goals and Roadmaps for Achieving and Improving Environmental Management)

Key Section Terms



Now that you've identified and ranked your most important environmental aspects and impacts, it's time to set some goals for improving your organization's environmental management. Setting objectives and targets presents an opportunity to identify where you want to be in the next year or two regarding your significant aspects. Let's determine which of your significant aspects will have specific and measurable objectives and targets for improving your performance.

Remember, all significant aspects must be managed in accordance with the ISO 14001 requirements; however, your organization can select aspects to set objectives and targets. In doing so, consider your organizational goals, environmental policy, and your organizational abilities. If you are in a position to be enthusiastic and push performance, then do so and select challenging objectives and targets. On the other hand, there is no shame in taking a more conservative approach and choosing more practical objectives and targets. Just remember that the EMS is about continual performance improvement!

As mentioned earlier in this document, your EMS can also be strengthened by using other important utility management tools and programs. For example, a number of utilities, including some that contributed to this Handbook, are using the Balanced Scorecard approach to set performance measures for their organization. The Balanced Scorecard gives organizations a well-organized method of developing measures that deal with both environmental performance and customer needs. When setting your objectives and targets, you may wish to use the Balanced Scorecard approach to ensure they are responsive to a full range of needs.

Let's review a few basic terms:

Environmental Objective: The internal goal your facility establishes to improve its environmental performance. Example: Reduce air emissions generated from the burning of diesel fuels.

Environmental Target: A measurable performance requirement that arises from your objective. Example: Reduce sulfur dioxide, particulate matter, and carbon dioxide emissions from the burning of diesel fuels by 50% from 2002 levels.

Performance Indicator: A measurement tool that can be used to evaluate and measure environmental performance in relation to a specific target. Examples include: measuring the emissions of sulfur dioxide, particulate matter, and carbon dioxide per year from established baselines in order to check the progress in meeting your target of 50% reduction from current levels. Performance indicators can be adjusted to meet specific management needs or as necessary to ensure progress toward reaching specific environmental targets.

Baseline – The starting point from which to track the achievement of an objective. Establish “normalized” baselines to accurately measure how your facility's environmental performance could change over time. Normalized baselines will measure your actual environmental performance changes rather than changes in production, customer demand, or other non-environmental related factors.

Environmental Aspect – Elements of an organization's activities, products or services that can interact with the environment. Aspects = Causes

Environmental Impact – Any change to the environment, whether adverse or beneficial, that results from an organization's activities, products or services. Impacts = Effects

Environmental Management Program (EMP) – A structured program with a set of specific identifiable actions (an “action plan”) providing the direction for EMS objectives and targets to be obtained and tracked. Your EMP should assign tasks, resources, responsibilities, and timeframes for achieving your objectives and targets.

Environmental Objective – An overall environmental goal based on an established environmental policy, that an organization sets itself to achieve. Wherever possible, environmental objectives should be quantified, to facilitate the evaluation of environmental performance and the measurement of progress towards specific environmental targets.

Key Section Terms, continued

Environmental Target – A detailed performance requirement, quantified where practicable, that arises from the environmental objectives and that needs to be set and met for the objective to be achieved.

Stakeholders – Groups and organizations having an interest or stake in an organization's EMS (e.g., regulators, shareholders, customers, suppliers, special interest groups, residents, etc.).

COACH'S CORNER



Setting objectives and targets will help your organization translate environmental goals into measurable results. These goals can be factored into your organization's strategic plans and can facilitate the integration of environmental management into your quality, health and safety, and other management programs.

How many objectives and targets should your organization have? Wastewater facilities that have implemented EMSs recommend that it is best to start with a limited number of objectives (2 to 3) and then expand the number over time. Keep your objectives simple initially, achieve some early successes, and then build on them. As you gain experience in managing your objectives and targets, additional and potentially more robust objectives and targets can be set and added.

NOTE



Your organization has the flexibility to determine what environmental goals are appropriate based on your needs. Objectives and targets can be set organization-wide or within an operation (e.g., 20% energy reduction for your entire wastewater treatment operation versus 20% energy reduction for the biosolids operation).

NOTE

Although there are a lot of examples from wastewater facilities that have implemented EMSs, there are no "standard" environmental objectives and targets that make sense for all organizations. Your objectives and targets should reflect what your organization does, how well it is currently performing, and what it wants to achieve.



Step-by-Step Guide to Setting Objectives & Targets and Establishing EMPs

- Step 1) Determine the Significant Aspects for which You'll Set Objectives & Targets
- Step 2) Identify Your Objectives and Establish Target(s)
- Step 3) Define the Performance Indicator(s) You'll Use to Measure Your Targets
- Step 4) Establish Your Environmental Management Programs (EMPs) to meet the Objectives and Targets
 - a. List the Individual Tasks Required to Meet Your Target
 - b. Assign Responsibility
 - c. Establish Deadlines for Individual Tasks
 - d. Estimate Staff Time and Costs
- Step 5) Get Top Management's Commitment and Approval
- Step 6) Develop a Procedure for Setting Objectives & Targets and Establishing EMPs
- Step 7) Check Your Objectives & Targets and EMPs for EMS Conformance
- Step 8) Communicate Your Objectives & Targets and EMPs
- Step 9) Review and Revise Your Objectives & Targets and EMPs



Step 1) Determine the Significant Aspects for which You'll Set Objectives and Targets

Previously it was mentioned that you do not have to set objectives and targets for every significant aspect, so how does your organization decide which to select? Look back at your list of ranked significant aspects and determine which aspects you want to establish performance improvement goals based on your: 1) legal and other requirements; 2) the views of interested parties (e.g., internal and external stakeholders); 3) technical options; and 4) financial, operational, and other organizational realities.

COACH'S CORNER



Be flexible in setting your objectives and targets. Define a desired result, then let your employees in the areas where the objectives and targets will be set determine how to achieve the result. Employees within these areas will be in the best position to establish, plan, and achieve your goals, as well as recommend what is realistically feasible. And remember, involving employees at all levels helps to build commitment to the EMS.

As you set your objectives and targets, don't forget to account for existing programs that are working well. For example, if you currently have an environmental preferred purchasing program or a material substitution effort that is producing results, think about other non-hazardous chemical substitutions based on your significance analysis. What programs have worked well in the past and what could or would have made them better?

Step 2) Identify Your Objectives and Establish Target(s)

Remember the sanitary sewer overflow (SSO) example that we analyzed for significant environmental impact?

Operation/Activity	Aspect	Impact
Repairing/Maintaining Manholes	Use of Oils and Lubricants	- Depletion of a Natural Resource - Contamination of Water/Land
Repair Leaking Sewer Lines	Energy Use	- Depletion of a Natural Resource - Employee H&S
Operate & Maintain Pump Stations	Sewer System Overflows (SSOs) – i.e., spills	- Degradation of Water/Land (Streams, Creeks, Soil, etc.) - Impact to Public Health

Keep your number of objectives and targets small and manageable to start. You can always expand the number of environmental goals you want to accomplish as your EMS matures.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

Three Keys to Success

(from wastewater facilities):



1. Post your organization's objectives and targets around your facility so staff can physically see the status or plan of your goals and objectives.
2. Score "quick wins" with your objectives and targets to bring about success and show management and employees that your EMS is paying off—environmentally and financially.
3. Establish operational controls (work instructions, training, roles & responsibilities, etc.) for all significant aspects, including your objectives and targets and EMPs.

COACH'S CORNER



Selecting the right performance indicators for objectives and targets can help you understand how well your EMS is working.

Make sure you select indicators that actually allow you to measure what you are trying to improve.

Examples of EMS performance indicators could include:

- ▶ Number of odor complaints/week
- ▶ Pounds of chlorine used/gallon of water treated
- ▶ Energy used per unit of production
- ▶ Percentage of solid waste recycled/used/year
- ▶ Percentage of employees completing environmental training

REMEMBER



Remember to focus your environmental goals on areas that will have the most impact on your environmental footprint and your wastewater operations. You may want to review your significant impacts and the environmental policy statement that your organization drafted before you finalize your goals.

In this example, that the SSOs, based on their potential impact, scored a 16 when reviewed for significance. Since you set your significance threshold at 15, SSOs became a significant aspect.

Operation/Activity	Aspect	Impact	Land Impact	Air Impact	Water Impact	Health & Safety	Total Score
Operate and Maintain Pump Stations	Sewer System Overflows (SSOs)	-Degradation of Water/Land (Streams, Creeks, Soil, etc.) - Impact to Public and Worker Health	5	1	5	5	16

Now let's look at setting an objective and target to improve our management of SSO events. After reviewing your technical and financial options, legal requirements, and the views of your local community stakeholders, what is a performance-driven, but achievable objective and target? Also remember that the best targets are those that are measurable.

Therefore, consider your current baseline data and/or your organization's ability to collect a good baseline for a particular target. The following objective and target serves as an example for decreasing the potential environmental impact of the sanitary sewer operations and maintenance division, with a focus on decreasing the number or percentage of SSOs.

Significant Aspect	Objective	Target
Sewer System Overflows (SSOs)	Reduce the number of sewer system overflows (i.e., spills)	Reduce SSOs by 40% from FY 2002 & 2003 normalized baseline levels

Sometimes behavior-based targets (e.g., learning a systems-based management approach) are not the biggest gains in performance measures related to your targets, but they are very important in terms of culture change and should be considered.

Donna Adams
Eugene, Oregon
Wastewater Division

Example Objectives and Targets from Wastewater Facilities

Significant Aspect	Objective	Target
Pollution Prevention, Improved Biosolids Quality	Improve the Quality of Biosolids and Limit Their Effect on the Environment	Arrange for Dewatering and Land Application of Water Plant Residuals
Solid Waste Generation (All Operations)	Optimize Existing Recycling Program	Expand Recycling Program to Aluminum, Plastics, Glass, Cardboard and Packing Materials; Manhole Recovery
Engine Generator Operation in Equipment Maintenance	Reduce Air Emissions	Reduce Sulfur Dioxide Emissions (lbs) from the Engine Generators by 85% (Baseline 2002)
Potable Water Used in Mixing of Polymer (Gravity Belt Thickener Operation and Belt Filter Press Operation)	Reduce Potable Water Use	Reduce potable water use (gallons) by 10% (Baseline 2002)
Water Effluent	Improve Water Quality in Watershed	1) Reduce Sediment in ABC Creek Stormwater by 10% by December 2005 2) Participate in and Contribute to ABC Creek TMDL Implementation Team

Step 3) Define the Performance Indicator(s) You'll Use to Measure Your Targets

Performance indicators are what you will need to measure your performance in meeting your established targets. In the case of environmental regulations they may already be spelled out. However, when it comes to your objectives and targets you will need to identify appropriate "performance" indicators to track and assess progress towards meeting your established goals.

Now that you've established a sample environmental objective and target, set a parameter to measure the performance of a target, such as reduction of SSOs events by 40% from 2002 levels.

Significant Aspect	Objective	Target	Performance Indicator
Sewer System Overflows (SSOs)	Reduce the number of sanitary sewer system overflows (i.e., spills)	Reduce SSOs by 40% from FY 2002 & 2003 normalized baseline levels	# of SSO events per year

Factors to consider in setting objectives and targets

- ▶ Ability to control
- ▶ Ability to track /measure
- ▶ Cost to track /measure
- ▶ Progress reporting
- ▶ Links to your environmental policy's 3 commitments

NOTE

Your performance indicators should be simple and understandable; measurable; and relevant to what your organization is trying to achieve (i.e., its objectives and targets).

Performance Indicators: A Few Words about Measuring Your Progress

When you establish quantifiable objectives and targets you first need to establish a baseline. This baseline serves as the starting point from which you will measure your progress. For example, if you set an objective to reduce hazardous waste and a target to reduce the waste by 10% by 2005, what does that mean? fifty pounds, 100 pounds, or 1000 pounds? You will first need to determine how much hazardous waste was generated the previous year. Is information available to make this calculation? If not, what level of effort is necessary to define the baseline? You may find that no baseline data exist. If so, do not let this stop you from moving forward. Set a plan to determine your baseline as a first step.

A Word About “Normalized” Baselines

To accurately measure how your facility performance is changing over time, establish “normalized” baselines where appropriate. Normalized baselines will measure your actual environmental performance changes rather than changes in production, customer demand, or other non-environmental related factors.

For example, if you were measuring the amount of salt used on your facility roads, you would want to establish a normalized baseline because the amount of snow and ice you get (and therefore, the salt you will use) will vary from year to year. Average your salt use over two or three years to normalize the salt you use to get an accurate baseline from which to measure.

REMEMBER



When setting up the EMPs for your wastewater facility, consider that you may already have baseline data that measure and track your

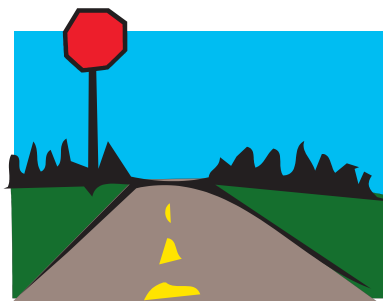
objectives and targets. For example, if your target was to decrease the amount of total dissolved solids in your effluent by 10%, you probably already have baseline effluent data from which to start to track your success in meeting a 10% reduction.

Environmental Management Programs (EMPs)

At this point, you have identified your significant aspects and set objectives and targets for those that you want to improve performance. Now it is time to look at how you will achieve these goals. An important part of your EMS is developing step-by-step action plans that define how your organization intends to reach its objectives and targets. These action plans (roadmaps) are called Environmental Management Programs or EMPs.

Your EMPs are directly linked to your objectives and targets—that is, they describe how your organization will translate its goals into concrete action plans so that environmental objectives and targets are achieved.

Establish your environmental practices as a way of ensuring that your EMS objectives and targets will be met. For example, the QualServ program, supported by the Water Environment Federation (WEF) and American Water Works Association (AWWA), has developed a series of best management practices that you may wish to consult. Remember—build on what’s already out there in your industry!



Step 4) Establish Your EMPs (Actions Plans)

Now that you have set an objective and target for your wastewater facility, how will you achieve it? How will you accomplish your goals? Let’s look at the SSO example again and develop a program (EMP) for achieving the target of reducing SSO events.

Your EMP should (step-by-step):

- a) List the individual tasks (what and how will you do it?)
- b) Assign responsibility for achieving goals (who will do it?)
- c) Establish deadlines (by when?) for individual tasks
- d) Estimate staff time and costs (how much?)

Use the sample Action Plan or EMP on the next page (or a similar method) to manage and track your objective and targets.

NOTE



If you do not have baseline data for a particular objective and target, the first step in your EMP could be to establish the baseline.

Step 4a) List the Individual Tasks Required to Meet Your Target

Area/Operation: Sanitary Sewer Operations and Maintenance

Significant Aspect: Sewer System Overflows (SSOs)

Objective: Reduce the number of SSOs

Target: Reduce SSOs by 40% from FY 2002 & 2003 normalized baseline levels

Start Date: 6/15/04

Completion Date 6/15/06

Tasks
Create Baseline Data (Normalized from CY 02 & 03 SSO events)
Develop a System to Document Causes/Locations/Sources, etc. of SSOs
Implement a Fats, Oils & Greases (FOG) Program
Communicate and Update Staff and Implement Public Outreach Program
Implement and Optimize Preventative (PM) Maintenance Program
Install SCADA and Flow Metering Devices to Improve Pump Station (PS) Inspection and Monitoring System
Communicate and Update Staff
Develop Capacity, Management, Operation, and Maintenance (CMOM) Program
Communicate Changes to Staff
Track SSO events for CY 06 & 07 and Compare Against your Target

Three Lessons Learned

(from wastewater facilities):

1. Track, review, and communicate the status of your objectives and targets, and action plans, on a regular basis (i.e., monthly to ensure they are on track). Report on your objectives in a monthly status report to top management.
2. Ask for volunteer(s) to “own” the objectives and targets. This allocates roles and responsibilities and increases EMS buy-in.
3. Keep in mind as you develop your objectives and targets and EMPs (Action Plans) that operations and divisions may have different priorities. Try and relate to each group when setting your goals. For example, show the cost savings of your objective to management and show the safety benefits to frontline employees.

REMEMBER

“What gets measured, gets managed.”

Peter Drucker
Management Expert

COACH'S CORNER



Involve employees early that will participate and have responsibility in meeting your targets to establish and carry out your programs. Also, clearly communicate the expectations defined in your programs to those with responsibilities. Check in frequently with key EMP staff. How are they progressing? Are there any problems or concerns? Communicating with staff on your objectives and targets and subsequent Action Plans will head off or manage problems that may arise. Make sure any hurdles or issues are communicated early to management so that resources can be re-directed as necessary.

Step 4b) Assign Responsibility

Assign responsibility both for the overall EMP and for the individual tasks. Make sure you communicate and confirm this with managers and staff in responsible areas.

Area/Operation: Sanitary Sewer Operations and Maintenance

Significant Aspect: Sewer System Overflows (SSOs)

Objective: Reduce the number of SSOs

Target: Reduce SSOs by 40% from FY 2002 & 2003 normalized baseline levels

Start Date: 6/15/04

Completion Date 6/15/06

Tasks	Staff
Create Baseline Data (Normalized from CY 02 & 03 SSO events)	McIntyre
Develop a System to Document Causes/Locations/ Sources, etc. of SSOs	Scott
Implement a Fats, Oils & Greases (FOG) Program	Franklin
Communicate and Update Staff and Implement Public Outreach Program	Prescott & Murray
Implement and Optimize Preventative (PM) Maintenance Program	Martin
Install SCADA and Flow Metering Devices to Improve Pump Station (PS) Inspection and Monitoring System	Jones
Communicate and Update Staff	Prescott
Develop Capacity, Management, Operation, and Maintenance (CMOM) Program	Solich
Communicate Changes to Staff	Smith
Track SSO events for CY 06 & 07 and Compare Against your Target	Enders

Step 4c) Establish Deadlines for Individual Tasks

Plan intermediate deadlines for your EMPs. Incorporating deadlines give those responsible a sense that this is important and needs to be accomplished in a timely manner.

Area/Operation: Sanitary Sewer Operations and Maintenance

Significant Aspect: Sewer System Overflows (SSOs)

Objective: Reduce the number of SSOs

Target: Reduce SSOs by 40% from FY 2002 & 2003 normalized baseline levels

Start Date: 6/15/04

Completion Date: 6/15/06

Tasks	Staff	Deadlines
Create Baseline Data (Normalized from CY 02 & 03 SSO events)	McIntyre	07/01/04
Develop a System to Document Causes/Locations/ Sources, etc. of SSOs	Scott	08/30/04
Implement a Fats, Oils & Greases (FOG) Program	Franklin	09/30/04
Communicate and Update Staff and Implement Public Outreach Program	Prescott & Murray	10/15/04
Implement and Optimize Preventative (PM) Maintenance Program	Martin	12/30/04
Install SCADA and Flow Metering Devices to Improve Pump Station (PS) Inspection and Monitoring System	Jones	06/31/05
Communicate and Update Staff	Prescott	08/01/05
Develop Capacity, Management, Operation, and Maintenance (CMOM) Program	Solich	11/30/05
Communicate Changes to Staff	Smith	12/30/05
Track SSO events for CY 06 & 07 and Compare Against your Target	Enders	01/01/06 to 12/31/07

REMEMBER



EMPs allow you to track and assess your progress in accomplishing your objectives and targets and your policy commitments and they also help you quantify the economic and environmental benefits of your EMS.

NOTE



Many wastewater facilities and public organizations have managers initial or sign their objectives and targets and EMPs to confirm their agreement with the goals and plans. Their support in keeping the EMS a priority is an important key to success in maintaining the EMP schedule.

REMEMBER



If you expect to accomplish your objective in one year, you won't want to wait until you're in the last month of that year to assess your progress. Track your progress routinely and make the necessary adjustments in the schedule if there are conflicts with high operational periods.



Three Things to Avoid

(from wastewater facilities):

1. Biting off more than you can chew. Begin with only two or three objectives and targets and make sure they are attainable and feasible for your facility.
2. Not communicating time and resource requirements to divisional and line managers and supervisors so they can alert their employees of their objective and target and EMP responsibilities.
3. Not establishing a normalized baseline from which to measure your targets. Normalized baselines are averaged to measure your actual environmental performance changes rather than changes in production, customer demand, or other non-environmental related factors.

Provide a reality check on your EMPs with line managers, department heads, and supervisors whose operational staff and management are involved.

- ✓ Are the appropriate staff members responsible?
- ✓ Does the timing conflict with other operational priorities?
- ✓ Do the tasks seem logical and sufficient to accomplish the target?

Step 4d) Estimate Staff Time and Costs

Confirm with managers that the resources (financial and human) are consistent with what was described in the approved budget. Are there other direct costs for materials? Equipment? Outside services? This point further reinforces the need to keep management actively involved and ensure that they are in agreement and committed to planned activities.

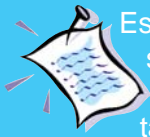
Area/Operation: Sanitary Sewer Operations and Maintenance
Significant Aspect: Sewer System Overflows (SSOs)
Objective: Reduce the number of SSOs
Target: Reduce SSOs by 40% from FY 2002 & 2003 normalized baseline levels
Start Date: 6/15/04
Completion Date: 6/15/06

Tasks	Staff	Deadlines	Time (in Person Hours)	Estimated Costs
Create Baseline Data (Normalized from CY 02 & 03 SSO events)	McIntyre	07/01/04	20	\$\$\$
Develop a System to Document Causes/Locations/Sources, etc. of SSOs	Scott	08/30/04	20	\$\$\$
Implement a Fats, Oils & Greases (FOG) Program	Franklin	09/30/04	40	\$\$\$
Communicate and Update Staff and Implement Public Outreach Program	Prescott & Murray	10/15/04	16	\$\$\$
Implement and Optimize Preventative (PM) Maintenance Program	Martin	12/30/04	80	\$\$\$
Install SCADA and Flow Metering Devices to Improve Pump Station (PS) Inspection and Monitoring System	Jones	06/31/05	120	\$\$\$
Communicate and Update Staff	Prescott	08/01/05	16	\$\$\$
Develop Capacity, Management, Operation, and Maintenance (CMOM) Program	Solich	11/30/05	120	\$\$\$
Communicate Changes to Staff	Smith	12/30/05	16	\$\$\$
Track SSO events for CY 06 & 07 and Compare Against your Target	Enders	01/01/06 to 12/31/07	40	\$\$\$

Total Estimated Cost for this EMP

\$\$\$

NOTE



Estimating your staff time and resources is an optional step. Management will need to understand the resource commitment before approving your objectives and targets, therefore many organizations incorporate this information into their EMP tables.

Step 5) Get Top Management's Commitment and Approval

Get top management buy-in and approval for your objectives and targets and EMPs. Top management needs to ensure that your objectives are integrated with other organizational objectives and are consistent with the overall mission of your facility. Management also needs to know what the efforts of achieving these goals will cost in terms of staff time and capital expenditures, the length of time needed to accomplish this effort, how it will interface with periods of high operational priority, and who will be involved in the tasks.

Step 6) Develop a Procedure for Setting Objectives & Targets and Establishing EMPs

When you're satisfied that your process for setting objectives and targets and establishing EMPs conforms to the EMS requirements, it's time to document the process in a system procedure. Your system procedure clearly defines what you will do, roles and responsibilities, when you will do it, how information will be communicated, and where information will be stored. This documented procedure will be a consistent, easily accessible, and clear guide for ensuring that this important element of your EMS is carried out according to plans.

For a sample procedure on setting Objectives and Targets and example Environmental Management Programs for a wastewater facility, see Appendix A.

Step 7) Check Your Objectives & Targets and EMPs for EMS Conformance

Once you have established your environmental objectives and targets, review the process for EMS conformance.

Check ✓

1. Are there documented objectives and targets applicable to the organization?
2. Are your objectives and targets consistent with your Environmental Policy goals?

COACH'S CORNER

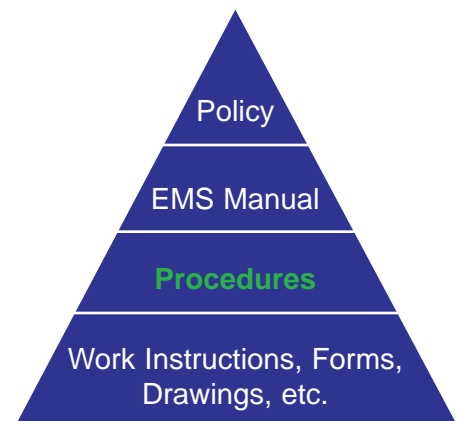


Make sure your objectives and targets are realistic and that metrics for measuring progress and setting success points are in line with the organization's business and technical goals.

NOTE



Invite your budget office to the meeting when you set your objectives and targets. Since they hold your purse strings, their involvement is important in determining the allocation of funds for your new EMPs (Action Plans).



An objective and target and EMP **procedure** is recommended for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

NOTE



To obtain the views of externally interested parties, consider holding an open house or establishing a focus group with people in the community. These activities can have other payoffs as well. For many wastewater organizations, public image and ultimately public acceptance is a high priority issue. Consider embracing the local community and giving them an opportunity to provide input. For example, you might find out that odor is a real concern and should be an operations focus area.

Involving Contractors and Temporary Staff

On-site contractors and temporary staff may work in areas in which there are significant aspects or where objectives and targets have been set. Communicating your objectives and targets and EMPs to contractors and temporary staff is important and can get you needed buy-in on what you are trying to accomplish. Also, keep in mind that your suppliers (of services or materials) can help you in meeting your objectives and targets (e.g., by providing more “environmentally-friendly” products).

3. Did you consider your legal and other requirements; significant environmental aspects; technical options; the views of your internal and external stakeholders; and your financial, operational, and business realities when setting your objectives and targets?
4. Did you set quantifiable performance indicators for your targets?
5. Are environmental performance improvements noted and tracked?
6. Are programs (plans) set to implement your objectives and targets?
7. Do you regularly communicate progress of your objectives and targets to management?

Step 8) Communicate Your Objectives & Targets and EMPs

Communicate your objectives and targets and action plans to employees, suppliers, contractors, and external stakeholders. Open communication will increase buy-in of your environmental goals and what you are trying to accomplish. In addition, communication of your goals and plans will keep the EMS on everyone’s radar and ensure that your organization is on the path to continual improvement (i.e., your goals are seen as important and a priority).

COACH'S CORNER



When communicating objectives and targets to employees, try to link them to their actual job activities and the reduced or positive impacts on the local community of which they live. Keep in mind that individuals respond to information that is meaningful to “their world,” thereby increasing the likelihood they will follow through and act on the goals you are trying to achieve.

Step 9) Review and Revise Your Objectives & Targets and EMPs

Once you have your objectives and targets in place and have determined the steps (in the form of your EMPs), for achieving your goals, remember that a fundamental element of the EMS is to review, assess, and improve (i.e., continual improvement!). Revisit your objectives and targets and EMPs on a regular basis as you conduct internal EMS audits and EMS management review, to ensure that your organization is on the right path, and moving toward meeting its commitments in your environmental policy and goals. This review is especially important if you have any new or modified operations. Consider leveraging your regular EMP tracking efforts as a vehicle, or opportunity, to continually share and discuss progress with top management.



Setting Objectives & Targets and Establishing EMPs

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Identify environmental goals (objectives and targets) that address your wastewater facility's significant environmental impacts.
- To establish and maintain environmental management programs (action plans) for achieving your organization's objectives and targets.

The **Results** of this EMS element are:

- Environmental objectives and targets that are documented and communicated.
- EMPs (action plans) for meeting your environmental objectives and targets.

Before You Begin this EMS element:

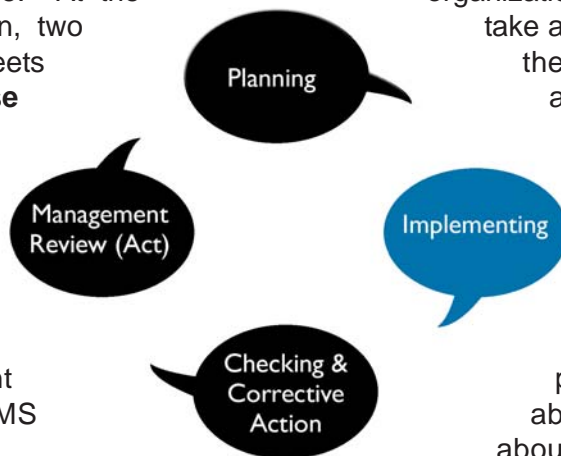
- Complete your significant aspects and impacts analysis.
- 
- 
- 

ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Objectives & Targets</i></p> <p>The organization shall establish and maintain documented environmental objectives and targets, at each relevant function and level within the organization. When establishing and reviewing its objectives, an organization shall consider the legal and other requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties. The objectives and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution.</p>	<p>Environmental Policy – Your environmental objectives and targets will guide the vision of your Policy.</p> <p>Environmental Aspects – When establishing your objectives and targets, look first at your significant environmental aspects.</p> <p>Legal & Other Requirements – Consider what regulations and other requirements you must comply with as you set your objectives and targets.</p> <p>Structure & Responsibility– Top management must commit to and approve your objectives and targets. Any employee can contribute to establishing and setting parameters for your objectives and targets.</p> <p>Environmental Management Programs - EMPs are the action plans that will layout how your objectives and targets will be accomplished.</p> <p>Monitoring & Measurement– Establish baselines and metrics of performance for your objectives and targets.</p> <p>Management Review – The progress of your objectives and targets will be a major agenda item at management review meetings to see how your EMS is functioning.</p>	<p>Documented Objectives and Targets</p>	<p>Pollution Prevention Plans</p> <p>Other Business or Organizational Goals</p>

ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Environmental Management Programs (EMPs)</i></p> <p>The organization shall establish and maintain (a) program(s) for achieving its objectives and targets. It shall include:</p> <p>a) designation of responsibility for achieving objectives and targets at each relevant function and level of the organization; and</p> <p>b) the means and time-frame by which they are to be achieved.</p> <p>If a project relates to new developments and new or modified activities, products or services, program(s) shall be amended where relevant to ensure that environmental management applies to such projects.</p>	<p>Environmental Aspects – When developing your EMPs for your objectives and targets, look first at your significant environmental aspects.</p> <p>Objectives and Targets – Your EMPs manage and track (who, what, by when, how much) your objectives and targets.</p> <p>Monitoring & Measurement – Establish baselines and metrics of performance for your quantitative objectives and targets and subsequent EMPs.</p> <p>Management Review – The progress of your objectives and targets and subsequent EMPs will be a major agenda item at management review meetings to see how your EMS is functioning.</p>	<p>Documented EMPs to manage your Objectives and Targets</p>	<p>Environmental Management Program Progress Report Form</p>

Phase III: Implementing

You are now ready to begin the Implementation Phase of the EMS cycle. Each section of this Handbook will guide you step-by-step through each of the EMS activities. Refer to the icons for case studies, sample documents, keys to success and other implementation assistance. At the end of each section, two handy reference sheets review the **Purpose** of each requirement, describe the **Results** you'll be developing, discuss how to **Prepare** to do the work, and show how the element links to other EMS requirements.



lishing performance indicators for each of your environmental targets to assess your EMS progress. This phase includes defining implementation team roles and responsibilities and establishing internal and external lines of communication. The activities in this phase will allow your organization an opportunity to take a more focused look at the specific operations and services that you decided were most significant for your wastewater facility. If you are using a two-year implementation strategy, the activities in this phase can be comfortably accomplished in about nine months.

In this phase, you will be focusing on managing significant aspects that were defined in the Planning Phase and estab-

Here's a checklist of requirements in this Phase:

Phase III EMS Requirements (9 months)	
Structure and Responsibility (See Section 2: Getting My Facility Ready to Implement an EMS)	✓
Training, Awareness, and Competence	✓
Internal and External Communication	✓
EMS Document and Records	✓
Operational Control	✓
Emergency Preparedness and Response	✓

Section 3: Training, Awareness, and Competence

As should be apparent from the previous sections of this manual, cross-sectional involvement from across your EMS fence line and organization is the key to a successful and viable EMS. What's the first step in achieving involvement? Training and awareness!

As you have learned by now, buy-in and understanding an EMS is not automatic, especially when reaching out to various levels within your organization. The context of your message and the level must be applicable to the staff receiving the message in order for them to connect their particular work activities and job functions to the EMS. In addition, sound operational management requires that personnel understand and follow the procedures outlining their roles and responsibilities. This simply cannot be accomplished without, you guessed it—training!

Want two great reasons to train employees about environmental management and your EMS?

- Every employee *can* have potential impacts on the environment; and,
- Any employee *can* identify positive ways in which to improve environmental management.

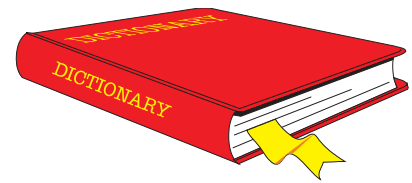
As part of your EMS, you will verify (i.e., have documented training records) that everyone has received general awareness training about the EMS, your environmental policy, and what the EMS means to each employee doing his/her job. You will also verify that each person whose job involves a significant environmental aspect is trained and competent (i.e., based on certification, education, etc.) to implement procedures and follow regulations to minimize the environmental impact of their operations.

Step-by-Step Guide to Training and Awareness

- Step 1) Assess EMS Training Needs
- Step 2) Review and Integrate EMS Training with Your Current Training and Methods
- Step 3) Conduct, Document and Maintain Training Records
- Step 4) Develop a System Procedure/Plan for EMS Training, Awareness & Competence
- Step 5) Check Your Training, Awareness and Competence for EMS conformance



Key Section Terms



EMS Awareness Training – Training involving an overview of the basics of your EMS, including your environmental policy, significant aspects, objectives and targets, and the importance of operating under specific procedures and work instructions (operational controls) required under the EMS.

Competency Training – Employees whose work may create a significant environmental impact must get appropriate training and be deemed competent based on education, training or experience. For example, most wastewater facilities need to have state licensed operators. The license is a way to demonstrate competency.

System Procedure – An EMS required document that establishes an element's purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

Assessing Training—Ask Yourself:

- What jobs affect the environment?
- What job activities involve a significant aspect?
- What types of training do we currently conduct in these areas?
- Can EMS roles/responsibilities/controls be included in this training?
- Can we tweak the training material we already have or do we need to develop new materials?
- How do we currently maintain training records?

Creative ways to Provide EMS Awareness Training

- ▶ New employee flyer
- ▶ Payroll or pay-stub insert
- ▶ Training videos
- ▶ Green mousepad
- ▶ Monthly newsletters

Three Keys to Success

(from wastewater facilities):



1. Relate EMS and environmental training to employee work activities.
2. Create one training plan/program and integrate EMS training into it. For example, if you have an all-employee health and safety training, add a few EMS slides to the presentation.
3. Have division managers present at training sessions to show support for the EMS program.

Times When Environmental Training is Typically Needed

- ◆ New employee is hired
- ◆ Employee is transferred to a new job
- ◆ Procedures are changed
- ◆ New process, material or equipment is introduced
- ◆ A change to objectives and targets or EMPs is made
- ◆ New regulation affecting your activities
- ◆ To stay current on operations (e.g., annual/refresher)

Step 1) Assess EMS Training Needs

All personnel receive training. Environmental/EMS training should be tailored to the different needs of employees and to various levels or functions in your wastewater organization. For example, someone in operations who handles hazardous chemicals will need a different type of environmental training from someone in procurement who purchases hazardous chemicals. However, keep in mind that both employees could potentially have significant impacts on the environment and must receive at least general EMS awareness training.

Who needs to receive environmental training at your facility? In assessing EMS training needs for your wastewater facility, consider both general and specific needs. For example:

- ▶ “What environmental management procedures affect Stu’s daily work and what happens if they aren’t followed?”
- ▶ “What environmental impacts might Stu’s work cause?”
- ▶ “What legal non-compliance issues might Stu’s work potentially raise?”
- ▶ “What broad understanding of environmental issues and the EMS does Stu need?”
- ▶ “What type of training does Stu currently receive?”

For your EMS, everyone must understand:

1. The environmental policy
2. The significant environmental impacts of his/her work activities
3. The environmental objectives and targets you have set
4. Key EMS roles and responsibilities
5. Environmental procedures and work instructions that apply to their work
6. The importance of following your EMS and environmental requirements, and the potential consequences of not doing so.

Step 2) Review and Integrate EMS Training with Your Current Training and Methods

Build on what you have in place and what currently works. Do you have an existing training procedure or plan? If so, build upon this to ensure that you are meeting your EMS requirements. Also, look at the training you conduct for environmental compliance, health and safety, and other related areas. What about certification training? You may find that many of your existing training efforts will satisfy some of the requirements for your wastewater EMS.

REMEMBER



Every person at your wastewater treatment facility can play a role in environmental management. Train your employees to help them understand their roles and responsibilities.

Step 3) Conduct, Document and Maintain EMS Training Records

Just like any other training you conduct, you will need to document and maintain (verify) your EMS training. For an EMS auditor, training can be verified by a signature and date that an employee attended a class on EMS Awareness. Another idea is an updated training matrix tracking training sessions and required and actual attendance. Again, consider how you currently track training needs and participation.

Remember, for your EMS, you need to train all employees on the EMS basics, including your environmental policy, objectives and targets, and how the EMS applies to their day-to-day activities. In addition, employees in areas with the potential to create significant environmental impacts must understand how to minimize those impacts and the potential consequences of not following EMS requirements.

CASE STUDY

At the New Hampshire Department of Transportation (NH DOT), Bureau of Traffic, an effort was made to combine the training requirements of the Safety and EMS programs. Combining the training programs helped reduce the overall time spent in training and administration of their programs. For example, 127 full and part time positions needed training. By combining the training requirements, the Bureau of Traffic saved about 7.5 hours each year per employee. This amounted to 127 additional workdays that was available to perform normal work activities.

EMS and Competence

What does it mean to be competent in your job under an EMS? It means that employees in certain jobs (particularly operations that can cause significant environmental impacts) have a combination of education, training, and experience to do their day-to-day tasks and ensure that your organization properly manages its significant aspects and environmental impacts. Make sure you maintain records of their experience and training (certifications, education, and previous job records, etc.) just as you would any other verifiable training records at your facility.

Consider cost effective and creative ways to train your staff on your EMS. For example, use a video for EMS awareness training. Computer-based training also may be an option, especially for employees who spend much of their time in the field and/or work varying hours/shifts.

Involving Contractors and Temporary Staff

Make sure that contractors and temporary staff are trained on the basics of your EMS (awareness, policy, emergency response, etc.). They need specific training on their roles and responsibilities in areas that can cause significant impacts or in which objectives and targets are set. The wastewater facilities that have EMSs in place that contributed to this Handbook provide general EMS awareness training to their contractors and temporary staff, and involve them in the aspect/impact analysis and in the setting of objectives and targets if their work can cause a potential environmental impact.

Three Lessons Learned

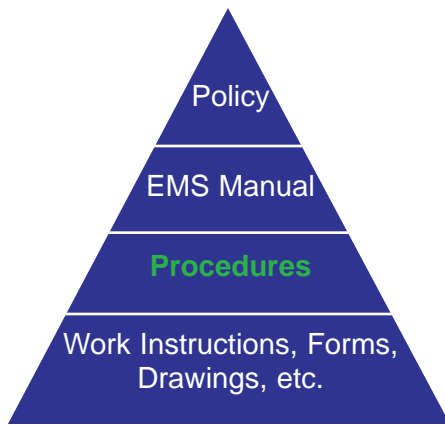
(from wastewater facilities):

1. Identify and document training requirements for each employee. For example, consider using a training matrix or table to identify employee titles, needs, and due dates.

A sample training matrix is attached at the end of this section and in Appendix B.

2. Get feedback from employees on the effectiveness of training materials and adjust your training based on their feedback.

3. Make your EMS training part of other training you currently conduct (e.g., new employee orientation, health and safety, etc.).



A Training, Awareness, and Competence system **procedure/plan** is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.



Three Things to Avoid

(from wastewater facilities):

1. Making your EMS training too technical or “jargony.” Remember the KISS principle!
2. Conducting training sessions that are too long. Keep your training sessions short, interesting and to the point.
3. Having training sessions that “preach” EMS or environmental requirements. Remember to keep a “blue jeans, no tie” (relatable) message.

Step 4) Develop a System Procedure/Plan for EMS Training, Awareness & Competence

When you’re satisfied that your process for training, awareness, and competence conforms to the EMS requirements, document the process in a system procedure, and update your training plan. Remember, most organizations have some type of training in place before they begin their EMS. Build off your existing procedures and plans.

Your system procedure should clearly define what you will do, roles and responsibilities, when they will do it, how the information will be communicated, and where the information will be stored. This documented procedure will be a consistent, easily accessible, and clearly ensure that this element of your EMS is carried out according to plans.

For samples of Training, Awareness, and Competence procedures from wastewater facilities, see Appendix A.

CASE STUDY

Training doesn’t always have to be done in a classroom setting. The City of San Diego Environmental Services Department, Refuse Disposal Division conducted some of its EMS awareness and competency training in “tailgate sessions.” Rather than pulling personnel off-site for training, they took the training sessions to their employees. Before starting up equipment in the morning or during breaks, personnel would gather and receive training on the environmental policy or a new work instruction. This approach saved a significant amount of time and eliminated the need to pull personnel off-site for training.

Step 5) Check Your Training, Awareness and Competence for EMS Conformance

About two or three months after you have documented and implemented your training, awareness, and competence procedure, check to see if it is actually working according to your plan. Here are some questions to investigate:

Check ✓

1. Do you have a current process for conducting environmental training?
2. What types of environmental training do you currently provide?
3. Have you conducted EMS Awareness training for all employees?
4. Have you conducted specific training for employees in significant aspect areas?
5. How do you verify competence?
6. How do you evaluate training effectiveness?

✂ ✂ ✂

Training, Awareness, and Competence

(Cut out this section for handy reference)

The **Purpose** of this EMS element is to:

- Identify and track environmental and EMS training requirements.

The **Result** of this EMS element is:

- A system procedure/plan (EMS document) that identifies and tracks your environmental and EMS training needs.

Before you Begin this EMS element:

- Acquire a knowledge on your organization's current training programs and methods.
- Complete your environmental aspect and impact assessment and determine significance.

✂ ✂ ✂

ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Training, Awareness and Competence</i></p> <p>The organization shall identify training needs. It shall require that all personnel whose work may create a significant impact upon the environment, have received appropriate training. It shall establish and maintain procedures to make its employees or members at each relevant function and level aware of</p> <p>a) The importance of conformance with the environmental policy and procedure and with the requirements of the EMS;</p> <p>b) The significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance;</p> <p>c) Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the EMS, including emergency preparedness and response requirements;</p> <p>d) The potential consequences of departure from specified operating procedures.</p> <p>Personnel performing the tasks which can cause significant environmental impacts shall be competent on the basis of appropriate education, training and/or experience.</p>	<p>Environmental Aspects - Employees that work in areas of potential significant impact need to be aware they are in these areas, and need to be trained on ways to minimize potential significant impacts.</p> <p>Legal and Other Requirements - Employees in regulated areas should be trained and have knowledge of regulatory requirements and the consequences of noncompliance.</p> <p>Structure & Responsibility - All employees need to understand and be trained in their EMS roles and responsibilities, including the basics of your EMS and your EMS Policy.</p> <p>Records - Conduct, document, and maintain training and competency records, including EMS awareness and training on significant aspects and objectives and targets.</p>	<p>Training Plans/Procedures</p> <p>Environmental Training Records</p> <p>EMS Awareness Training</p> <p>EMS Significance Area Training</p> <p>Certificates/Education Records (to verify competency) in significant areas</p>	<p>Job Category Training Matrix</p>

The EMS Coordinator ensures delivery of the appropriate training modules according to this matrix to all personnel within the EMS scope.		Staff							Contractors				
		Operations Managers	Planning Officer	Engineering Officer	Engineering Technicians	Operations	Field Operations Supervisor	Other Field Staff	Other Office Staff	Supervisor	Engineering Roads	Layout	Hauling
Training Modules	Content												
EMS 1	EMS Awareness	X	X	X	X	X	X	X	X	X	X	X	X
EMS 2	EMS Procedures	X		X	X	X	X	X					
Procedures and WIs 1	Job Specific Procedures				X	X	X	X		X	X	X	X
Legal Requirements	CMOM			X	X	X	X	X		X	X	X	
	CWA	X			X	X	X			X			
	Pretreatment	X	X	X	X	X	X	X	X	X	X		X
Emergency	Action Plans				X	X	X	X		X	X	X	X
	Spill Response				X	X	X	X		X	X	X	X

Section 3: Communication—Internal and External

A central component of any EMS is to establish clear communication channels both internally within your organization and externally to interested parties. Effective, proactive communication is often an unexpected, but a welcome benefit of EMS implementation. You need to establish and implement procedures that describe how your organization:

1. Ensures effective internal communication through the flow of information from the top down, from the bottom up, and across your entire EMS fenceline;
2. Solicits, receives, documents, and responds to external communications; and,
3. Considers and records external communications on your significant environmental aspects.

Internal Communication: Do employees within your organization understand with whom to talk regarding your EMS and environmental procedures, emergency situations, and legal and other requirements? Communication requires the involvement of everyone within your organization. Internal communication is important to keep staff aware of your EMS, EMS success stories, and any changes to your operations and services that affect your EMS.

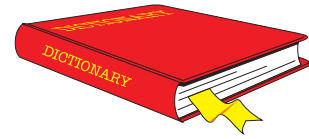
External Communication: As public organizations, it is important to consider proactively communicating with your local community and other interested stakeholders (e.g., regulatory agencies, citizens, Commissioners, etc.) about your EMS. Taking the initiative to obtain the views of your external stakeholders will help you better understand how the community feels about your facility. Also, getting their buy-in on your EMS will help ensure that you are identifying their most important environmental issues.

Step-by-Step Guide to Communication

- Step 1) Determine What Needs to be Communicated **Internally** to Your Organization
- Step 2) Determine Who You Currently Communicate With **Externally**
- Step 3) Determine Who has an Interest and Who has a Potential Effect on Your EMS
- Step 4) Define How Your Organization Can Best Reach External Stakeholders
- Step 5) Develop an EMS System Procedure(s) for Internal and External Communications
- Step 6) Check the Communication Procedure(s) for EMS Conformance



Key Section Terms



External Communication – Providing information and soliciting input, receiving inquiries and complaints, responding, and documenting exchanges with interested parties outside the fenceline of your facility.

Internal Communication – Flow of information top-down, bottom-up, and across your entire EMS fenceline.

Interested Parties (“Stakeholders”) – An individual or group, internal or external to the organization, concerned with or affected by the environmental performance of your organization. For example, local residents, citizen groups, and environmental regulators are all examples of “interested parties.” In addition, consider your own employees—inside and outside of your fenceline—to be interested parties.

System Procedure – An EMS (ISO 14001) required document that establishes purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

Common Wastewater External Interested Parties (“Stakeholders”)

- Local citizen/community groups
- Neighbors
- State/local environmental groups
- Regulatory agencies
- Advisory groups
- Local Officials
- Emergency response personnel
- Contractors and vendors

Internally Communicate:

- Environmental Policy
- Legal and Other Requirements
- Procedures and Work Instructions
- Roles & Responsibilities
- Significant Aspects
- Objectives & Targets
- EMS Progress and Success Stories
- EMS Audit Results

COACH'S CORNER



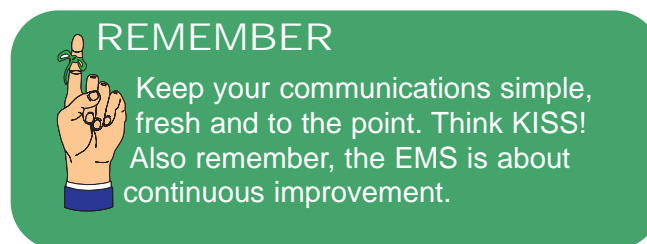
Remember that great ideas come from front-line employees that work directly in areas that affect your wastewater facility's environmental impact. Make sure there are ways for them to provide feedback to their line managers and to top management.

Externally Communicate:

- Environmental Policy
- Significant Aspects (Optional)
- Objectives & Targets (Optional)
- Requirements to Suppliers and Contractors
- Annual Reports
- EMS Highlights and Successes (Optional but Highly Recommended!)

Step 1) Determine What Needs to be Communicated Internally to Your Organization

A good place to start in developing your EMS communication strategy is to look at how your organization currently communicates messages internally. How do managers currently get information to employees and receive information and communicate back to managers? How do line managers communicate with one another? Leverage these strategies that are already in place, especially those that are familiar to personnel.



Internal Communication Vehicles

- ♦ Employee Meetings
- ♦ Environmental, Health, and Safety Training
- ♦ Working Lunches (free food!)
- ♦ Newsletters
- ♦ Pay Stub Inserts
- ♦ Intranet
- ♦ Bulletin Boards

For a sample EMS newsletter, see Appendix B

Step 2) Determine Who You Currently Communicate With Externally

Once you have your EMS internal communication strategy in place, the first step in determining your external communication strategy is to identify with whom you are currently communicating. As a public organization, you probably already have external stakeholders that you talk with, including City Commissioners, local citizens and citizen groups, the Mayor, regulatory agencies, etc.

Many public organizations find that when they reach out within their local communities, sometimes for the first time, they are well-received and confronted with “Why haven’t you asked us before? We have some great ideas to share.”

While ISO 14001 does not require an organization to have a truly proactive external communications program, in all likelihood it will benefit your organization and your EMS if you make a strong effort to reach out to key external stakeholders. While the timing and nature of this outreach is up to you, you may wish to consult with key stakeholders *why* you have chosen to implement an EMS and what you want to get out of it. Finally, you are encouraged to keep key stakeholders abreast of your progress as you develop the EMS and how your system is performing once it is in place. Again, the final decision is always up to you, but as a public agency you have an obligation to work closely with your key stakeholders.

CASE STUDY

The Lowell, Massachusetts Wastewater Treatment Plant asked local residents to assist in efforts to address the facility's odor issues. Residents in a chosen target area recorded weather information on days the odor was prevalent, as well as the degree of the odor and the time the odor occurred. This information identified a pattern of specific conditions during which odors were most prevalent. The City of Lowell responded by making changes to its operational patterns during times when those specific conditions had occurred and, in turn, established greater trust within the local community.

Step 3) Determine Who has an Interest and Who has a Potential Effect on Your EMS

Once you've identified with whom you currently communicate externally, define additional external stakeholders or new methods of communicating by determining: 1) who potentially has an interest in your EMS and 2) who potentially has an affect on your EMS.

In determining what to communicate to your external interested parties, your organization will need to assess the extent to which your strategy will be proactive. Ask:

- What is your current level of public acceptance?
- What are your external stakeholder's concerns?
- Have you had public relations issues in the past that require certain strategies or cautions?
- Since communication is most effective when it's a two-way dialogue, what type of input from them would interest you most and be most useful?
- What will be the return on investment of a proactive approach?



Three Things to Avoid

(from wastewater facilities):

1. Starting your EMS communication plans and procedures from scratch. Build on existing communication methods.
2. Not communicating frequently on the progress of your EMS. Instead, send management and employees regular status updates of your EMS (i.e., send three EMS "good news bullets" each month in your newsletter).
3. Not identifying and communicating with your key external stakeholders and seeking their input. The local community and other external stakeholders, if informed on what you are trying to achieve, can be critical allies for your organization.

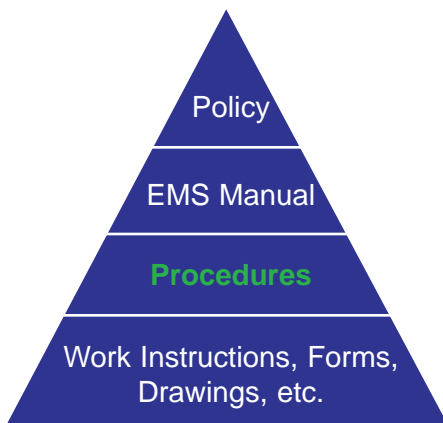
COACH'S CORNER



Your organization may want to take a very proactive external communications approach, at least initially. Include an educational focus and promote an understanding of the environmental controls involved in the management of your facility—this will lead to increased appreciation for your wastewater services by the community.

Three Lessons Learned (from wastewater facilities):

1. Communicate EMS information up, down, and across your wastewater organization. This will promote buy-in to your EMS.
2. Keep internal messages simple, clear, concise, and fresh. Remember, Keep It Simple, Simple (KISS)!
3. Proactive (two-way) communication with external parties is important. Take steps to obtain the views of external stakeholders. This will help you better understand how your organization and your EMS is perceived by others.



A **Communications system procedure** is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/ areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

Step 4) Define How Your Organization Can Best Reach External Stakeholders

Now that you've determined who your external stakeholders are and the potential reasons why they might have an interest and effect on your EMS, determine how to best reach your external stakeholders. Consider the following methods that wastewater facilities with an EMS have used.

External Communication Vehicles

- ♦ Annual Reports
- ♦ Steering Committees and/or Advisory Groups
- ♦ Media Releases
- ♦ Open Houses and Tours
- ♦ Websites
- ♦ Surveys
- ♦ Mailings & Newsletters to Local Communities

NOTE



Find out which issues are of greatest interest to your external stakeholders and focus your efforts on what those issues (i.e., health and safety, compliance, SSO runoff into waterways, odor issues, etc.).

Step 5) Develop an EMS System Procedure(s) for Internal and External Communications

When you are satisfied that your process for internal and external communications conforms to the EMS requirements and that it allows your organization to achieve its goals for enhancing communication, document the process in a system procedure. As with all EMS system procedures, it needs to clearly define what, when, how, and where.

For samples of Internal and External Communications procedures from wastewater facilities, see Appendix A.

From the beginning, we involved all employees in the EMS process. Therefore, we improved communications between ALL levels of staff in our wastewater facility.

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

Step 6) Check the Communication Procedure(s) for EMS Conformance

After you have documented and implemented your communications procedure it's time to check if it's actually working according to your plan and establishing the necessary communication channels. Here are some questions to investigate:

Check ✓

1. Who are the key interested parties and how were they identified?
2. What are the key concerns of our defined interested parties?
3. Do employees know their roles and responsibilities for ensuring solid communication?
4. Are employees aware of procedures and operational changes that affect their daily activities?
5. Can employees relate, in their own words, how their job functions connect to the Environmental Policy? Significant Aspects? Objectives and Targets?
6. Can employees who need necessary information access it easily? What processes do we utilize to respond to internal inquiries, concerns, and suggestions?
7. Have EMS requirements been communicated and understood by the employees and contractors that need to know?

We felt that getting the word out about our EMS would help our public image, which was one of the reasons we wanted to develop the EMS. The easiest way to do that was to put information about our EMS program on our Website.

Jim Newton, P.E., DEE
Kent County, Delaware
Levy Court Public Works

Three Keys to Success

(from wastewater facilities):



1. Try using creative methods to communicate your EMS message. For example, in an effort to educate outside stakeholders and reward employees, Jefferson County, Alabama sponsored an EMS event at a minor league baseball game. Free admission was given to employees who provided EMS information at the admissions gate, while other ticket holders were given EMS information as they entered the game.

In addition, consider printing your EMS policy or a summary of your policy on mouse pads, coffee mugs, magnets, business cards, tee shirts, etc.

2. In communicating with your employees, explain not only what they need to do, but also why they need to do it. For example, when describing a legal requirement, explain the purpose behind the rule and why it is important. Make a clear connection between the requirement and how it applies to each person's job.

3. Get the word out on the EMS! Communication of your EMS (e.g., policy, cost benefits, objective and target performance, status of your EMPs, etc.) with internal and external stakeholders is key to obtain buy-in from employees and maintaining external stakeholder support.

✂ ✂ ✂

Internal and External Communication

(Cut out this section for handy reference)

The **Purpose** of this EMS element is to:

- Define and implement a procedure for identifying and communicating with internal and external interested parties regarding your EMS process and environmental management activities and approaches.

The **Results** of this EMS requirement are:

- An approved procedure(s) (EMS Document) for internal and external communication.
- A record of communications (EMS Record) with external interested parties.
- A record of your decision (EMS Record) on ways to communicate significant aspects to external interested parties.

Before you Begin this EMS element:

- Complete your significant environmental aspects analysis.
- Identify what and how you currently communicate both internally and externally.

✂ ✂ ✂

ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Communication</i></p> <p>With regard to its environmental aspects and environmental management system, the organization shall establish and maintain procedures for:</p> <p>a) internal communication between the various levels and functions of the organization; and</p> <p>b) receiving, documenting, and responding to relevant communication from external interested parties.</p> <p>The organization shall consider processes for external communication on its significant environmental aspects and record its decision.</p>	<p>Environmental Policy - Your Policy must be communicated to all employees and made available to the public.</p> <p>Environmental Aspects - Employees are aware of their roles and responsibilities in relation to environmental aspects. Processes for external communication are considered and decisions recorded.</p> <p>Objectives & Targets - Communicate with employees in areas and operations with environmental targets so that they understand their roles and responsibilities.</p> <p>Structure and Responsibility - Roles, responsibilities, and authorities shall be defined, documented, and communicated.</p> <p>Training & Awareness - Employees are aware of their roles and responsibilities in relation to environmental aspects and the potential consequences of departure from specified procedures.</p>	<p>Communications Procedure(s)</p> <p>Record of External Communications</p> <p>Record of decision on communicating significant aspects to external interested parties</p>	<p>List of Internal and External Interested Parties</p>

Section 3: EMS Documents and Records

The EMS documents are written procedures, policies, work instructions, manuals, etc. used to keep your EMS working and functioning as you planned and intended. EMS documents describe your organization's daily EMS tasks and how they are accomplished. EMS documentation ensures that activities and operations are consistent through the use of up-to-date procedures and work instructions. Example EMS documents could include your aspect analysis system procedure, your environmental policy statement, your emergency response plan, or a work instruction on shutting down your air compressors in case of an emergency.

EMS records, on the other hand, present objective evidence, or proof, that your organization is following EMS procedures, policies, work instructions, and manuals, etc., as intended. Examples include training records, audit checklists, your list of significant aspects, and management review meeting notes.

To ensure that your employees work from the most current procedures, work instructions, and manuals, controlling your documents becomes very important. In addition, both documentation and records will help you explain your processes to auditors and other external interested parties, as well as allow your organization to effectively preserve institutional knowledge that would otherwise stay "between the ears" of your personnel.

Step-by-Step Guide to Controlling Documents and Records

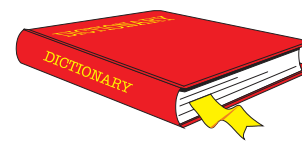
- Step 1) Assess EMS Document Control and Records Requirements
- Step 2) Review Current Document Control and Records Procedures
- Step 3) Integrate/Develop a System Procedure(s) for EMS Documents and Records
- Step 4) Check Your Documents and Records for EMS Conformance



Step 1) Assess EMS Document Control and Records Requirements

From the beginning of your EMS implementation, you will be creating EMS system procedures and other documents of your processes that you will use to manage your EMS and meet EMS requirements. System procedures provide the basis for your EMS, and although it takes some time to create EMS procedures at the early stages of implementation, don't fret! Once in place, your EMS documents simply need to be periodically reviewed and modified as necessary to keep them current.

Key Section Terms



Controlled Documents – Policies, procedures, manuals, and other documents part of your EMS that require control and are maintained. A controlled document is one that is reviewed for relevance to your activities on a regular schedule (typically annually) to ensure that the most current version is being used "in the field."

EMS Manual – An EMS document that describes your core system elements and how the different elements are interrelated—a "roadmap" for your EMS. Auditors find a manual very useful when verifying your EMS.

EMS Records – Reports, checklists, training, and other data generated that provides verification that your organization is following the EMS as intended.

System Procedure – An EMS (ISO 14001) required document that establishes purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

Work Instruction – Documented work tasks at your facility that provide a detailed understanding of how specific work process(es) are accomplished. For example, an instruction or checklist on the proper disposal of recyclables (batteries, oils and greases, rags, etc.) in your auto maintenance shop.

EMS Required System Procedures

- ◆ Environmental Aspects
- ◆ Legal and Other Requirements
- ◆ Communication
- ◆ Document Control
- ◆ Operational Control (for Significant Aspects)
- ◆ Emergency Response
- ◆ Nonconformance and Corrective and Preventative Action
- ◆ Records

Other Commonly Produced EMS Procedures

- ◆ Objectives and Targets
- ◆ Environmental Management Programs
- ◆ Management Review

Other Typical EMS Documentation

- ◆ Maintenance Manuals
- ◆ Work Instructions
- ◆ Contractor Contact Information
- ◆ Contracts
- ◆ Permits and Related Guidance Material

Example EMS Records

- ◆ Training Records
- ◆ Delivery Logs/Bills
- ◆ Calibration Results
- ◆ Audit Reports and Checklists
- ◆ A List of Your Significant Aspects
- ◆ Management Review
- ◆ Meeting Notes

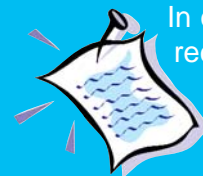
In addition to EMS system procedures, your organization will rely upon other documentation specific to operations and services. This documentation (e.g., work instructions, maintenance manuals, etc.) will be referenced in your EMS system procedures and your EMS Manual and is used to instruct employees on how to execute specific tasks. Examples include a work instruction for calibrating a pH meter and a manual for maintaining your air compressors.

EMS Records

EMS records are a direct result of your EMS procedures and activities and demonstrate that your organization is doing what the EMS documentation says you are doing.

Your EMS records should be traceable to and identified with an activity or operation, maintained for review, and disposed of if no longer applicable.

NOTE



In order to meet EMS requirements, maintain EMS records including EMS Awareness Training, EMS Audit Checklists, a Significant Aspect List, etc. However, do not forget about maintaining records related to your environmental aspects. For example, an air permit or a calibration record, if in areas that can lead to significant impacts, need to be tracked and maintained as EMS records and available for your EMS auditors review.

Step 2) Review Current Document Control and Records Procedures

Once you have taken a look at the EMS requirements for maintaining your EMS documents and records, review what procedures/systems you have in place to meet the requirements and those that will work best for your wastewater facility.

- ◆ Will a paper or electronic process, or maybe a combination of both, work best?
- ◆ Who has the responsibility and authority for creating and revising documents?
- ◆ Which documents should be controlled and how do you ensure that employees refer to the correct versions?
- ◆ Does your organization currently employ a standard document format and numbering system?
- ◆ Does the current system meet EMS requirements?

Step 3) Integrate/Develop a System Procedure(s) for EMS Documents and Records

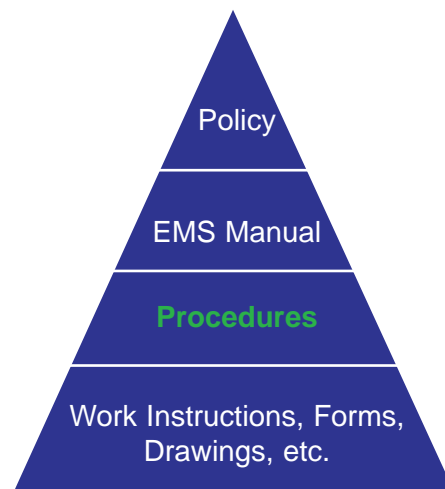
When you're satisfied that your process for managing and controlling your documents and records conforms to the EMS requirements, integrate that process with your current systems or document both processes in a system procedure.

Your team should develop an EMS system procedure for Document Control that ensures documents are:

- Easily located
- Periodically reviewed
- Readily available to personnel that need them
- Removed immediately if obsolete and replaced with current versions.


In addition, your procedure must clearly identify who is responsible for preparing documents, making necessary changes, and ensuring that documents are kept current. In other words, your organization needs a clearly defined system that designates authority for review and approval of documentation at various levels.

For samples of Document Control and Records procedure(s) from wastewater facilities, see Appendix A.



A **Document Control and Records Management system procedure(s)** is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

COACH'S CORNER



Many wastewater and public organizations write one procedure for controlling and maintaining both their EMS documents and records. Take a look at what you have in place and integrate or develop a method that works best for your facility.

Step 4) Check Your Documents and Records for EMS Conformance


About two or three months after you have documented and implemented your Document Control and Records Management procedure(s) check and see if the procedure(s) is working according to your plan. Here are some questions to investigate:

Document Control Check ✓

- 1) Are the document control and record management procedures being followed in practice?
- 2) How do you verify that current versions of documents/procedures are being used?
- 3) Are your documents legible and dated?
- 4) Do you have a process to remove obsolete documents?

Three Keys to Success

(from wastewater facilities):



1. Prepare a document control index that shows all of your EMS documents and the history of their revision. Include the index (or master list) in your EMS Manual.
2. If your wastewater organization uses computers extensively, consider using an electronic EMS document and records management system. This can help you manage and track changes. See the PEER Center (www.peercenter.net) for a survey of available EMS software.
3. Clearly explain the difference between EMS documents and records and how they are managed.

Three Lessons Learned

(from wastewater facilities):

1. Develop a document management system early in the EMS implementation so that EMS documentation will be immediately managed. Use your existing document format and control system if you have one.

2. Create a file folder on your Intranet that will house and control the most current versions (and change history) of your EMS documents instead of printing and distributing multiple revisions. Remind staff that **ONLY** the electronic version is the most current and the one that is to be followed.

3. Establish a records retention policy and stick to it. Consider what is required for your compliance obligations.



Three Things to Avoid

(from wastewater facilities):

1. Creating an EMS Manual that is too lengthy. Keep your manual to no more than 1/2 to 1 page per EMS system element. Remember, easy to understand and to the point equals easy to implement.

2. Not establishing clear procedures on who can generate and make changes to your EMS and environmental documents. Limiting access and control of documents will make tracking and updating them easier.

3. Collecting and maintaining EMS records that do not add value. If records have no value or are not specifically required, don't collect them. Start with compliance records and records that you use to track your objectives and targets and significant aspects.

Records Management Check ✓

- 1) Have you identified what EMS records need to be maintained?
- 2) Have you determined the period of time necessary for retaining your environmental records?
- 3) How are your records stored and retrieved (electronic vs. hard copy)?
- 4) Are you maintaining all the records as required for your EMS?
- 5) Are records easily accessible?

The EMS Manual (ISO 14001, 4.4.4)

It is recommended that you maintain a summary of your EMS that:

- ◆ Describes the basics of your system's 17 core elements (and how the elements relate to each other), and
- ◆ Provides where you can find related documentation.

An EMS Manual or "roadmap" summarizes how the pieces of your EMS fit together and can be a very useful tool. Think of it as your EMS's roadmap to all 17 EMS elements.

For a sample EMS Manual from a wastewater facility, see Appendix A.






COACH'S CORNER

An EMS Manual is a great tool for your internal and 3rd-party auditors to follow to determine what your system looks like and how all your elements fit and link together. The Manual will reference procedures, work instructions, records, etc. relevant to each EMS element and provides auditors (and your own staff) with a "snapshot" of your system.



NOTE

Under an ISO 14001-based EMS, maintaining "control" of your documents means that your EMS procedures, work instructions, manuals, and policies, etc. are managed to ensure that they are reviewed, current, dated, legible, and removed from circulation if they are out of date. For an example of what to look for to ensure that a document is controlled, take a look at the sample page at the end of this section. The circled areas demonstrate that the document is assigned, reviewed, and kept current.



Document Control and Records Management

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Write or modify your document control procedures to ensure documents are managed and kept up to date.
- Write or modify your records management procedures to ensure that all records are tracked and maintained.

The **Results** of this EMS element are:

- A document control procedure (EMS Document) for assuring that EMS procedures, work instructions, manuals, and policies are available at locations where they apply; and that they are periodically reviewed, are current, accurate, complete, and effective.
- A records management system (EMS Document) for assuring that all records required to support your organization's EMS are identified, controlled and accessible.

Before you Begin this EMS element:

- Consider your organization's current document and records management control procedures and tools.
- 
- 
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ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Document Control</i></p> <p>The organization shall establish and maintain a procedure for controlling all documents required by this International Standard to ensure that</p> <ul style="list-style-type: none"> a) They can be located; b) They are periodically reviewed, revised as necessary and approved for adequacy by authorized personnel; c) The current versions of relevant documents are available at all locations where operations essential to the effective functioning of the environmental management system are performed; d) Obsolete documents are promptly removed from all points of issue and points of use, or otherwise assured against unintended use; and e) Any obsolete documents retained for legal and/or knowledge preservation purposes are suitably identified. <p>Documentation shall be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner and retained for a specified period. Procedures and responsibilities shall be established and maintained concerning the creation and modification of the various types of document.</p>	<p>Demonstrate document control on EMS required and recommended procedures, work instructions, manuals, policies, etc.).</p>	<p>Document Control Procedure</p>	<p>Master List of Documents</p>

ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Records</i></p> <p>The organization shall establish and maintain procedures for the identification, maintenance and disposition of environmental records. These records shall include training records and the results of audits and reviews.</p> <p>Environmental records shall be legible, identifiable and traceable to the activity, product or service involved.</p> <p>Environmental records shall be stored and maintained in such a way that they are readily retrievable and protected against damage, deterioration or loss. Their retention times shall be established and recorded. Records shall be maintained, as appropriate to the system and to the organization, to demonstrate conformance to the requirements of this International Standard.</p>	<p>A number of EMS elements will generate environmental records that need to be tracked and maintained, including:</p> <ol style="list-style-type: none"> 1) Training 2) Communication 3) Monitoring and Measuring 4) Nonconformance and Corrective and Preventative Actions 5) EMS Audits 	<p>Records Management Procedure</p>	<p>Master Records List</p>



Standard Operating Procedure - EMS-0100.002 Name: EMS Document Control Procedure	Corresponding Requirements: ISO Standard: 4.4.5 EMS Manual: 4.4.5 NBP Element: 12
Prepared By: Beth Eckert, Environmental/Administrative Manager	Revision #: 7 Revision Date: 5/12/03
Approved By: Beth Eckert, Environmental /Administrative Manager Signature:	Effective Date: 1/1/00 Page 1 of 1

Demonstrates EMS Document Control

EMS Document Control Standard Operating Procedure

- 1.0 Purpose
- 1.1 The following procedure covers the various requirements for control of existing documents and development of new documents.
- 2.0 Associated Equipment
- 2.1 None
- 3.0 Associated Reference Material
- 3.1 ISO 14001 Standard: ANSI/ISO 14001-1996 Environmental management systems - Specifications with guidance for use
- 3.2 National Biosolids Partnership - Elements of an Environmental Management System for Biosolids
- 3.3 EMS Document Control Checklist - EMS-0101.002A
- 3.4 City of Gastonia: Environmental Management System Manual - EMS-0100.000
- 3.5 Crowders Creek Operations Document Control Matrix: WCR-0101.000
- 3.6 Long Creek Operations Document Control Matrix: WLC-0101.000
- 3.7 Long Creek Laboratory Document Control Matrix: WLC-0101.100
- 3.8 Crowders Creek Laboratory Document Control Matrix: WCR-0101.000
- 3.9 Pretreatment Document Control Matrix: WPR-0101.000
- 3.10 Resource Recovery Farm/Biosolids Document Control Matrix: WRF-0101.000
- 3.11 Procedure template located in the EMS & Divisionwide directory of the read-only drive on the computer network. (Should be used as a guide in procedure development).

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Section 3: Operational Control

An EMS is about “managing” or controlling your facility's environmental impacts and, in particular, operations and services from which your identified significant environmental impacts, objectives and targets, and regulatory requirements are derived. What is operational control and how do you document it? You probably already have procedures, work instructions, permits, maintenance manuals, and similar in place for many of your operations and services. In other words, documents, processes, and programs are in place for how you do a particular job or operation, who is responsible, etc. This shows control and management of an operation or service.

The following steps will allow your organization to determine which operations or services should be covered by documented procedures and work instructions and how those operations should be controlled.

Step-by-Step Guide to Establishing Operational Control

- Step 1) Identify Significant Environmental Operations
- Step 2) Review and Draft Operational Controls
- Step 3) Review Maintenance and Calibration Requirements
- Step 4) Check Operational Controls for EMS Conformance
- Step 5) Communicate Operational Controls



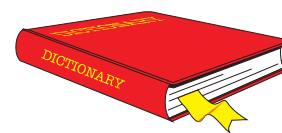
Step 1) Identify Significant Environmental Operations

Determining which operations should be covered by documented operational controls and how those operations should be controlled is an important step in developing your EMS. Review the operations and services that are related to your significant aspects and objectives and targets that you identified earlier. Now review your regulatory requirements in these areas.

Is it clear to your employees how you want these activities to be conducted and controlled? In other words, do these activities have manuals, procedures, work instructions, and similar documents and instructions to manage how their day-to-day tasks are accomplished?

Keep in mind that you might need documented operational controls in order to manage significant aspects and legal requirements, regardless of whether you established objectives and targets for each of them.

Key Section Terms



Operational Controls – Documents that specify the way to execute a certain activity or operation. Operational controls are assigned to operations and services involving significant aspects and are documented through the use of work instructions, procedures, manuals, programs, etc. Examples include maintenance work, pretreatment operations, chemical ordering, etc.

System Procedure – An EMS – (ISO 14001) required document that establishes purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

Work Instruction – A series of steps and activities directed to a very specific area or process. Examples include cleaning the rake at wastewater pretreatment operations and calibrating a pH meter.

Three Lessons Learned (from wastewater facilities):

1. The most effective operational controls are short and to the point. Several examples from wastewater facilities are included in the appendices of this Handbook.
2. In determining which operations and activities need to be controlled, look beyond operations and services. Activities such as equipment maintenance, management of on-site contractors, and services provided by suppliers or vendors could affect your organization's environmental performance significantly.
3. Use photos and diagrams where applicable for your operational controls. For example, a diagram showing the direction and how far to turn a valve is much clearer than text.



Three Things to Avoid

(from wastewater facilities):

1. Not including suppliers and contractors that provide operations, goods, and services that have a direct impact on your facility's significant aspects and objectives and targets. Cross-reference your significant environmental aspect list and your objectives and targets with the associated supplier and contractor operations to ensure operational control.
2. Starting from scratch when developing your operational controls. Most wastewater organizations had about 80% of the necessary documentation in place when they began their EMS implementation.
3. Overlooking the maintenance and calibration of equipment for significant environmental aspect areas and objectives and targets. Maintenance manuals and calibration records also demonstrate control.

Involving Contractors and Temporary Staff

If your contractors and temporary staff are in areas or provide services that affect your significant environmental impacts, objectives and targets, or legal and other requirements, make sure that they have procedures, work instructions, and/or maintenance manuals, etc. that cover and show control of those operations and services. For example, if you use an off-site contractor to maintain a piece of equipment that is within one of your identified significant areas, make sure they have a documented work instruction that they follow to maintain the equipment.

Step 2) Review and Draft Operational Controls

Once you have a list of operations and services that require documented operational controls, take a look at what you already have in place to manage these activities. Do your current procedures reflect what is actually being done at your wastewater facility? How do you control the operations now and are the controls adequate? Can the employees, whose work the procedures describe, easily understand them?

If you have documented operational control procedures already in place for your significant activities—great! Reference and document them in your EMS Manual (see EMS Documents and Records later in this section). If not, you will need to add language to current procedures and/or draft new procedures to ensure adequate control of your significant environmental operations, legal requirements and your objectives and targets.

For an example of an Operational Control Procedure, see Appendix A.

Step 3) Review Maintenance and Calibration Requirements

Maintenance and calibration of equipment in areas that could have significant environmental impact must be considered for your wastewater EMS. Once you have identified operations that require control and have documented your procedures and work instructions for these, determine the maintenance and calibration requirements for these operations and services and document and maintain these records. Don't ignore the maintenance manuals that come with your equipment.

Some organizations place critical monitoring equipment under a special calibration and preventive maintenance program. This can help to ensure accurate monitoring and make your employees aware of which instruments are most critical for environmental monitoring purposes.

“After you have identified your significant environmental aspects, there are two separate paths to follow (a fork in the road). The first is setting your objectives and targets and then developing environmental management programs to achieve your targets. The second path is to ensure that you have or develop operational controls to deal with any other significant aspects you have identified that may not be covered under your current objectives and targets and the associated programs to meet them.”

Donna Adams
Eugene, Oregon
Wastewater Division

REMEMBER



You probably already have some of the procedures, work instructions, maintenance manuals, etc. that demonstrate control of your identified significant environmental operations and services. Now it's simply a matter of documenting what you have in place OR establishing and writing new procedures and work instructions in your significant areas that need them.

Step 4) Check Operational Controls for EMS Conformance

About two or three months after you have documented and implemented your Operational Controls procedures, check if they are working according to your plan. Here are some questions to investigate:

Check ✓

1. Have you identified all operations and activities associated with significant environmental aspects, legal requirements and environmental objectives & targets?
2. Are these operations and activities under control through programs, documented procedures, work instructions, etc.?
3. Have you communicated and trained your employees, suppliers, vendors, and contractors on applicable procedures, work instructions, and policies?

Step 5) Communicate Operational Controls

Review your documented procedures and work instructions (controls) with all applicable employees. Communicating your procedures with the people who will need to implement them will help secure their input. Also remember to communicate operational controls with applicable vendors, contractors, suppliers and temporary staff.

NOTE



Operational control is demonstrated and can be communicated through other EMS elements, including training, communication, document control, records management, and emergency preparedness and response. Use your current procedures, work instructions, and manuals relevant to these elements as ways to demonstrate control.

Initially, establish control for all your identified significant aspects. Then, establish controls for all your aspects and activities. This will bring consistency and accountability to those on your frontline who are ensuring environmental stewardship.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

Three Keys to Success




(from wastewater facilities):



1. Check in with all of your shifts and satellite offices for improvement suggestions, to test your procedures and to get involvement and buy-in to the EMS. If changes are made to procedures, make sure affected personnel are communicated with and trained accordingly.
2. Keep the language in your procedures and work instructions clear and simple. A good check is to ask someone unfamiliar with the activity if he/she could complete the work using the instructions provided.
3. Start by looking at the significant environmental aspects and legal requirements that you identified in Phase 1. Identify the operations and services that are related and then consider what types of controls are needed to manage these environmental aspects and compliance requirements.

Examples of Operations and Services that may Require Operational Controls:

- Management/disposal of wastes
- Approval of new chemicals
- Storage & handling of raw materials and chemicals
- Equipment maintenance & servicing
- Wastewater pretreatment
- Management of contractors



Operational Control

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Define and implement a procedure for controlling (procedures, work instructions, manuals, etc.) the significant operations and services, objectives and targets, and compliance requirements of your organization.

The **Results** of this EMS element are:

- Documented methods to control (e.g., procedures, work instructions, maintenance manuals, etc.) operations and services that affect your facility's significant environmental aspects, objectives and targets, and compliance requirements.

Before you Begin this EMS element:

- Complete your significant environmental aspects analysis.
- 
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ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Operational Control</i></p> <p>The organization shall identify those operations and activities that are associated with the identified significant environmental aspects in line with its policy, objectives and targets. The organization shall plan these activities, including maintenance, in order to ensure that they are carried out under specified conditions by:</p> <p>a) Establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets;</p> <p>b) Stipulating operating criteria in the procedure;</p> <p>c) Establishing and maintaining procedures related to the identifiable significant environmental aspects of goods and services used by the organization and communicating relevant procedures and requirements to suppliers and contractors.</p>	<p>Policy - To satisfy the commitments made in your environmental policy, operations and activities must be controlled.</p> <p>Environmental Aspects - Identified significant environmental aspects must have documented procedures (i.e., controls) in place.</p> <p>Legal and Other Requirements - Regulated operations must have documented procedures (i.e., controls) in place.</p> <p>Objectives and Targets - The environmental goals set by your organization must have documented procedures (i.e., controls) in place.</p> <p>Training - Training is required for employees, vendors, service providers, and contractors that could significantly affect the environment.</p> <p>Monitoring and Measurement - Equipment in potentially significant areas must be properly maintained and calibrated.</p>	<p>Documented operational controls (e.g., procedures, work instructions, manuals, etc.) for significant aspects and areas and for your objectives and targets.</p>	<p>A list of operations and services related to your significant environmental aspects, objectives and targets, and compliance programs.</p>

Section 3: Emergency Preparedness and Response

Even in the best-managed facilities, accidents and emergency situations can and do occur. Today's post 9/11 threats and realities require that facilities remain vigilant and prepare for an entirely new variety of changing pressures and risks. Under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, many local utilities are now required by the U.S. Environmental Protection Agency to conduct **vulnerability assessments** and to certify that updated emergency response plans exist. The EMS process offers enormous potential for water providers to proactively identify and successfully manage environmental as well as security risks and vulnerabilities.

The intent of the EMS Emergency Preparedness and Response element is to ensure that effective plans for preparing for and responding to emergencies are available, easily accessible, and clearly understood by everyone that might need them.

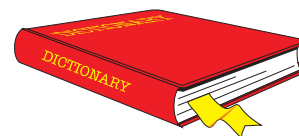
Emergency response is fundamentally integrated into everyday operations, activities, and services, guiding an organization to continuously improve the management of their risks and threats over a short and long-term basis. The ultimate goal is to protect employees and the community, to prevent and minimize environmental impacts, and to reduce operational damage. Those wastewater and drinking water utilities who have conducted vulnerability assessments will find that this point in the EMS process is also a great place to incorporate plans for ensuring the security of their facilities.

Step-by-Step Guide to Emergency Preparedness and Response

- Step 1) Identify Existing Emergency Plans and/or Procedures
- Step 2) Identify Potential Accident and Emergency Scenarios
- Step 3) Define How Your Organization Can Prevent Emergency Incidents and Mitigate Impacts
- Step 4) Develop EMS System Procedures/Plans for Emergency Preparedness and Response
- Step 5) Check Your Procedures/Plans to Ensure Conformance to EMS Requirements



Key Section Terms



Emergency Situation – Condition (e.g., spills, releases, fires, etc.) that can have an environmental impact and that requires an emergency response or action.

Emergency Response – Actions taken to address an environmental incident.

Emergency Response Plan – A detailed plan that describes the logistics, procedures, who to contact, roles and responsibilities, reporting requirements, etc. in the event of an emergency or spill.

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 - Federal requirements for public water and wastewater utilities to conduct a vulnerability assessment and to certify to the U.S. EPA that emergency response plans have incorporated the assessment information and have been fully integrated into their operations.

Vulnerability Assessment – A tool to assist water utilities in systematically evaluating their susceptibility to potential threats and identifying corrective actions that can reduce or mitigate the risk of serious consequences from adversarial actions (e.g., vandalism, insider sabotage, terrorist attack, etc.). For more information please see the Vulnerability Assessment Fact Sheet.

Common Emergency Contacts

- Police
- Local Emergency Responders
- Fire Department
- Medical Services
- Internal Emergency Coordinator(s)

Three Keys to Success

(from wastewater facilities):



1. Evaluate the effectiveness of your emergency response plans on a regular (at least annually) basis by conducting drills and exercises. Ensure that all emergency response actions are reviewed and documented.

2. Make emergency response plans available, easily accessible, and clearly understood by everyone who might need them. Effective training and well communicated plans will help prevent and minimize potential environmental impact that could occur as a result of the accident or emergency.

3. Evaluate the effectiveness of your emergency response procedures/plans and vulnerability assessments on a regular basis (at least annually). Consider using your wastewater staff in your emergency and security drills as part of their training program.

NOTE



Emergency preparedness and response is a heavily regulated area for wastewater facilities. The importance of this EMS element should be communicated and trained to all employees and contractors.

In order to fulfill EMS requirements, you need to establish and implement procedures that describe how your organization:

1. Identifies potential for and responds to accidents and emergency situations;
2. Prevents and mitigates the environmental impacts that may be associated with them;
3. Reviews and revises, where necessary, emergency preparedness and response procedures after the occurrence of accidents and emergency situations; and,
4. Periodically tests such procedures where practicable.

Step 1) Identify Existing Emergency Plans and/or Procedures

Most organizations will find that they already have a number of emergency response plans in place. For example, most wastewater facilities must have Spill Prevention, Control, and Countermeasure (SPCC) plans in place. Sticking with the Keep It Simple, Simple (KISS) rule, review what you already have in place first and evaluate how they address the EMS requirements. Your emergency and response procedures/plans ensure that potential accidents and emergency situations are identified, avoided, and mitigated if they do occur. By all means, if you have plans in place that work, keep them and build from them to develop a comprehensive approach.

In reviewing your existing emergency plans, consider:

- ✓ Are the plans current?
- ✓ Have contact information or telephone numbers changed?
- ✓ When was the last time we tested them?
- ✓ Is training adequate and up-to-date?
- ✓ Are new and temporary employees being trained?
- ✓ Are there gaps between what is in place and what the EMS requires?

NOTE



Review previous spills and other emergencies and your responses as a guide to where future accidents or incidents could occur and be prevented. Take the lessons learned from previous emergencies to review if your plans are effective.

Step 2) Identify Potential Accident and Emergency Scenarios

When you have reviewed your existing emergency preparedness and response plans, take a moment to brainstorm potential emergency situations that could arise from your organization's everyday activities and operations. You may also want to consider the potential risks from accidents and/or hostile acts. Your EMS can help ensure that your employees are adequately prepared for potential scenarios, including security risks.

NOTE



FIRST RESPONDERS

More often than not, frontline (i.e., shop floor) employees will be the first responders to an incident and must know what procedures to take to manage potential emergency scenarios effectively.

Remember, your organization's response plans may overlap (i.e., who to call, who to report to, etc.) for a number of emergency situations. It's good to ensure that personnel know exactly what to do in each different situation. In addition, if you have already conducted a vulnerability assessment to identify your security risks, you may want to include this information in your emergency plans as well.

COACH'S CORNER



Communicate with local officials (fire department, hospital, etc.) about potential emergencies at your wastewater facility and how they can support your response efforts. Involving local responders in mock drills is an excellent way to reinforce training, keep them informed of any changes to operations, and get feedback on the effectiveness of your plans/procedures.



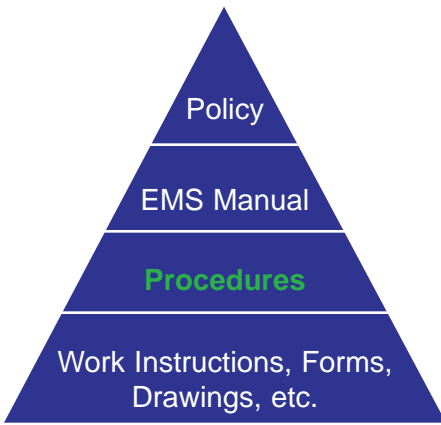
Three Things to Avoid

(from wastewater facilities):

1. Not inviting local emergency response agencies into your facility for emergency reviews and drills. Local responders need to know the layout and any changes to operations of your facility. In addition, response agencies can assist you in developing and updating your response plans.
2. Thinking only about response – focus on how to prevent accidents and emergencies in the first place.
3. Starting your emergency preparedness and response procedures/plans from scratch. Build on what you currently have in place for responding to emergencies and accidents.

Incident reviews give an organization the opportunity to step back and evaluate what went right and what went wrong after an emergency situation. These reviews facilitate positive change and continual improvement.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works



*Emergency Preparedness and Response **Procedures/Plans** are required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.*

Focus on both internal and external response criteria. Team build with local and state emergency response agencies. Coordinate exercises involving both employees and external agencies together. This tests the response of both parties and promotes team work. In addition, conduct bi-annual drills (or more frequent) to test your system.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

Step 3) Define How Your Organization Can Prevent Emergency Incidents and Mitigate Impacts

As your facility puts this EMS element in place, focus on emergency response and do not overlook and forget that accident prevention is equally important. Spend time looking at ways to prevent environmental accidents in the first place. However, emergencies still happen in the best planned and managed operations. Therefore, ask:

How can we mitigate the potential impacts of these situations?
Are there adequate controls in place now?

Step 4) Develop EMS System Procedures/Plans for Emergency Preparedness and Response

Being prepared for emergencies means that you have identified all potential emergency situations that could arise, and have developed, put in place, and tested emergency response procedures.

Effective emergency preparedness and response plans are a core element of an EMS. They should be readily available, easily accessible, and clearly understood by everyone who might need them. From a practical perspective, your plans should include up-to-date emergency contact information, including current contact names (POCs) and current phone numbers. Make this information available **throughout** your facility, especially in areas where there is potential for accidents and emergencies.

Your emergency response procedures/plans should include actions that will minimize any environmental impact that could occur as a result of an accident, emergency or threat (e.g., in the case of security plans, this might include alternative water supply secured, public notice created and ready for immediate distribution, etc.).

COACH'S CORNER



A systems approach can successfully integrate environmental and security considerations into everyday business operations. Roles and responsibilities are defined based upon activities related to your priority risks and vulnerabilities, empowering employees to analyze, control, and mitigate impacts related to their daily work. These designations can also be utilized to control and monitor access to critical areas and processes within a facility that relate to operations identified in vulnerability assessments. In essence, employees throughout an organization take on a real sense of ownership for emergency response in their daily responsibilities and within the organization as a whole.

Your EMS leadership team will periodically review your emergency response plans and verify that they are realistic operationally, environmentally, technologically, and financially, and in the case of security response plans, that they meet any regulatory requirements imposed under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002.

For samples of emergency preparedness and response procedures from wastewater facilities, see Appendix A.

NOTE



FIRST RESPONDERS

Each organization should test their emergency response plans regularly in order to verify their effectiveness, to apply lessons learned, and to apply any new technological enhancements.

Step 5) Check Your Emergency Procedures/Plans to Ensure Conformance to EMS Requirements

Check ✓

1. Have you reviewed environmental operations and activities for potential emergency situations?
2. Are personnel trained and aware of their roles and responsibilities during an emergency?
3. Do you conduct emergency drills and document the results?

REMEMBER



Don't think only about emergency **response**—focus on how you can **prevent** accidents in the first place by conducting drills, training, and communicating with local responders.

Look back at accidents and emergency situations that have occurred in the past. Are there any lessons learned or noticeable patterns?

Three Lessons Learned

(from wastewater facilities):

1. Be very clear on staff roles and responsibilities related to emergency prevention and response. For example, what do you do as a member of the response team versus as an employee that works in the laboratory or in the front office?
2. Be specific about who in your organization will conduct your emergency response training and when it will be conducted. Where practical, consider conducting training in cooperation with relevant external parties and first responders, including local and regional emergency response agencies.
3. Post copies of your emergency plans (or at least critical contact names and phone numbers) around your facility, especially in areas where potential hazards exist. Include phone numbers for your on-site emergency coordinator, local fire department, local police, hospital, and rescue squad members as appropriate.

Involving Contractors and Temporary Staff

Make sure that contractors and temporary staff are communicated with and trained on their roles and responsibilities during an emergency. If they are the ones to first identify a spill or accident, do they know what phone number to call and what to do? This should be part of the basic training they are provided if they come on to your wastewater facility.

Water Security Legislation

EPA's Water Protection Task Force (WPTF) and Regional Offices, working with many partners, are taking actions to improve the security of the nation's drinking water and wastewater infrastructure in line with EPA's Strategic Plan for Homeland Security. Federal Legislation impacting water security includes the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Title IV), which amends the Safe Drinking Water Act and specifies required actions of community drinking water systems and the responsibilities of the U.S. EPA must take to improve the security of the nation's drinking water infrastructure.

For additional information, visit www.epa.gov/safewater/security.

U.S. EPA Water Emergency Response/Security Resources and Guidance Documents

[Vulnerability Assessment Fact Sheet](#), produced by the U.S. EPA Office of Water in November 2002. Describes the purpose and six basic elements of vulnerability assessments to help water systems evaluate potential threats and identify corrective actions to prepare for and respond to an attack.

[Instructions to Assist Community Water Systems in Complying with the Public Health Security and Bioterrorism Preparedness and Response Act](#), Produced by the U.S. EPA Office of Water in January 2003.

[Protecting Your Community's Assets: A Guide for Small Wastewater Systems](#), Produced by the National Environmental Training Center for Small Communities.

[Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems Serving Populations of 3,300 and 10,000](#), The guide was developed by the Association of State Drinking Water Administrators (ASDWA) and the National Rural Water Association (NRWA) in May 2002.

[Model Emergency Response Guidelines](#), Produced by the U.S. EPA Office of Water in April 2002.

[Water Information Sharing and Analysis Center \(Water ISAC\)](#), Information service to provide water systems with a secure web-based environment for early warning of potential threats and a source of knowledge about water system security.

Checklist for Emergency Preparedness & Response

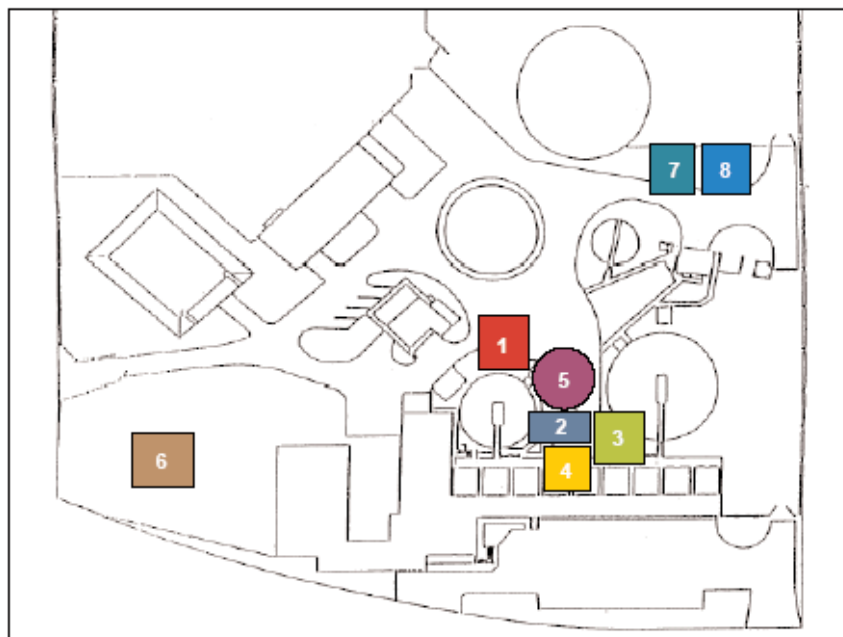
Does your plan describe the following?	
X	Potential emergency situations (such as fires, explosions, spills or releases of hazardous materials, and natural disasters)?
X	Hazardous materials used on-site (and their locations)?
X	Key organizational responsibilities (including emergency coordinator)?
X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

CASE STUDY

Security Management


Recently, a wastewater facility identified a large chemical storage area as a high priority (significant) environmental issue that it wanted to manage as part of its EMS. Using a parallel approach, the facility integrated its security issues into the Plan-Do-Check-Act system and identified the chemical storage tank as a high priority security risk as well. The facility's objective was to determine how to manage this environmental and security issue in an efficient and cost-effective way. Drawing on the experiences of employees up, down, and across the organization, and on best practices information and product substitutions gathered from a variety of state, trade association and federal web sources, the wastewater facility determined that product substitution could be a technologically realistic, operationally feasible, and cost-effective solution. Until the new product was fully implemented, trainers updated existing training with "need to know" environmental and security competency training for employees who worked with the chemical tanks and provided awareness training for others about the risks involved. This example shows how the plan-do-check-act process can work effectively for both environment and security (vulnerability) outcomes.

Case Study Example : Anytown, USA Water Plant



LEGEND

1. Chlorine Storage Shed
2. Anhydrous Ammonia Storage Tank
3. Hydrofluosilicic Acid Tank
4. Carbon Dioxide Storage Tank
5. Calcium Oxide Silo
6. Diesel Fuel (aux. generator)
7. Hydrochloric Acid Shed
8. Calcium Hypochlorite Shed



Emergency Preparedness and Response

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Establish or modify emergency preparedness and response procedures/plans that address the potential for and response to accidents and emergency situations.

The **Result** of this EMS element is:

- Verification that your organization's emergency preparedness and response procedure(s)/plan(s) (EMS Document) are effective in relation to the significant environmental aspects and objectives and targets of your organization.

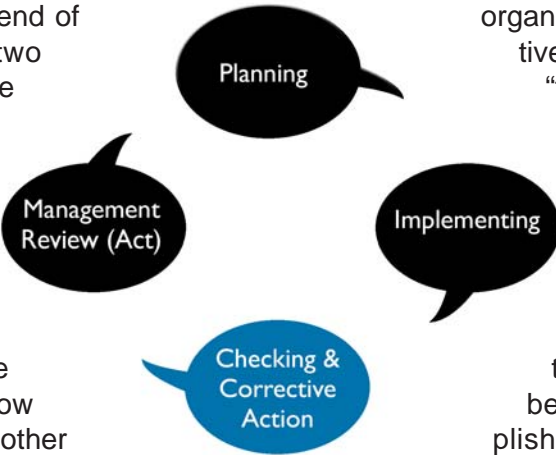
Before you Begin this EMS element:

- Complete your significant environmental aspects analysis.
- 
- 
- 

ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Emergency Preparedness and Response</i></p> <p>The organization shall establish and maintain procedures to identify potential for and respond to accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them.</p> <p>The organization shall review and revise, where necessary, its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations.</p> <p>The organization shall also periodically test such procedures where practicable.</p>	<p>Environmental Aspects - Environmental aspects are reviewed for potential emergency situations.</p> <p>Legal and Other Requirements - Spills, fires, and other emergency events that are likely to have legal (e.g., reporting) requirements.</p> <p>Training & Awareness - Employees that respond to emergencies are trained and certified.</p> <p>Communication - All employees understand what they need to do in case of an emergency.</p> <p>Document Control - Emergency response procedures/plans are controlled so that the most recent version(s) are being utilized.</p>	<p>Emergency Procedures/Plans</p> <p>Records of Emergency Incidents, Training, and Drills</p>	<p>None</p>

Phase IV: Checking & Corrective Action

You are now ready to begin the Checking and Corrective Action Phase of the EMS cycle. Each section of this Handbook will guide you step-by-step through each of the EMS activities. Refer to the icons for case studies, sample documents, keys to successes and other implementation assistance. At the end of each section, two handy reference sheets review the **Purpose** of each requirement, describe the **Results** you'll be developing, discuss how to **Prepare** to do the work, and show how the element links to other EMS requirements.



and functioning as you intended. The check, an EMS audit or review, is a tool that you will periodically use to identify any flaws or weaknesses in your EMS. This information can help you assess how well your EMS is performing and help your organization continually improve. As part of the audit process, your organization will take corrective actions on any EMS “findings” to make sure that nonconformances are examined for its root causes, corrected, and prevented from re-occurring. If you are using a two-year cycle, the activities in this phase can be comfortably accomplished in about five months.

In this phase, you will define and document methods that your organization will use to verify that your EMS is effective

Here’s a checklist of requirements in this Phase:

Phase IV EMS Requirements (5 months)	
Monitoring and Measuring	✓
EMS Internal Auditing	✓
Nonconformance & Corrective/Preventative Action	✓

Section 3: Monitoring & Measurement (Assessing how well your system is performing)

So far, you've identified your significant environmental aspects, set objectives and targets, and conducted a review of your operations and services to identify applicable regulatory and other requirements. You have also put procedures and work instructions (operational controls) in place to ensure that your environmental issues (i.e., significant aspects) are managed. The next step is to *monitor and measure* your progress in meeting your objectives and targets, and assess your compliance toward meeting your regulatory requirements.

Monitoring and measuring allows you to track your environmental performance and improve efficiency by managing what you do. Remember, you can't manage what you can't measure! The results of your objectives and targets and other environmental efforts are easier to demonstrate when current and reliable data are available and referenced against a defined baseline. These data can help you demonstrate the value of the EMS to top management, as well as to other interested parties such as your local community.

In this section you will develop ways to:

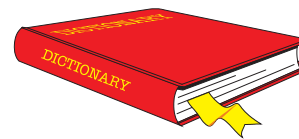
- Identify key characteristics of operations and activities that can have significant impact
- Track performance (including progress in achieving your objectives and targets)
- Monitor conformance with operational controls
- Calibrate and maintain monitoring equipment
- Periodically evaluate your compliance with applicable laws and regulations

Step-by-Step Guide for Monitoring and Measuring Your Key Environmental Activities

- Step 1) Determine What You Currently Monitor and Measure
- Step 2) Identify What You Need to Monitor and Measure to Determine How Your EMS is Performing
- Step 3) Assess Compliance and Track Your Environmental Performance
- Step 4) Develop an EMS System Procedure for Monitoring and Measurement
- Step 5) Check Your Monitoring and Measurement Procedure for EMS Conformance
- Step 6) Communicate Progress and Performance



Key Section Terms



Baseline – The starting point from which the meeting of an objective is to be measured. Establish “normalized” baselines to accurately measure how your facility’s environmental performance could change over time. Normalized baselines will measure your actual environmental performance changes rather than changes in production, customer demand, or other non-environmental related factors.

Environmental Aspect – Element of an organization’s activities, products or services that can interact with the environment. Aspects = Causes

Environmental Management Program (EMP) – A structured program with a set of specific identifiable actions (an “action plan”) providing the direction for EMS objectives and targets to be obtained and tracked. Your plan should assign tasks, resources, responsibilities, and timeframes for achieving your objectives and targets.

Environmental Objective – An overall environmental goal based on an established environmental policy, that an organization sets itself to achieve. Wherever possible, environmental objectives should be quantified to facilitate the evaluation of environmental performance and the measurement of progress towards specific environmental targets.

Environmental Target – A detailed performance requirement, quantified where practicable, that arises from the environmental objectives and that needs to be set and met in order for the objective to be achieved.

Key Section Terms, continued

Key Characteristic – An element of an operation or activity that can be measured or evaluated for environmental performance of objectives and targets.

Performance Indicators – Measurement tools, selected by management that can be used to support the evaluation of environmental performance in relation to a specific target. Performance indicators may be adjusted to meet specific management needs or as necessary to ensure progress towards specific environmental targets.

Three Keys to Success

(from wastewater facilities):



1. Evaluate the information that you collect for value. If you are going to spend the time and resources to collect it, make sure that it is useful.
2. Include top management and other decision makers in setting up what you will monitor and measure. Checking in with them will help you identify what you need to measure to provide meaningful results and maximize the benefits you'll receive from your EMS.
3. Remember your external stakeholders (i.e., city commissioners, citizen groups, etc.) as you determine what to monitor and measure.

Step 1) Determine What You Currently Monitor and Measure

Examine your wastewater operations and services and determine what you are currently monitoring and measuring. Your environmental regulations are a good place to start, since these requirements typically include monitoring, measuring, (permit limits, etc.) and reporting components (Toxic Release Inventory (TRI), etc.). How well do these measurements serve your EMS purposes? What additional monitoring or measuring might be needed as your organization continues to move beyond compliance?

Step 2) Identify What You Need to Monitor and Measure to Determine How Your EMS is Performing

Your organization will track data and information, collected through your EMS on a continuing basis, to determine whether and how your wastewater facility is achieving its environmental objectives and targets and to properly manage your significant aspects. Information collected by monitoring and measuring your key environmental issues can help make this determination and answer the questions: Is your EMS being carried out as planned? Is your organization achieving its commitments and its objectives and targets? What information is most valuable?

To determine what you need to monitor and measure, identify wastewater operations and services that affect your environmental performance. What are the key characteristics of the operations, services and related equipment and how do you measure these characteristics to ensure proper performance?

Monitoring and measurement takes the pulse of an organization. Their application can be the most important tools in a manager's toolbox with regard to setting goals, objectives and targets, and improving overall operations.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

REMEMBER



Start by looking at what's regulated and then look at the significant aspects and objectives and targets that you identified earlier.

Let's review the sanitary sewer overflow (SSO) significant aspect example again and make a sample list of the operational controls, key characteristics, monitoring and measurement methods, and calibration needs for operating and maintaining wastewater pump stations.

Operation with Significant Environmental Aspect	Significant Aspect	Operational Controls	Key Characteristics of Operation or Activity	Monitoring or Measurement Methods	Equipment & System Calibration Needs
Operate and Maintain Pump Stations	Sewer System Overflows (SSOs)	<ul style="list-style-type: none"> ◆ Pump Maintenance Manual(s); ◆ Work Instructions on Cleaning Sewer Mainlines; ◆ Emergency Generator Operations and Maintenance 	<ul style="list-style-type: none"> ◆ # of Alarms ◆ Flow per Capita ◆ # of Overflows ◆ # of Cleanings per Month 	<ul style="list-style-type: none"> ◆ Measure Quantities; ◆ Monitor Lift Stations; ◆ Census Data; ◆ Monthly Operating Reports 	<ul style="list-style-type: none"> ◆ Flow Meters; ◆ SCADA

A Word on Calibration

As part of meeting your monitoring and measurement requirements, you will need to document calibration requirements and dates for equipment used in areas where you identified significant aspects, where you set objectives and targets, and in areas where you have compliance requirements. Example calibrated equipment could include gauges used to monitor stack air emissions or a pH meter used to measure effluent water quality. Make sure a regular schedule is in place to calibrate the equipment and make sure you retain your calibration records. Remember, some equipment may be calibrated off-site, so make sure the vendor supplies you with a copy of the records.

NOTE



Environmental measurement can be a combination of process and outcome measures. In other words, you may want to consider measurements that assess “how” you are doing something as well as measurements for “what” is produced.

- **Outcome measures** look at **results** of a process or activity, such as the amount of waste generated or the number of spills.
- **Process measures** look at “**upstream**” factors, such as the number of employees trained on a topic.

Consider selecting a combination of process and outcome measures that are appropriate to your wastewater facility. For example, using the SSO significant aspect example above, an outcome measure would be the number of overflows per year and a process measure could be the number of cleaning or maintenance activities completed per month to prevent line blockage and that would consequently reduce the chance for an overflow event.

Step 3) Assess Compliance and Track Your Environmental Performance

An EMS requires you to periodically evaluate your compliance with applicable laws and regulations. In practice, most organizations go through some form of compliance audit and this can be done either by internal staff or by an outside organization. While the compliance audit is generally a way to determine if you are actually in compliance, you should also use it as a way of determining if your organization is well

REMEMBER



Don't forget about the maintenance manuals that come with your equipment. They may contain calibration and/or measurement methods for your equipment. In addition, your equipment may have calibration procedures set by the manufacturer that must be followed.

Three Lessons Learned

(from wastewater facilities):

1. Start with a relatively simple monitoring and measurement process, looking at your legal requirements and significant aspects. It is OK to start small and build over time as you gain experience in evaluating your performance.
2. Select performance indicators that will provide the information you need to make effective decisions about your EMS.
3. Don't forget about on- and off-site contractors that calibrate and/or maintain equipment that is within your identified significant operations and services.



Three Things to Avoid

(from wastewater facilities):

1. Going out of your way to monitor and measure everything. Start with what is required by law and then examine your objectives and targets. Don't collect data for data's sake!
2. Not committing the necessary resources (human and dollars) to track performance information over time.
3. Not communicating the performance and progress of your objectives and targets to management and staff.

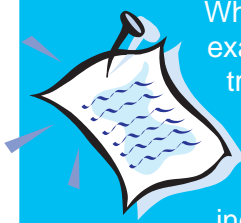
suited to address instances of noncompliance should they occur. In other words, are you able to effectively *manage* compliance as well as audit for it? When determining if you are effectively managing compliance, you should use this opportunity to make sure that proper procedures are in place to respond to instances of noncompliance, determine the root causes of noncompliance, and make any changes to your system to help ensure that the noncompliance does not recur. Effective compliance management is an essential part of an EMS.

Once you know what to measure and what indicators that you will use, assess and track your objectives and targets so you know how well they are performing. Remember to have regular checks on the progress of your objectives and targets and report the results to top management.

Remember to also assess and track your significant aspects. Keeping track of your significant aspects will let you know how well they are managed (being controlled) and also provide you with a baseline for potential future objectives and targets.

For example, have operational controls (procedures, work instructions, etc.) been documented for each of your significant aspects? Have employees been trained on any changes to emergency preparedness and response plans? Are your training records up to date and documented? Do employees whose work involves significant aspects understand their roles and responsibilities?

NOTE



What about issues that are not so easy to quantify? For example, better odor management in wastewater treatment plants, improved public image, and improved relationship with stakeholders? It takes some rather creative "indicators" to quantify these improvements. Talk to your peers in the wastewater industry to see how they measured these types of issues.

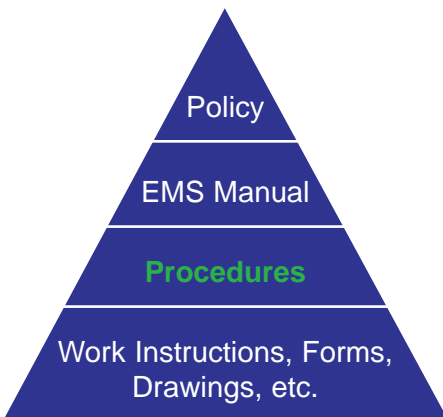
The top five performance indicators that the wastewater facilities that contributed to this Handbook used to monitor and measure their EMS performance are included below:

Wastewater Facility	Performance Indicator
Buncombe County, North Carolina	<ul style="list-style-type: none"> ● Quarterly internal audits ● Environmental compliance audits ● Quarterly management review meetings ● Monthly steering committee meetings ● Monthly ISO Team meetings.
Charleston, South Carolina	<ul style="list-style-type: none"> ● Random inspections to ensure conformance to standard operating procedures. ● Monthly reporting of objectives & targets associated with continual improvement. ● Regulatory monitoring is performed through established monitoring systems. Items are monitored on varied recurring cycles (each month to once every 3 years) depending on the regulatory requirements. ● Employees are encouraged (with incentives) to fill out Corrective-Preventive Action Requests (CPARs). These requests provide opportunities for preventing pollution and improving operations. ● Performance measurement is performed through our Productivity Measurement Program (PMP). Tasks are valued at certain levels based upon the length of time to accomplish with a specified manpower requirement. Incentives are provided for attaining set goals, and inter-departmental competition is also fostered.
Eugene, Oregon	<ul style="list-style-type: none"> ● Regulatory compliance and reporting ● Objectives and targets ● Internal/external audits (EMS, compliance) ● Training records (completion) ● Document control (reviews and updates)
Gastonia, North Carolina	<ul style="list-style-type: none"> ● Compliance ● Internal audits (EMS and Compliance) ● Public comments - Review of communications with external parties/customer satisfaction surveys ● Communication and cooperation among staff and management ● Costs and efficiencies particularly with regard to energy and chemical usage
San Diego, California	<ul style="list-style-type: none"> ● Sanitary sewage overflow reduction ● Targets and objectives tracking ● Recycled material tracking ● CPAR status ● Standard operating procedures status



REMEMBER

Remember to track and record your EMS benefits, especially the ones realized from our objectives and targets. These will make an impression with management as you move forward with your EMS.



A *Monitoring and Measurement system procedure* is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

NOTE



You can monitor and quantify other organizational benefits that the EMS brings, such as efficiency savings, reduced landfill costs from recycling efforts, and accidents/fines avoided, etc., when tracking your EMS performance.

Involving Contractors and Temporary Staff

It is important to involve contractors and temporary employees in this phase of your EMS, especially if they work in areas that can create a significant impact on the environment and/or monitor or maintain equipment for your significant aspects and/or objectives and targets. Communicate with and train contractors and temporary staff on their roles and responsibilities.

Step 4) Develop an EMS System Procedure for Monitoring and Measurement

When you're satisfied that your process for monitoring and measuring conforms to the EMS requirements, document the process in a system procedure. As with all EMS system procedures, it needs to clearly define what, who, when, how, and where.

For samples of Monitoring and Measurement procedures from wastewater facilities, see Appendix A.

REMEMBER



To be compliant with the requirements of ISO 14001, you also need to establish and maintain a documented procedure for evaluating compliance with environmental laws. You should have set up a Legal and Other Requirements procedure in your Planning Phase of the EMS.

Step 5) Check Your Monitoring and Measurement Procedure for EMS Conformance

Check to see if your procedure is working according to your plan. Here are some questions to investigate:

Check ✓

1. Have you identified operations and activities associated with significant environmental aspects, legal requirements and environmental objectives?
2. Have you completed a review of your legal compliance status?
3. Have you identified what needs to be monitored and measured?
4. Have you decided what performance indicators/metrics are appropriate?
5. Have you established a schedule for monitoring and measuring?
6. Have you reviewed what equipment needs to be maintained and calibrated?
7. Do you communicate performance information to management on a regular basis?

Step 6) Communicate Progress and Performance

Communicate and record the progress and performance of your objectives and targets to top management and to your staff. Management needs to know if resources are appropriate for what you want to accomplish and if you are on track with your environmental goals.

Remember, employees respond best to information that is meaningful to them. Putting environmental information in a form that is relevant to their function and work area increases the likelihood they will act on the information.

CASE STUDY

Eugene, Oregon Wastewater

"Paper Products Consumption"

To achieve the target of reducing overall paper goods consumption by 30%, we developed and implemented extensive facility-wide conservation, recycling, training, and purchasing programs.

We greatly exceeded our target, and actually reduced paper use by 50% total. We reduced janitorial paper use by 48%, and office paper use by 37%.

To achieve this substantial reduction, we implemented the following strategies:

- Provided easily accessible, shared information on alternative products (kitchen products, cornstarch plates and cups, etc.). We tested dish drying racks in the kitchens to reduce paper towel use, and we will use cloth towels for large events. Installed cloth towel mechanisms in most restrooms, reducing paper use by 4.6 tons compared to 2002.
- Implemented an extensive employee awareness program, including equipment use training that emphasized waste reduction for printers, copiers and fax machines.

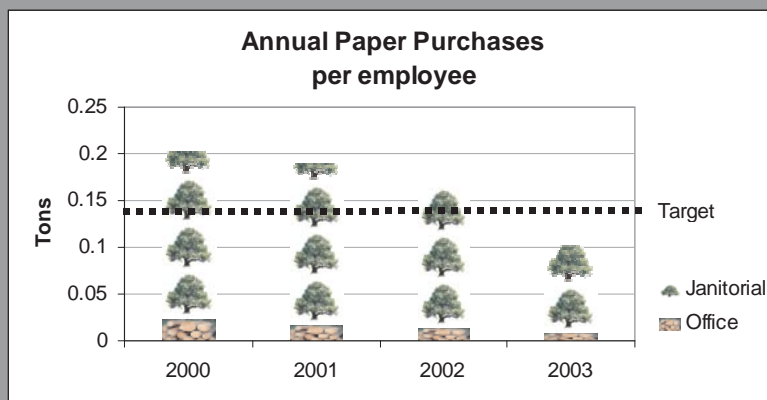
- Redesigned documentation to minimize paper waste, and use electronic distribution where possible. In addition, we are participating in the WADERS pilot project for regulatory electronic reporting, and transitioning to the maximum electronic reporting possible, resulting in a drastic reduction of office paper use.

2003 Savings from Reducing Paper Use by 7.6 Tons

- 129.2 trees
- 52842 gallons of water
- 3515 gallons of oil
- 4457 pounds of air pollution
- 23 cubic yards of landfill space
- 30988 KWh of electricity

- Developed procedures and purchasing guidelines that target reduced paper use and emphasize purchase of products with recycled content.

- Continued with our previous objective to purchase paper goods containing higher recycled content. We increased purchases of products with greater than 30% recycled content by weight from 97% to 98% from 2002.





Monitoring and Measurement

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Monitor and measure the performance of your EMS, including your significant aspects, objectives and targets, legal compliance and operational controls.

The **Result** of this EMS element is:

- A procedure (EMS Document) to control monitoring and measurement activities that affect your significant environmental aspects and compliance requirements.

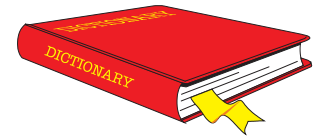
Before You Begin this EMS element:

- Complete your significant aspects and impacts analysis.
- 
- 
- 

ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Monitoring and Measurement</i></p> <p>The organization shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. This shall include the recording of information to track performance, relevant operational controls and conformance with the organization's environmental objectives and targets.</p> <p>Monitoring equipment shall be calibrated and maintained and records of this process shall be retained according to the organization's procedures.</p> <p>The organization shall establish and maintain a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations.</p>	<p>Environmental Aspects - Determining your significant aspects will identify the operations and services that you will need to monitor and measure.</p> <p>Legal and Other Requirements - A status check on compliance needs to be assessed and continually monitored.</p> <p>Objectives & Targets - Your environmental goals need to be tracked and measured to determine how well they are performing and meeting your intentions.</p> <p>Operational Control - Your significant aspects must have controls (procedures, work instructions, manuals, etc.) in place.</p> <p>Management Review - Top Management will review the progress and performance of your objectives and targets to help determine if you are on track and/or to see if resources are allocated appropriately.</p>	<p>Monitoring and Measurement Procedure</p> <p>Calibration Records</p>	<p>Calibration and Maintenance Procedure</p> <p>List of devices, location, calibration frequency and method, etc.</p> <p>Maintenance Manuals</p>

Section 3: EMS Internal Auditing

Key Section Terms



Once your organization has established its EMS, verify its effectiveness. The process of reviewing and verifying your EMS through an internal audit is critical and key to improving your system.

An EMS internal audit is a tool that your wastewater facility will use periodically to identify where things are working well and where improvements are needed. This information will help you assess how well your EMS is performing. The internal audit is a documented review of whether your organization is doing what it said it would do to manage its environmental issues and whether it is doing so effectively. An EMS internal audit is conducted by your organization's employees to determine your conformance with the ISO 14001 Standard.

Audit Finding – A discovery of lack of conformance to the requirements of an (ISO 14001-based) EMS criteria/checklist. All audit findings must be resolved as found during the internal audit or through a formal EMS process of corrective and preventative action.

Corrective Actions – As a result of the audit findings, corrective action reports (CARs) are assigned to all nonconformances to correct EMS deficiencies as they occur. CARs track an audit finding, assigning tasks to be completed, responsibilities, and timeframes.

EMS Audit – A planned and documented review performed in accordance with a documented audit procedure for the purpose of verifying, through interview and an evaluation of EMS documents and records, conformance with the applicable elements of your EMS.

EMS Auditor – A qualified and trained individual who conducts EMS audits. Each EMS Auditor should attend documented training that presents the requirements of a standard (e.g., ISO 14001) EMS and of your organization's EMS audit procedure and discusses their roles in an EMS internal audit.

EMS Lead Auditor – A qualified and trained individual who plans, organizes, and directs your organization's EMS internal audits. The EMS Lead Auditor is the leader of your EMS audit team and will report audit findings and observations to management.

NOTE



An EMS external audit is an EMS review conducted by an independent, third-party to determine EMS conformance, typically as means to seek third-party certification (see Section 4 for more information on third-party certification).

Your EMS internal audit is a snapshot in time. It evaluates your documents, procedures, and records and reviews their implementation effectiveness and consistency. The audit looks at your facility's planned activities for meeting its objectives and targets and controlling its significant aspects. It also looks for signs of management's commitment to the environmental policy and the EMS, and awareness and competency among all your wastewater employees.

Step-by-Step Guide to EMS Internal Auditing

- Step 1) Select and Train EMS Internal Auditors
- Step 2) Determine EMS Audit Scope and Frequency
- Step 3) Prepare Staff for Your EMS Internal Audit
- Step 4) Conduct an EMS Desktop Review
- Step 5) Conduct an EMS Internal Audit
 - a. Hold an Opening Meeting
 - b. Audit for EMS Conformance
 - c. Report EMS Audit Findings
- Step 6) Develop a System Procedure for Conducting EMS Internal Audits
- Step 7) Check the EMS Internal Audit Procedure for EMS Conformance



Key Section Terms, continued

Major Nonconformance – A deficiency in meeting the requirements of an EMS. One or more of the 17 elements of the EMS which are not addressed (e.g., no system procedure) or implemented (e.g., a number of employees are not aware that you have an Environmental Policy).

Minor Nonconformance – A finding that leads to a failure to conform completely with an EMS element, but is not considered to be a breakdown in your system. (e.g., for example, a number of employees were overdue on their EMS refresher training).

Observation – A recognition of something done incorrectly or an area of concern. While not a major or minor nonconformance with an EMS requirement, if done correctly it could strengthen the EMS or if done incorrectly, could potentially cause a system failure. Remember to also document positive observations – things you are doing well.

System Procedure – An EMS (ISO 14001) required document that establishes purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

NOTE



The size of a typical EMS audit team will vary depending on the size of your facility. It is recommended that you have at least two to three qualified members on your team. This will allow you to rotate your auditors to different areas and prevent scheduling conflicts when auditors are sick or on vacation.

Step 1) Select and Train EMS Internal Auditors

Your own qualified and trained employees are the best people to conduct an internal audit. If possible, train at least two people as EMS internal auditors, with one as the lead auditor. This will allow your auditors to work as a team. This also allows audits to take place when one auditor is unavailable.

Your auditors should be objective, and not audit his/her own areas of operation or service. For example, if your wastewater lab manager is one of your internal auditors, he/she should not be auditing your laboratory operations.

NOTE



Your EMS internal auditors require training in order to be effective reviewers of your system. Consider a three-day EMS Audit Overview or five-day EMS Lead Auditor training conducted by EMS training organizations in your area. For training, contact a certified Registrar Accreditation Board (RAB) commercial organization in your area (http://www.rabnet.com/ec_main.shtml). Also consult the Technical Assistance Providers (TAP) Directory or contact a Local Resource Center (LRC) in your region to find out if they offer EMS training for auditors. LRCs can be found on the PEER Center Website.

Step 2) Determine EMS Audit Scope and Frequency

Next, determine how often you want to conduct your internal audits and determine your audit scope. All programs and elements of your EMS should be audited every year. Audit your entire EMS at one time each year or break your review into specific elements for more frequent audits, where you would review a sampling of elements every quarter, but still audit all EMS elements within a year.

To determine the scope and frequency of your EMS internal audits, consider the environmental importance of the activities and the results of your previous audits. For example, you may want to focus audit efforts on significant aspect areas and activities or your objectives and targets, as well as on the findings from your previous EMS audits. This will direct your EMS audits to the most important areas for potential improvement.

Conduct internal audits quarterly to simplify the audit process and to get a quarterly check up on how your EMS is working. These quarterly audits and their results can then be reviewed in a quarterly management review.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

A sample EMS audit scope and schedule is shown below. Review your entire EMS at least every year, beginning with a review of all EMS elements during your first internal audit. Then, consider conducting a sampling of EMS elements every quarter, as shown in the schedule below. Also, remember that your EMS internal audits can be integrated with other reviews you currently conduct (e.g., environmental, health and safety, quality, or security audits, etc.).

A Sample EMS Audit Scope and Schedule

(For an Example of Internal Audits Conducted Every Quarter)

ISO 14001:1996

		01/2005	04/2005	07/2005	10/2005	01/2006
4.2	Environmental Policy	*		*		*
4.3.1	Environmental Aspects	*	*	*	*	*
4.3.2	Legal and other Requirements	*		*		*
4.3.3	Objectives and Targets	*	*	*	*	*
4.3.4	Environmental Management Programs	*	*	*	*	*
4.4.1	Structure and Responsibility	*		*		*
4.4.2	Training, Awareness and Competence	*		*		*
4.4.3	Communication	*	*		*	
4.4.4	Environmental Management System Documentation	*	*		*	
4.4.5	Document Control	*		*		*
4.4.6	Operational Control	*	*	*	*	*
4.4.7	Emergency Preparedness and Response	*		*		*
4.5.1	Monitoring and Measurement	*	*		*	
4.5.2	Nonconformance & Correct/Prev Action	*	*	*	*	*
4.5.3	Records	*	*	*	*	*
4.5.4	EMS Audit	*		*		*
4.6	Management Review	*	*	*	*	*
	Previous Findings of Nonconformance	*	*	*	*	*

Three Lessons Learned

(from wastewater facilities):

1. Make “cheat sheets” for your employees. For example, post significant aspects and objectives and targets in work areas and have wallet cards made of your environmental policy so that employees do not have to memorize the EMS.
2. Work with your staff’s schedule so that you do not disrupt the routine of daily operations in the area you are auditing – be flexible with your audit schedule.
3. Establish a well-defined audit schedule and plan. Also, use an EMS checklist. These tools will effectively prepare your EMS auditor(s) and keep your audits consistent.



Three Things to Avoid

(from wastewater facilities):

1. Trying to be too “textbook” and/or using too much EMS jargon during the internal audits. Your internal auditors should take what they know and relate it to the activities that are being reviewed – then tie in the EMS requirement.
2. Not providing the necessary training for your internal auditors. Make sure your auditors understand the EMS and ISO 14001 requirements AND what you are trying to accomplish with your internal audits (i.e., environmental improvement).
3. Not preparing staff for your EMS Audits – all employees should understand what is expected of them during an EMS internal audit.

Step 3) Prepare Staff for Your EMS Internal Audit

You’ve developed an EMS internal audit scope and agreed on an audit schedule. You are ready to begin and so are your internal auditors. Your job as lead EMS auditor is to support the audit function by preparing your managers, employees, and all documents and records. All of these should be readily available to your audit team according to a pre-arranged audit schedule.

In advance of the audit, prepare management by:

- ▶ Reviewing their EMS responsibilities
- ▶ Rehearsing the type of questions that the auditor might ask (NSF Guide [Second Addition](#), Appendix A, pages 153 - 156)
- ▶ Organizing and tracking corrective actions that the audit identifies.
- ▶ Indicating on managers’ calendars suggested times for the pre-audit meeting to review the audit scope, plan and schedule, and the closing meeting to share audit findings
- ▶ Encouraging them to be visible, involved, and available for the month of preparation preceding the registration audit

Prepare employees by:

- ▶ Emphasizing the “find, fix, and prevent” opportunity the audit provides
- ▶ Reviewing the environmental policy and confirming the role it has in employees’ daily activities
- ▶ Reviewing significant aspects, objectives and targets with relevant department managers and folks on the front-line
- ▶ Rehearsing the types of questions that an auditor might ask them (you may want to use the checklist you developed in the internal audit)
- ▶ Reviewing EMS roles and responsibilities

Prepare documents and records by:

- ▶ Ensuring they are current, easily retrievable, and controlled according to your document control procedures

For sample EMS Audit Checklists, Plans, and an Audit Report Template from wastewater facilities, see Appendix B.

Step 4) Conduct an EMS Desktop Review

An EMS “desktop” or document review is a review of written EMS policies, procedures and records that is developed before you conduct your full EMS internal audit and interview personnel. The desktop review is conducted to provide the audit team with a “snapshot” overview of an organization’s EMS elements and how they fit together. A desktop review also provides the audit team with a first look at an organization’s EMS and how the system elements fit with your current environmental programs and will therefore increase the efficiency of your full EMS internal audit.

Step 5) Conduct an EMS Internal Audit

Step 5a) Hold an Opening Meeting

Before you begin your internal audit, conduct an EMS opening meeting with management and relevant staff. During the meeting, go over: 1) the members of the audit team and introduce the team leader; 2) review the audit scope and the checklists/questionnaires that will be used; and 3) the audit schedule. Also, leave time at the end for questions.

This meeting will help set the stage on what to expect for your employees and management.

Step 5b) Audit Your System for EMS Conformance

Check your EMS by touring the site and observing the operations and services within your fenceline. While on-site, your audit team will want to review work practices and operations, interview employees, and examine procedures, documents and records.

Although not a requirement, it’s important to use an EMS audit checklist/protocol to conduct your EMS internal audit. The checklist provides your audit team with typical ISO 14001 language, and audit tips and suggestions to ensure that all EMS elements and their requirements are covered and reviewed. Besides, it’s a great tool to ensure consistency!

Step 5c) Report EMS Audit Results

As your audit team conducts and finalizes your internal EMS review, they will be taking notes, making observations, documenting audit findings, and writing up (if applicable) findings of nonconformance. Audit findings are typically documented and noted in a final report as either 1) observations (i.e., suggestions for improvement or a note on something done well); 2) major nonconformances (e.g., an entire system element is missing); 3) or minor nonconformances (e.g., One or two employees in the administration are overdue on EMS refresher training).

Nonconformances are discrepancies in your EMS that require attention through a corrective action. Corrective Action Reports (CARs) will be noted by the lead auditor and/or environmental management representative (EMR). CARs should include the discrepancy and the timeframe, and the person(s) responsible for bringing the discrepancy back into EMS conformance.

Your EMS Lead Auditor will be tasked with completing an audit plan to determine the scope of each of your internal audits. The following should be included in each audit plan:

- ▶ a statement of the audit objectives
- ▶ an identification of the specific elements being audited
- ▶ a review of any special emphasis or focus (e.g., corrective actions from previous EMS audits)
- ▶ references to appropriate plans, procedures, or requirements documents
- ▶ a timetable for the audit
- ▶ an identification of the Audit Team and the members assigned rolls
- ▶ audit materials such as checklists, questionnaires, etc.

Three Keys to Success

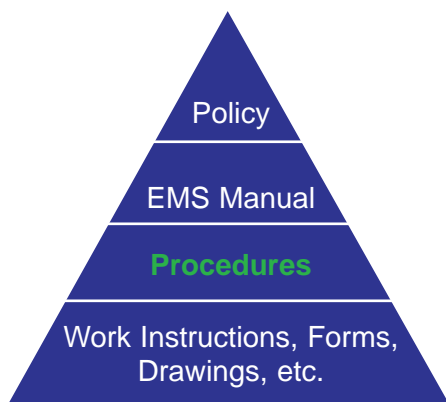
(from wastewater facilities):



1. Streamline the EMS internal auditing process to be understandable for employees. Don’t make the process too lengthy or complicated.
2. Perform an internal audit of your EMS system and processes—not individuals.
3. Make the EMS internal audit process positive—identify the good things and compliment people—as well as identify the opportunities for system improvements.

An EMS Internal Audit is a tool to improve your system. View it as such, and as an effective management tool.

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department



An EMS Internal Audit system procedure is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

Examples of Nonconformance:

- No external/internal communication procedure
- Emergency preparation procedure exists, but is not posted
- A number of employees are not aware that you have an Environmental Policy

An EMS nonconformance requires a documented corrective action. An observation is a recognition noted during the audit that a system element may lead to a nonconformance; or if done correctly, could strengthen your EMS.

Examples of Observations

- Procedures that are long and difficult to follow
- Poor housekeeping
- EMS knowledge of pretreatment staff was excellent

More on documenting, managing, and closing out nonconformant EMS audit findings can be found in this Handbook in the next Section on Nonconformance and Corrective and Preventative Actions.

Step 6) Develop a System Procedure for Conducting Your EMS Internal Audits

Document your internal audit process in a system procedure that clearly defines what you'll do, roles and responsibilities, when they'll do it, how the information will be communicated, and where the information will be stored. This documented procedure will be a consistent, easily accessible, and clear guide for ensuring that this important element of your environmental management system is carried out according to your plans.

REMEMBER



Documenting a procedure is not enough to satisfy the EMS requirement and the audit team. It's critical to put the procedure into practice in your facility – to implement it and do what you say you will do. Within a few months it's time to verify that your procedure is working well, and if necessary, make any improvements.

For sample EMS Internal Auditing procedures from wastewater facilities, see Appendix A.

Step 7) Check the EMS Internal Audit Procedure for EMS Conformance

Here are some questions to investigate regarding your EMS internal audit procedure:

Check ✓

1. Have you determined who will be conducting your EMS Internal Audits?
2. Are they qualified and trained?
3. Do you have an EMS audit program that verifies the conformance of your EMS?
4. Are EMS findings of nonconformance documented?
5. Are corrective and preventative actions implemented for audit findings of past nonconformance?
6. Are audit checklists and reports maintained as EMS records?
7. Are audit results communicated to management?

Solicit internal auditors from various levels and functions of the organization to provide different viewpoints of the system. Set schedule to audit the entire system on a yearly basis.

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

REMEMBER



Your internal auditing program is a great tool for identifying areas to improve your system. In addition, it is a valuable step in preparing for external audits if you are pursuing third-party accreditation. Set up your internal audits to mirror the scope of your external audits.

Your EMS Internal Audit can Accomplish Several Things, Including:

1. It lets you know if the EMS element is being implemented as planned.
2. It gives employees practice in being audited.
3. It gives audit teams a chance to practice their auditing skills.
4. It reinforces everyone's involvement and responsibility in your EMS.
5. It's a teaching tool to get employees to understand each element of the EMS.
6. It's an important tool to measure how your system is or is not continually improving.
7. It's a "find, fix, and prevent" opportunity to identify weaknesses in procedures and work instructions before they become a documented part of your EMS.

Communication of your audit goals to all levels of the organization is crucial in providing a level of comfort and knowledge to field crews.

Chris Toth
City of San Diego
Wastewater Collection Division

Auditor Credentials

- ⇒ Independent of the areas being audited
- ⇒ Has an understanding of relevant laws and regulations
- ⇒ EMS training
- ⇒ An understanding of audit process and procedures
- ⇒ Good communication skills
- ⇒ An attention to detail

NOTE



A systems audit looks for system elements and system linkages. For example, did the environmental goals you set consider your significant impacts and what you said in your policy statement? A compliance audit looks for regulatory violations based on meeting specific laws and regulations. For example, are the discharges from your outfall within the permit limits?

Involving Contractors and Temporary Staff




If your contractor and temporary employees work in operations and services that your organization identified as significant, they should understand what is expected of them during your internal EMS audits. For example, temporary and contractor staff should understand the basics of your EMS Policy, what operations and services have significant aspects, and the environmental goals your wastewater facility is looking to achieve.

Suggestions on Conducting EMS Internal Audits from Wastewater Facilities and Other Public Organizations

We've benefited from hiring an outside consultant to train our internal audit team. The outside expert credibility factor worked wonders in a short time.

We partnered with other public entities in our region and are using each other's audit teams for internal EMS audits. We get a fresh look at our own system, and we learn a lot about how others have implemented and improved their EMS. These are extremely valuable experiences for all of us.

We handed out a manual of all our work to date before our internal audit training. This proved very valuable in showing off the big picture and reinforcing what we had already accomplished so far. It also made the audits that much easier to conduct at each facility.



EMS Internal Auditing

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Establish an effective EMS internal audit program to continually evaluate and improve your EMS system.

The **Results** of this EMS element are:

- An EMS audit procedure (EMS Document) that covers scope, frequency, methods and responsibilities.
- A mechanism for EMS internal audit results (EMS Record) to be reported to management for the purpose of management review.
- An EMS Internal Audit Schedule/Plan that covers all elements of the EMS requirements.
- A group of trained EMS internal auditors identified and available to conduct EMS internal audits.
- Internal audit documentation, including checklists, reporting documents (e.g., an internal audit report), and summary documents (EMS Records) to review and follow-up on the results of audits.

Before you Begin this EMS element:

- Implement all elements of your EMS.
 - Conduct EMS employee awareness and understanding training for all staff to prepare them for the internal audit process.
- 
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ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Environmental Management System Audit</i></p> <p>The organization shall establish and maintain (a) program(s) and procedures for periodic EMS audits to be carried out, in order to:</p> <p>a) determine whether or not the environmental management system</p> <p>1) conforms to planned arrangements for environmental management including the requirements of this International Standard; and</p> <p>2) has been properly implemented and maintained; and</p> <p>b) provide information on the results of audits to management.</p> <p>The organization's audit program, including any schedule, shall be based on the environmental importance of the activity concerned and the results of previous audits. To be comprehensive, the audit procedures shall cover the audit scope, frequency and methodologies, as well as the responsibilities and requirements for conducting audits and reporting results.</p>	<p>Structure & Responsibility - Employees and management are aware of their roles for your EMS internal audit program.</p> <p>Training & Awareness - Your organization has qualified, trained and capable EMS internal auditors. All staff are aware of their responsibilities during the EMS internal audit.</p> <p>Corrective Actions - Establish a report (CAR) that identifies EMS audit discrepancies, action items, responsibilities and timeframes for improving your system.</p> <p>Management Review - Meet with top management to discuss new or changed priorities based on your internal audit results.</p>	<p>EMS Audit Procedure</p> <p>Audit Records/Reports</p> <p>Corrective Action Reports (CARs)</p> <p>List on Nonconformances</p>	<p>Audit Plan/Schedule</p> <p>List of Qualified EMS/QS Auditors</p>

Section 3: EMS Nonconformance and Corrective/Preventative Actions

What is an EMS Nonconformance?

A nonconformance is the audit term used to describe one or more EMS requirements that have not been addressed (i.e., no procedure) or have not been implemented (e.g., employees not following a procedure) within your organization's defined EMS fence line.

Examples of Nonconformance:

- No external/internal communication procedure
- Emergency preparation procedure exists, but is not posted
- A number of employees are not aware that you have an environmental policy

Step-by-Step Guide to Nonconformance and Corrective and Preventative Action

- Step 1) Identify EMS Nonconformances
- Step 2) Identify Root Causes and Prevent their Reoccurrence
- Step 3) Implement Corrective and Preventative Actions
- Step 4) Update and Communicate EMS Corrective and Preventative Actions
- Step 5) Develop a System Procedure for Nonconformance and Corrective and Preventative Actions
- Step 6) Check Your Nonconformance and Corrective and Preventative Action Procedure for EMS Conformance

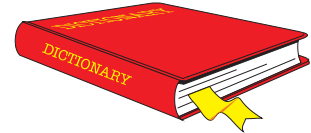


Step 1) Identify EMS Nonconformances

EMS nonconformances (potential problems or areas requiring improvement) can be initiated in a number of ways, including through 1) audit "findings"; 2) suggestions from employees (e.g., from working with day-to-day operating procedures); and 3) monitoring your significant environmental issues. To manage your EMS nonconformances, identify and investigate your EMS deficiencies, determine their root causes, and implement corrective and preventative actions to manage them and verify their effectiveness. A corrective and preventative action program will do this for you.

A sample Corrective/Preventative Action Request/Report (CPAR) is attached at the end of this Section.

Key Section Terms



Audit Finding – The discovery of a lack of conformance to the requirements of an EMS (ISO 14001-based) criteria/checklist. All audit findings must be resolved as found during the internal audit or through a formal EMS process of corrective and preventative action.

Corrective Actions – As a result of the audit findings, corrective action reports (CARs) are assigned to all nonconformances to correct EMS deficiencies as they occur. CARs track an audit finding, and assign tasks to be completed, responsibilities, and timeframes.

Corrective Action Request (CAR) – A report form to identify, track and manage corrective actions.

EMS Audit – A planned and documented review performed in accordance with a documented audit procedure for the purpose of verifying, through interview and an evaluation of EMS documents and records, conformance with the applicable elements of your EMS.

Major Nonconformance – A deficiency in meeting the requirements of an EMS. One or more of the 17 elements of the EMS are not addressed (e.g., no system procedure) or implemented (e.g., not following a system procedure as written).

Minor Nonconformance – A finding that leads to a failure to conform completely with an EMS element, but is not considered to be a breakdown in your system. For example, a number of employees were overdue on their EMS refresher training.

Key Section Terms, continued

Observation – A recognition of something done incorrectly or an area of concern. While not a major or minor nonconformance with an EMS requirement, if done correctly it could strengthen the EMS or if done incorrectly, could potentially cause a system failure.

Preventive Actions – A proactive approach to managing actions that are assigned to any EMS nonconformance made that will prevent potential environmental issues before they occur.

Root Cause – Underlying reason that led to or may lead to an EMS nonconformance. For example, if a group of employees were not following a procedure, the underlying cause could be that they were not properly trained on the procedure or that an updated procedure was not communicated to them.

System Procedure – An EMS required document that establishes an element's purpose, scope, roles & responsibilities, the tasks to be completed, and where or how the associated records and documents are maintained.

Typical Causes of EMS Nonconformances Include:

- ✓ Poor communication
- ✓ Faulty or missing procedures
- ✓ Equipment malfunction (or lack of maintenance)
- ✓ Lack of training
- ✓ Lack of understanding of an EMS requirement
- ✓ Not following an EMS requirement

Step 2) Identify Root Causes and Prevent their Reoccurrence

While many corrective actions may be “common sense,” look beneath the surface to determine why the problems occurred in the first place. Many organizations use the term “root cause” in their corrective and preventative action processes. By determining the root causes of your nonconformances, you are simply looking past the most obvious or immediate reasons to determine why it occurred.

For example, a new procedure was recently updated by the document control center to include an EMS initiative to recycle oil and grease. However, it was noted on the most recent EMS internal audit that employees in maintenance were not disposing of their oils and greases properly. So how would you determine the root cause of this nonconformance?

By performing a check of the potential sources or causes of nonconformance.

- ◆ Was the procedure updated with the new recycling initiative? Yes.
- ◆ Were all employees in maintenance trained and was the new procedure communicated? Yes.
- ◆ Were they using the most current procedure? No.

Even though employees were trained on the new procedure, it was determined that employees were still using a hard copy procedure that was outdated and that did not include the updates on recycling. It's important to find the cause of the nonconformance in order to fix it and prevent it from reoccurring.

Step 3) Implement Corrective and Preventative Actions

Correct, prevent and manage the nonconformance until it is corrected. This is done through a corrective/preventive action request or CAR.

A CAR identifies and describes the EMS nonconformance, the action items needed to implement the correction, the person(s) responsible for implementing and tracking the correction, and the timeframes for completion. A CAR is an EMS record and documents and tracks corrective actions until the action items from the nonconformance are completed by the established timeframes.

Step 4) Update and Communicate EMS Corrective and Preventative Actions

Update and communicate what you have learned. Based on your root cause review, you may need to update, train, and communicate procedures and work instructions, establish new programs, calibrate equipment, etc.

Let's look back at our example in which the personnel in maintenance were not recycling their oils and greases. It was determined through identifying the nonconformance root cause that the employees in maintenance were using an outdated procedure. As part of updating and communicating the completion of this particular CAR, and to prevent this nonconformance from occurring again: 1) make sure that the document control center "manages" (see section on EMS document and records) all hard copy procedures and work instructions; and 2) communicates and trains the changes to maintenance employees.

In addition, as part of "institutionalizing" this or other corrective actions, inform management so that your EMS improvements will become the new way to do things in your day-to-day operations. For example, from now on, the document control center will put a stamp or footer on all hard copy procedures with the following language: "If printed, this document is obsolete. See an employee from the Document Control Center for the most current version."

REMEMBER



Nonconformances can also be identified outside of an EMS audit. Anyone in your wastewater facility can identify and report findings and make recommendations. This should be encouraged. Find ways to get employees involved in the EMS improvement process – whether formally or informally (for example, via suggestion boxes, contests or incentive programs).

Step 5) Develop a System Procedure for Nonconformance and Corrective and Preventative Action

Document your process for nonconformance and corrective and preventative action in a system procedure that clearly defines what you'll do, roles and responsibilities, when they'll do it, how the information will be communicated, and where the information will be stored. This documented procedure will be a consistent, easily accessible, and clear guide for ensuring that this important element of your EMS is carried out according to your plans.

For samples of Nonconformance and Corrective and Preventative Action procedures from wastewater facilities, see Appendix A.

COACH'S CORNER



Follow a "find, fix, and prevent" approach for smaller issues rather than go through documenting nonconformances. If you're unsure which approach to follow you can start by documenting every finding and filling out a corrective action request (CAR) and then scale back at a later date. Remember, an EMS is about continual improvement.

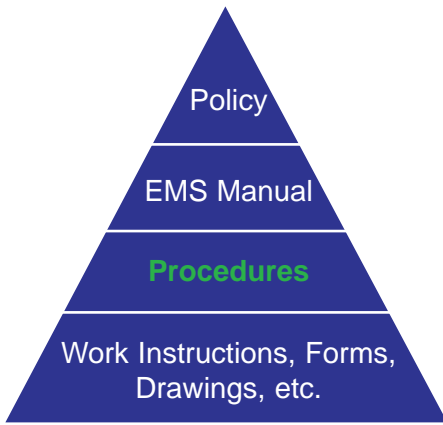
NOTE



Completed CARs are EMS records that need to be traceable to an operation or activity and maintained for review.

Involving Contractors and Temporary Staff

Contractor and temporary employees should understand what is expected of them during your internal EMS audits. Therefore, if an EMS audit finding is found within their operation or service at your facility, they need to understand their roles and responsibilities in correcting the nonconformance (finding), and preventing the EMS audit finding from reoccurring.



A Nonconformance and Corrective and Preventative Action **procedure** is required for this element. A procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

Three Keys to Success

(from wastewater facilities):



1. Focus on correcting and preventing problems. Preventing problems is cheaper than fixing them after they occur (or after they reoccur).
2. EMS nonconformances should be analyzed to detect patterns or trends. Identifying trends allows you to anticipate and prevent future problems as well as identify things going well.
3. Be sure that your corrective & preventive action process specifies roles and responsibilities and schedules for completion for Corrective Action Reports (CARs).

Step 6) Check Your Nonconformance and Corrective and Preventative Action Procedure for EMS Conformance

About two or three months after you have documented and implemented your Nonconformance and Corrective and Preventative Action procedure, check to see if it is working according to your plans. Here are some questions to investigate:

Check ✓

1. Do you have a procedure for identifying, managing, tracking, and completing (closing) EMS nonconformances?
2. Does your process include identifying the root cause and assigning responsibilities and timeframes for completing the corrective actions?
3. Do you document and record your corrective actions?
4. Do you have a procedure to prevent nonconformances from reoccurring?

NOTE



Start thinking about your EMS nonconformances as opportunities to improve. Also, don't forget to document what you are doing well!

After an EMS nonconformance, consult with your employees on how they would implement a solution. Your frontline employees have great ideas on how to improve operations, since they wrestle with the same type of issues each day. The challenge of a manager is how to get ideas out of these individuals, use their knowledge, and reward them for their concepts and foresight.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

When you receive a nonconformance, take a breath and try to think about the whole system. Try to avoid jumping in with a quick fix. A quick fix can trigger other unintended consequences that may be another problem down the road.

Donna Adams
Eugene, Oregon
Wastewater Division

Three Lessons Learned

(from wastewater facilities):

- 1.** Your corrective actions should be based on good information and analysis of root cause. While many corrective actions may be “common sense,” you need to look beneath the surface to determine why problems occur.
- 2.** Designate employees from the areas where the nonconformances occurred as the ones responsible for implementing their corrective and preventative actions. These personnel will be the best at identifying appropriate corrective and preventative actions, and the process will get them involved in the EMS.
- 3.** Review your EMS progress regularly and follow up to ensure that corrective actions taken are effective.



Three Things to Avoid

(from wastewater facilities):

- 1.** Starting from scratch. If your organization has a system for correcting environmental compliance findings and/or an ISO 9001 management system, use your current methods as models (or integrate with them) for your EMS.
- 2.** Not documenting and resolving your nonconformances in a timely manner.
- 3.** Not documenting EMS activities that are going well. In addition to documenting nonconformances or problems with your EMS, identify and document EMS successes. This will motivate your staff and help ensure EMS buy-in.



Nonconformance and Corrective and Preventative Action

(Cut out this section for handy reference)




The **Purpose** of this EMS element is to:

- Implement a Corrective and Preventative Action (improvement) process that will identify and manage problems identified in your EMS.

The **Results** of this EMS requirement are:

- A Nonconformance and Corrective and Preventative Action procedure (EMS Document), that identifies, tracks and closes out corrective and preventative actions.
- Corrective and Preventative Action Reports (EMS Records).

Before you Begin this EMS element:

- Develop formal (e.g., audits) and non-formal (e.g., employee suggestions) methods to identify nonconformances or areas that require improvement within your EMS.
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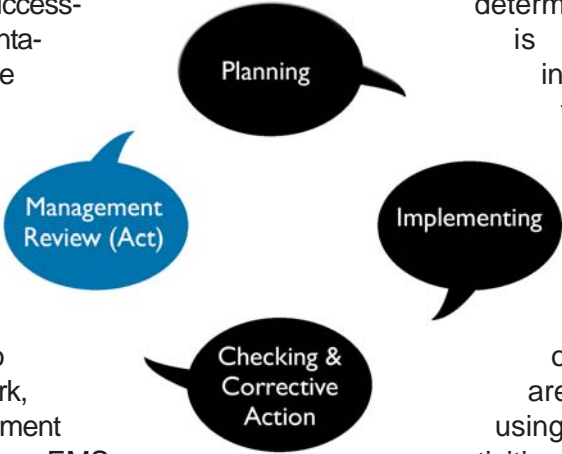
ISO 14001 Requirements	Key Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Nonconformance and Corrective and Preventive Action</i></p> <p>The organization shall establish and maintain procedures for defining responsibility and authority for handling and investigating nonconformance, taking action to mitigate any impacts caused and for initiating and completing corrective and preventive action.</p> <p>Any corrective or preventive action taken to eliminate the causes of actual and potential nonconformances shall be appropriate to the magnitude of problems and commensurate with the environmental impact encountered. The organization shall implement and record any changes in the documented procedures resulting from corrective and preventive action.</p>	<p>Operational Control – make sure controls (e.g., procedures, work instructions, manuals, etc.) are in place to prevent EMS nonconformances.</p> <p>Monitoring & Measurement – monitor your significant environmental aspects to determine if they are under control.</p> <p>EMS Audits – internal EMS reviews provide a source to identify EMS nonconformances.</p> <p>Management Review – review nonconformances, corrective and preventative actions, and completion of nonconformant issues with management as a way to continually improve and institutionalize the EMS at your facility.</p>	<p>Nonconformance and Corrective and Preventive Action Procedure</p> <p>Corrective and Preventive Action Requests (CPARs)</p>	<p>CAR Logs</p>

Corrective/Preventative Action Request/Report

A. Area/Department:	
<i>Audit Date:</i> <i>Auditee(s):</i>	<i>Auditor(s):</i> <i>Date:</i>
B. Description of Non-Conformance: Audit Criteria: Applicable ISO 14001 Element:	C. Root Cause Analysis:
D. Corrective Action: Date of Implementation:	
E. Preventative Action: Date of Implementation:	
F. Verification of Completion: Date of Verification:	
<i>Auditor (signed):</i>	Date:

Phase V: Management Review

You are now ready to begin the Management Review Phase of the EMS cycle. Each section of the Handbook will guide you step-by-step through each of the EMS activities. Refer to the icons for case studies, sample documents, keys to successes and other implementation assistance. At the end of each section, two handy reference sheets review the **Purpose** of each requirement, describe the **Results** you'll be developing, discuss how to **Prepare** to do the work, and show how the element links to other EMS requirements.



consider, through dialogue with senior management, new organizational goals. This phase is an opportunity for top management to review and fine-tune your EMS and make course corrections, if needed. Top management will determine whether the EMS is functioning as you intended, where additional resources may need to be allocated, if your environmental policy is appropriate or needs to be revised, and if your organization's objectives and targets are on track. If you are using a two-year cycle, the activities in this phase can be comfortably accomplished in about one month.

In this phase, your organization will take the opportunity to assess your EMS performance and judge the suitability, adequacy, and effectiveness of the system. As part of this review, your EMS Team will

Here's a checklist of requirements in this Phase:

Phase V EMS Requirements (1 month)	
Management Review	✓
Organizational Goal Assessment	✓
Apply Lessons Learned for Continual Improvement	✓

Section 3: Management Review

The management review is the final element in your EMS cycle (“Act”). It’s an opportunity to review the effectiveness of your EMS with top management and fine-tune your EMS and make course corrections. Top management will help determine whether the EMS is functioning properly, where additional resources need to be allocated, and if the environmental policy is appropriate or needs to be revised. The management review provides opportunities for continual improvements to be implemented into the system.

The management review element provides the opportunity for constructive dialogue with management to judge the suitability, adequacy, and effectiveness of the EMS. Seize the opportunity to reflect upon your organization’s environmental policy and commitment to continuous improvement. Are resources, both time and monetary, being strategically employed? Are there any course corrections that need to be made? Are you on the right path to efficiently and effectively meeting your organization’s EMS objectives and targets?

Step-by-Step Guide to Management Review

- Step 1) Determine When and What to Review
- Step 2) Identify Who Should Attend Your Management Review
- Step 3) Document Accomplishments and Follow-up Actions
- Step 4) Develop an EMS System Procedure for Management Review
- Step 5) Check Your Management Review Procedure for EMS Conformance



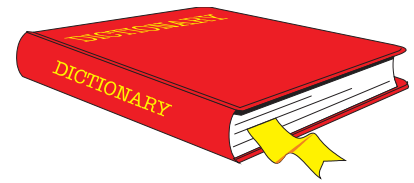
Step 1) Determine When and What to Review

Schedule your Management Reviews at appropriate intervals, typically after your EMS internal audits, to check on the progress of your objectives and targets, but at least annually. Determine a management review frequency that will work best for your organization.

What to Review

There is a wide range of information you can report to management. Decide with your Core Team the appropriate information to communicate. Present the information to management so it is easily understood without overloading them with details.

Key Section Terms



EMS Audit – A systematic, documented verification process of objectively obtaining and evaluating an organization’s EMS to determine whether or not it conforms to the environmental audit criteria pre-defined by the organization and applicable standards (i.e. the ISO 14001 Standard).

Continual Improvement – The principle of continual improvement, as fundamental to the ISO 14001 Standard, is intended to ensure that an organization does not simply adopt an EMS, or other Plan-Do-Check-Act based management system, for cosmetic purposes and thereby remain static. Continual improvement is the process of enhancing a management system to achieve improvement in overall performance and effectiveness in line with the organization’s management policies.

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 Objective – Overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable. Objectives are based on specific significant aspects.

Environmental Target – Detailed performance requirement, quantified where practicable, based on an organization’s defined environmental objectives and that must be met to achieve those objectives.

Management Review: Questions to Consider

- ◆ Did we achieve our objectives and targets? If not, why not?
- ◆ Is our environmental policy still relevant to what we do?
- ◆ Are we applying resources effectively?
- ◆ Are our procedures clear and adequate? Do we need other controls or to modify any?
- ◆ Are we monitoring our EMS (e.g., via EMS audits)?
- ◆ What do the results of those audits tell us?
- ◆ What other changes are coming? What impacts (if any) will these have on our EMS?
- ◆ What stakeholder concerns have been raised since our last review?
- ◆ How are stakeholder concerns being addressed?



Three Things to Avoid (from wastewater facilities):

1. Not communicating with top management on what they would like to review to access the performance of the EMS.
2. Conducting only annual reviews. Consider having management reviews every quarter to give management an update and to check the progress of your EMS.
3. Not training top management on the fundamentals of an EMS. If Management understands what an EMS can do for you, they will understand what it can accomplish for your organization.

Use objective information from internal audits and other “checks.” Focus on performance and not on process or procedures. You might consider providing some information (e.g., status on meeting EMS objectives and targets, etc.) to management before the meeting. Since the EMR is the communication “link” between the organization’s EMS activities and management, it is his/her responsibility to pull the information and materials together to allow management to conduct an adequate and constructive review. However, as with all EMS activities, this is a team effort. Work together with your Core Team and other personnel to ensure that everyone is on the same page and that information flows laterally and from the top-down and the bottom-up.

Step 2) Identify Who Should Attend Your Management Review

Make sure you get managers involved that can make key decisions regarding your EMS. You identified top management (Phase I) earlier in the implementation process. Are these the same people you will have in the management review meeting?

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

- ⇒ People who have the right kind of information/knowledge
- ⇒ People who can make decisions about the organization and its resources (top management).

Wastewater organizations that have implemented EMSs at their facilities have indicated that Public Works Directors, General Managers, Plant Managers, Line and Division Managers (especially within areas where objectives and targets were set), the EMR, and invited City/County Commissioners, other local leaders and citizen groups attended Management Reviews.

Step 3) Document Accomplishments and Follow-up Actions

EMS progress and updates from implementing the EMS can be reported back to management in the monthly “good news” stories or in other creative ways. During management review meetings, make sure that someone documents and records what issues were discussed, what decisions were reached, and follow up on action items and responsibilities.

REMEMBER



Remember to track and document your EMS performance and benefits to management on a regular basis. How well you are reaching your environmental goals, avoiding accidents and spills, and saving money is very important to management as they develop plans and allocate resources.

NOTE



Your EMR is responsible for gathering the meeting information, agenda topics, planning, scheduling, etc. for management reviews.

“Conduct a management review at least annually to review your entire EMS. To be more proactive, conduct quarterly management reviews to assess internal quarterly audits and quarterly legal requirements. This allows a snap shot, every three months, of your system progress.”

James Naber
Buncombe County, North Carolina
Metropolitan Sewer District

Step 4) Develop EMS System Procedures for Management Review

When you're satisfied that your process for conducting management review conforms to the EMS requirements, document the process in a system procedure. As with all EMS system procedures, it needs to clearly define what, who, when, how, and where.

For samples of Management Review procedures and a Management Review Agenda from wastewater facilities, see Appendix A.

Step 5) Check Your Management Review Procedure for EMS Conformance

Check ✓

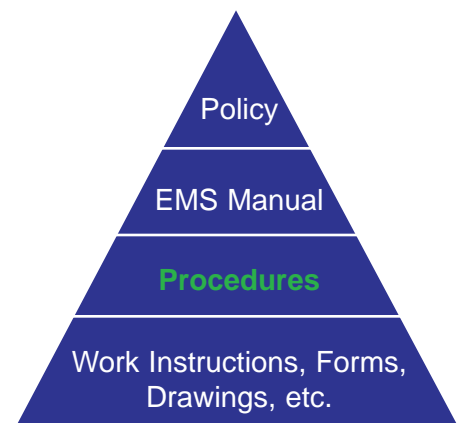
1. Are management reviews scheduled on a regular (at least annual) basis?
2. Does the management review check for the effectiveness of the EMS based on policy, Objectives & Targets, previous audits, changes to operations, etc.?
3. Are management reviews documented and recorded? Are action items tracked?

“Attempting to implement improvements to your operations will be futile if you don't have management's full support, commitment and involvement.”

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

Information to Cover During the Management Review

- ▶ Audit results - EMS and compliance status
- ▶ External communications
- ▶ Progress on achieving objectives and targets
- ▶ Progress towards or achievement of environmental performance measures
- ▶ Reports of emergencies, spills, other incidents and/or accidents
- ▶ Status of corrective actions
- ▶ Results of action items from previous management review meetings
- ▶ Policy revision based on EMS effectiveness and suitability
- ▶ Changing circumstances (e.g., changes in operations or services, new customers, etc.)



A Management Review **system procedure** is required for this element. A system procedure defines the purpose (why the procedure is needed), scope (to what operations/areas/staff the procedure applies), roles & responsibilities (who needs to complete the tasks), and the tasks that need to be completed for this element.

Three Keys to Success

(from wastewater facilities):



1. Top management must receive frequent updates, especially with regard to the status and performance of your EMS objectives and targets.
2. Management reviews should assess how changing circumstances might influence the suitability, effectiveness or adequacy of your EMS. Changing circumstances might be internal to your organization (such as new facilities, changes in products or services, new customers, etc.) or might be external factors (such as new laws, new scientific information, changes in political leadership, or changes in adjacent land use).
3. 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.

Three Lessons Learned

(from wastewater facilities):

1. Communicate and review with top management to find out what they would like to see in order to assess the EMS. If the meeting is relative to management, they will continue to be more engaged and committed to the EMS.
2. Provide top management with just a summary of the EMS. Top management are “big picture” people and do not need a lot of detail during the management review meetings.
3. Ensure that all levels of management (division, line managers, etc.) participate in management review meetings.

Our planning has improved considerably. Prior to EMS establishment, no formal, consistent structure was available for environmental planning. Also, our planning is much more focused by having a management review process. EMS drivers are known in our place, and employees have a better understanding of the reasons behind planning initiatives. Additionally, knowledge of our facility's impact on the environment has been heightened and is reviewed on a regular basis.

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

Management review meetings provide good guidance for progress and improvement, a resource for future projects, and a strategic direction for future departments' involvement.

Tri-County Metropolitan Transportation District
Portland, Oregon

✂

✂

✂

Management Review

(Cut out this section for handy reference)

The **Purpose** of this EMS element is to:

- Establish a management review system to check the effectiveness and adequacy of the EMS.

The **Results** of this EMS element are:

- Identification and confirmation of a group of key management level personnel who will attend scheduled management review sessions.
- Development of a management review procedure (EMS Document) that addresses the requirements of the EMS and is appropriate and effective to your organization's operations and services.
- Establishment of a schedule, agenda, and meeting notes (EMS Record) for your management reviews.

Before you Begin this EMS element:

- Establish an EMS internal audit and corrective action system.
- Establish all elements of your EMS.

✂

✂

✂

ISO 14001 Requirements	Links to Other EMS Elements	Required Documents & Records	Optional Documents & Records
<p><i>Management Review</i></p> <p>The organization's top management shall, at intervals that it determines, review the environmental management system, to ensure its continuing suitability, adequacy and effectiveness. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. This review shall be documented.</p> <p>The management review shall address the possible need for changes to policy, objectives and other elements of the environmental management system, in the light of environmental management system audit results, changing circumstances and the commitment to continual improvement.</p>	<p>All elements of the EMS are linked as part of the Management Review.</p>	<p>Management Review Procedure</p> <p>Meeting Minutes</p>	<p>Management Review Agenda</p>

Section 4: Third-Party Registration

Now that you have conducted your EMS Internal Review and Management Assessment at your wastewater facility, you may want to consider a third-party audit of your EMS and go for ISO certification.

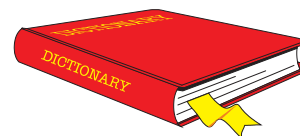
EMS third-party registration provides a check that an organization has met the requirements of an ISO 14001 EMS and has demonstrated a commitment to environmental management and improvement. Furthermore, public organizations have achieved a number of benefits from EMS implementation and registration/certification, including public (local community) recognition and managing environmental issues in a more consistent way. This section describes the process and benefits of having your facility go through a third-party review based on the ISO 14001 International EMS Standard. Most Publicly Owned Treatment Works (POTWs) in the U.S., including those who helped develop this guide, have followed this approach to EMS implementation.



What this Section Will Cover:

- ⇒ Third-Party Registration
- ⇒ Why Wastewater Facilities Choose Third-Party Registration
- ⇒ The Benefits of Third-Party Registration
- ⇒ Step-by-Step Overview of a Third-Party Registration Process
- ⇒ The Keys to Selecting a Third-Party Registrar
- ⇒ The Costs and Typical Timeline of Third-Party Registration
- ⇒ The Keys, Lessons Learned and Things to Avoid when Considering Third-Party Registration
- ⇒ EMS Registrar POCs with Wastewater and Public Sector Experience
- ⇒ FAQs

Key Section Terms



ISO 14001 – The standard protocol (requirements document) in the ISO 14000 series that specifies the necessary elements of an EMS.

Auditor – Person with the qualifications to conduct an EMS audit.

American National Standards Institute Registrar Accreditation Board (ANSI-RAB) – Body that accredits ISO 14001 Environmental Management Systems (EMS) registrars and auditors.

Conformance – To verify an organization's EMS to a specified standard (ISO 14001).

Registrar – A third-party organization that awards the EMS certification.

Registration – A recognized validation that an EMS has passed an accredited independent, third-party audit.

Self-Declaration – An internal review of conformance to all elements of an EMS. EMS self-declaration is an organization's statement that it conforms with all elements of the ISO 14001 Standard.

Surveillance – A scheduled sampling of EMS elements to maintain a third-party registration.

Third-Party – An independent EMS auditor that is qualified to conduct EMS audits.

NOTE

Implementing an ISO 14001 EMS does not require third-party registration. However, many organizations, including wastewater operations, have experienced benefits from obtaining third-party registration.



What is Third-Party Registration?

Third-party registration is an independent review and recognized validation of an organization's EMS. An organization can meet the objectives and requirements of an ISO 14001 EMS either through self-declaration or through third-party registration. Many public organizations that have chosen third-party registration have experienced a greater level of credibility with their communities and outside stakeholders because of the independent review.

NOTE



Keep in mind that a third-party EMS conformance review is not a compliance audit. Prepare and keep staff on their toes, but realize that this review is to assist you in meeting your EMS goals on continuous improvement.

One wastewater facility used a RFP selection process to choose its Third-Party registrar based on the following criteria:

- ☑ Registrar's experience conducting ISO Registration Services. (20 Points)
- ☑ Registrar's experience conducting ISO Registration Services for public agencies, particularly wastewater treatment agencies. (20 points)
- ☑ Qualifications and experience of assigned lead auditor(s). (20 points)
- ☑ Match of registrar's auditing philosophy with our EMS policy, goals, and objectives. (20 points)
- ☑ Registrar's experience and reputation for satisfactory work, judgment, integrity, and reliability. (Used Reference Checks) (20 points)
- ☑ Overall cost of the proposal. (20 points)

Third-Party Registration Audit	Regulatory Compliance Audit
Looks for system elements and linkages	Looks for regulatory violations
Based on verifying that the 17 elements of an EMS are institutionalized	Based upon meeting applicable environmental laws and regulations
Focuses on employee interviews and document review	Focuses on individual operations and outputs

Why Wastewater Facilities Choose Third-Party Registration: The Drivers & Benefits

A successful third-party review of an organization's EMS can help maintain a system's integrity, establish credibility, and inspire greater confidence in external stakeholders (e.g., the public, regulators, governments, and other organizations); third-party registrars act independently and review an organization's EMS in an unbiased manner.



"To add system credibility from an outside independent source."
Buncombe County, North Carolina

"Good Public Relations" and "Incentives from regulatory agencies to provide benefits to environmentally proactive organizations."
Gastonia, North Carolina

"To force private contractors to achieve similar service and verifiable levels."
San Diego, California

Internal Benefits of a EMS Third-Party Registration:

- Assures that EMS system elements are in place and working as expected
- Protects the investment made in the EMS
- Keeps management's and staff's attention on the EMS

External Benefits of a EMS Third-Party Registration:

- Provides credibility and commitment to external stakeholders
- Improves relationship with regulators
- Supports federal and state EMS incentive programs

Questions to Think About When Considering a Third-Party Registration:

- ◆ Are competitors and peer organizations pursuing registration?
- ◆ Are "customers" indicating that they require or desire registration?
- ◆ Will registration improve the relationship with regulatory agencies?
- ◆ Will insurers offer preferential treatment because of perceived lower risk?
- ◆ Will registration improve public relations with the surrounding community?

Wastewater Facility Benefits

“Third-Party EMS registration confirms to the public and regulatory agencies that the ISO standard is being conformed to. Second, having a Third-Party audit prompts CPW's staff to develop better strategies on how to conform to the standard. Third, the Third-Party audit gives management a greater sense that the system is in place and is doing exactly what it was designed to accomplish.”

Rick Bickerstaff
Charleston, South Carolina
Commissioners of Public Works

“The Third-Party registration process gave us the staying power to build a system that, now if maintained as intended, will provide a framework for continual environmental and other organizational improvements. This system ensures management's continued involvement in clearly defining our environmental goals, keeps staff more engaged and accountable, provides another perspective outside of the organization, provides us a much better document control system, and provides better credibility and service to the communities we serve.”

Donna Adams
Eugene, Oregon
Wastewater Division

Step-by-Step Guide to Third-Party EMS Registration

- 1) Select a Registrar
- 2) Prepare Staff for EMS Third-Party Registration Audit
- 3) Have an EMS Desktop Review Conducted
- 4) Support the EMS Third-Party Registration Audit
- 5) Follow-up on the EMS Third-Party Registration Audit



Step 1) Select a Registrar

How should you go about selecting a registrar to externally verify your EMS? And what should you look for in a registrar? What about costs? These questions were put to wastewater facilities that have been there.

Asking the "right" questions...

Each organization must consider whether an ISO 14001 registration will provide worthwhile benefits. Five (5) wastewater treatment facilities

NOTE



Each organization must consider whether an ISO 14001 registration will provide worthwhile benefits. Five wastewater treatment facilities from around the country and of various sizes were asked to provide their experiences, lessons learned and the keys to success as they went through the process of third-party registration. All of the facilities have implemented and maintained third-party registered EMSs.

Keys to Success



1. Be flexible. Don't stress over on-site recommendations during the EMS third-party registration audit. The auditor should allow ample time to modify and close out any minor or major nonconformances.

2. Prepare the Steering Committee, EMS Team, Department Supervisors and frontline employees concerning questions that could arise during the third-party audit. The frontline level employees need to understand that they do not need a textbook answer for a question. Simply tell them to answer questions in their own words.

3. Make "cheat sheets" for the employees (i.e. post the significant aspects, impacts, objectives, targets, environmental policy, and emergency procedures in all departments). This allows the employees an avenue of discussion with the auditor if they cannot remember the details. The employee can show the third-party auditor the bulletin board information.

4. Look for ISO 14001 third-party auditors with wastewater and public sector credentials and experience.

5. Look for registrars that have a Board of Directors and a mechanism to give feedback on their auditing. Sometimes, auditors can be inflexible and difficult to work with. Discuss this with their review board or the auditing organization they work for.

from around the country and of various sizes were asked to provide their experiences, lessons learned and the keys to success as they went through the process of third-party registration. All of the facilities have implemented and maintained third-party registered EMSs.



NOTE

- Four of five of the wastewater managers conducted qualifying interviews with Registrars.
- Four of five interviewed multiple Registrars.

Wastewater facilities that conducted interviews to qualify registrars considered the following to be the most important in registrar selection:

- Public, utility, chemical and wastewater sector experience.
- Comfort with the auditor; personality of the auditor relating to staff; staff level of comfort and friendliness with the auditor (i.e., shirt and tie — NO; blue jeans and boots — YES).
- Good price for services received.
- Knowledge of how public entities are set up and operate.
- The added value expected from the registrar through the registration process.
- Technical and auditing expertise of the registrar staff.

Step 2) Prepare Staff for EMS Third-Party Registration Audit

Congratulations! You've made the decision that a third-party registration of your EMS makes good business sense. You've interviewed several registrars, and have decided on one company that best suits your organization. You've signed a contract, developed an audit plan and agreed on an audit schedule. You are ready to go and so are the auditors. Generally, when the auditors arrive they will have a tight schedule of documents to review, people to interview, reports to write, and audit results to discuss. Your job is to support the audit function by preparing your managers, your employees, and your documents and records. All of these should be readily available for the auditors according to the prearranged audit schedule.

Well in advance of the audit, prepare management by:

- ▶ Reviewing their EMS responsibilities
- ▶ Rehearsing the type of questions that the auditor might ask them (see NSF guide Second Addition, Appendix A, pages 153 - 156)
- ▶ Preparing them to organize and track corrective actions that the audit identifies. (i.e., how the organization will respond to nonconformances if found)



NOTE

A team of individuals typically made the choice on which registrar to select at wastewater treatment facilities, with top management giving the final approval (sign-off).

- ▶ Indicating on managers' calendars suggested times for the pre-audit meeting to review the audit scope, plan and schedule, and the closing meeting to share audit findings
- ▶ Encouraging them to be visible, involved, and available for the month of preparation preceding the registration audit
- ▶ Freeing up the Environmental Management Representative to accompany auditors on their rounds

Well in advance of the audit, prepare employees by:

- ▶ Emphasizing the "find, fix, and prevent" opportunity the audit provides.
- ▶ Reviewing the environmental policy and confirming the role it has in employees' daily activities
- ▶ Reviewing significant aspects, objectives and targets with relevant department managers and the front-line
- ▶ Rehearsing the type of questions that the auditor might ask employees (you may want to use the checklist you developed in the internal audit)
- ▶ Reviewing EMS roles and responsibilities



NOTE
Wastewater Facilities: Four of Five have six-month surveillance audits and One of Five have three-month surveillance audits.


Well in advance of the audit, prepare documents and records by:

- ▶ Ensuring they are current, easily retrievable, and managed according to your document control procedures

Step 3) Have an EMS Desktop Review Conducted

An EMS "desktop" or document review, required for an EMS registration audit, is a review (by a third-party) of EMS policies, procedures and records before the third-party auditor comes onsite to conduct a full EMS audit and interview personnel. Some auditors prefer to conduct this onsite in conjunction with other audit activities. The desktop is conducted to provide the auditor a "snapshot" overview of an organization's EMS elements and how they fit together. A desktop review also provides the auditor with a first look at an organization's EMS and how the system elements fit with your current environmental programs and will therefore increase the efficiency of the third-party on-site audit.

An EMS desktop review will benefit the organization by assuring that key documents and records are in place and accessible.



NOTE
The five wastewater facilities that have an EMS in place and contributed to this Handbook had EMS desktop reviews conducted approximately two months before the third-party on-site audit.

Lessons Learned

(from wastewater facilities):

1. Don't be afraid to disagree with the auditor and stand up for your program if you feel what you have done meets the requirements of the standard.
2. Contact other organizations that have been successful in passing their third-party registration audit for information and documentation examples, so that you learn from the experiences of other organizations.
3. Keep it simple! This is particularly true for your environmental aspect identification and for how you determine environmental significance. If you have a complicated aspect analysis system, third-party registration may be harder to maintain.
4. Only have one current procedure available for what you do! Remove old documents before your third-party audit.
5. When the third-party auditors come out to review your EMS, make sure to stress to employees that the auditors are not auditing them, but auditing a system.



Things to Avoid

(from wastewater facilities):

1. Scheduling audits with major commitments prior to and after the audit. You will want ample time to reflect on the system prior to the audit and after.
2. Unnecessary interruptions during the registration audit.
3. Selecting registrars with no technical or related industry expertise.
4. Being unprepared! The Environmental Management Representative, Document Administrators and **all** key staff must be prepared before a third-party audit.

NOTE

Consider having a third party review your EMS whether you decide to officially certify to ISO 14001 or not. An external set of eyes will help you identify new opportunities to improve your EMS that you may have missed. If cost is an issue, consider asking other public organizations in your area to form a pool of qualified auditors and review each other's EMSs.



NOTE

Do not stress! Employees do not have to give textbook answers to the auditor. They simply need to know the basics of an EMS and how it affects their jobs.

Step 4) Support the EMS Third-Party Registration Audit

Support an EMS registration audit by:

- Providing facilities (i.e., place to work, computers, etc.) required for the third-party audit team to be effective and efficient.
- Providing access to on-site areas and systems to interview personnel and retrieve documents and records.
- Cooperating with the audit team so that the EMS third-party audit objectives will be achieved.

Step 5) Follow-up on the EMS Third-Party Registration Audit

Once the third-party audit has been completed, the audit team will review the findings so that the organization will have a clear understanding of the audit team's findings. One of the following recommendations will then be given:

Recommend registration: certification is immediately issued and the organization is added to the public register.

Recommend registration after corrective actions: minor non-conformances or "find, fix, and prevent" issues were found and will be corrected within a prescribed time period that is agreed upon by both the auditing organization and the facility.

Recommend onsite re-audit: one or more findings of major nonconformance were found or enough minor nonconformances were identified by the third-party audit to show system inconsistencies.

Remember that this is a find, fix, and prevent management system. A finding of a major nonconformance is unlikely since you've had the third-party auditor(s) conduct a desktop review and you've prepared your staff. Use your own internal EMS audits and the third-party audit as an opportunity to improve your EMS.



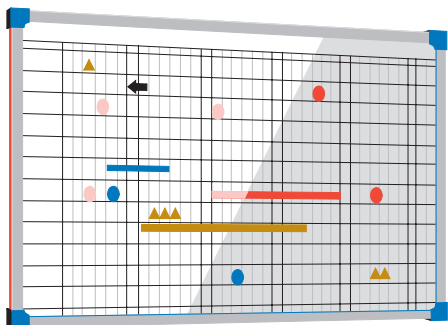
NOTE

An ISO 14001-based EMS registration is valid for three years. Once completing the registration, an organization can choose to have an EMS surveillance (sampling) audit every six months or every year, but must have all elements of an (ISO 14001) EMS audited at least every three years to maintain third-party registration.

Activities/Timeline of EMS Initial Registration Process

- ◆ Development and solicitation of RFP or Qualifications - average one to two months
- ◆ Interviewing, Negotiations and Selection - average one month
- ◆ Arrangement of Audit Schedule - average one month
- ◆ Pre-Review (Desktop Audit) - average one to two months
- ◆ Registration Audit - average three days

These tasks take place concurrently.



What if I do not Choose Third-Party Registration?

If all requirements of an ISO 14001 EMS are fully implemented and self-declared, then the organization will reap the same internal benefits as an organization earning third-party registration. The primary difference between the two is the independent, objective credibility provided by a third-party registration. If the third-party objectivity and credibility are irrelevant to the organization, then self-declaration of an ISO 14001 EMS may be preferred.

ISO 14001 Registration conveys a positive, professional image to our sewer ratepayers and to community non-governmental organizations. ISO 14001 Registration also provides our own employees with a real sense of professional competence and accomplishment. Our employees connect with our governmental organization being a business system and our management decisions based upon a Plan-Do-Check-Act system rather than politics or personalities.

Chris Toth
City of San Diego
Wastewater Collection Division

ISO registration gets an objective set of eyes in to look at your system and it adds credibility to what you have done. Additionally, we feel that it strengthens our position against potential privatization since it would be difficult for a private company to compete with our management process and offer the same customer service to our citizens and the environment and manage the organization better than we do.

Beth Eckert
Gastonia, North Carolina
Public Works and Utilities Department

Table 1.0 Costs and Number of Auditors/Days for EMS Initial and Surveillance Audits.

WW Facility	Fenceline	Size (In Average MGD OF WW)	Year of Initial Registration	Initial Registration Cost	# of Auditors	# of Days Auditor(s) On Site	Ongoing Costs of (External) Surveillance/Maintenance Audits (in Dollars/Year)	# of Auditor(s)	# of Days Auditor(s) On Site
Buncombe	WW Plant	40	2002	\$ 10,500	1	2.5	\$ 3,000	1	1.5
Gastonia	Two WW Plants, lab, pretreatment	22	2001	\$ 7,500	2	2.5	\$ 3,200	1	1
San Diego	Operations and Maintenance Division	180	1999	\$ 7,000	2	3	\$ 5,000	2	3
Charleston	WW Plant	36	1999	\$ 11,000	2	4	\$ 9,000	2	4
Eugene	WW Division, not including O&M	62	2001	\$ 8,300*	1	3	\$ 3,000	1	1

Note: included application fee, desk audit, on-site readiness review, registration audit, and final report

Table 2.0 EMS Registrar Experience and POC Information.

from EMS Wastewater Steering Committee



EMS Registrar POC Info	Wastewater Experience? (Yes Or No)	Public Organization Experience? (Yes Or No)
Registrar name: NSF International Strategic Registrations, Ltd Address: 789 N. Dixboro Road, Ann Arbor, MI 48105 Phone #: 1-888-NSF-9000 Email Contact: Website: www.gehrke@nsf-isr.org	Yes	Yes
Registrar Name: Advanced Waste Management Address: 6430 Hixson Pike, Chattanooga, TN 37343 phone #: 423-843-2206 Email Contact: mail@awm.net Website: http://www.awm.net	With Charleston CPW Only	No
Registrar Name: AQA International Address: 1105 Belleview Avenue, Columbia, SC 29201 Phone #: 803-779-8150 Email contact: bob@aqausa.com Website: www.aqausa.com	Yes	Yes
ABS Quality Evaluations Registrar Name: Georgene Porter Address: 16855 Northchase Drive, Houston, TX 77060 Phone #: 281-877-6800 Email contact: Website: www.absconsulting.com	Yes	Yes
ABS Quality Evaluations Registrar Name: Jack Carmody Address: 16855 Northchase Drive, Houston, TX 77060 Phone #: 281-877-6800 Email Contact: Website: www.absconsulting.com	Yes	Yes

Frequently Asked Questions about ISO 14001 Third-Party Registration

While third-party registration may be common in industry, it is a relatively new concept for public entities. The PEER Center has gathered the questions most commonly posed about ISO 14001 registration and asked a registrar to answer them for you. Questions are organized in a "Before," "During," and "After Registration" format:

Before Registration:

Q. What is the difference between the terms "registration" and "certification?"

A. In common usage and even in publications, the terms are used interchangeably. The distinction can be made that you "register" a management system and "certify" to a product standard but this distinction is rarely noted in the world of ISO 14001. Even the Standard refers to "certification/registration."

Q. Who is ANSI-RAB and what is their role in registration?

A. RAB stands for the Registrar Accreditation Board. The American National Standards Institute (ANSI) and RAB have joined to form the National Accreditation Program (NAP) for ISO 14001 and 9000. The NAP also covers the accreditation of providers offering the 36-hour Lead EMS Auditor course. Registration programs for both EMS and QMS auditors are operated solely by RAB, separate from the NAP.

RAB, headquartered in Milwaukee, WI, is a not-for-profit organization that is financially self-supported and governed by a 15-member board of directors. Members of the board represent both quality and environmental stakeholders and include technical experts, business executives, industry representatives, and employees of registrar organizations.

Q. How can I find out who the accredited registrars are?

A. The RAB website at www.rabnet.com contains a list of accredited registrars.

Q. How can I find out who the registrars with wastewater and/or public sector experience?

A. Check the POC table (Table 2.0) on page 7.

Q. What if I do not like the registrar audit team or team leader?

A. RAB says that your registrar must inform you of the names of your audit team members in time for you to appeal against the appointment of any particular auditor. So, if for some reason, you do not feel like the assigned auditor is the right one for your organization, let your registrar know as soon as possible.

During Registration:

Q. What happens if I disagree with a finding made by the registrar?

A. As noted above, accredited registrars are required to have procedures or policies to address dispute resolution. Ask your registrar about this process before the audit begins.

Q. What happens if the auditor finds a regulatory noncompliance during the registration audit?

A. Good question! First of all, it does not mean that you have automatically failed the audit. If your registrar identifies a noncompliance, RAB says that you may still become registered if your EMS addresses such noncompliances and when taken into consideration, the noncompliances do not indicate a major nonconformance with ISO 14001 requirements. The auditor is not there primarily to determine if you are in compliance, but rather to determine if you are adequately managing your compliance obligations as part of your EMS.

The best way to ensure that your EMS is adequately managing compliance issues is to: 1) Be knowledgeable about all federal, state, and local environmental and legal requirements; 2) Undertake periodic assessments of your own compliance; 3) Have procedures in place to identify and respond to instances of noncompliance, including procedures to identify the root causes of noncompliance to ensure they do not reoccur.

Your accredited registrar is required to have methods for handling and reporting any discoveries of noncompliance so be sure to ask how they would handle this situation if it arises.

After Registration:

Q. Once I have successfully completed the audit and become registered to ISO 14001, what is next? Are follow-up audits required?

A. Yes, follow-up audits, called surveillance audits, are required and are another strength of the third-party audit system. The required surveillance after you achieve registration is another strength of the third-party system. Surveillance helps to ensure that your EMS stays in conformance with ISO 14001 and that it is continually improving. Under RAB's requirements you have two options for surveillance:

1. A six-month surveillance cycle with no re-audit after three years, or
2. An annual surveillance with a re-audit after three years. With either option, the number of audit days/year is the same, except for the re-audit. For example, you can choose to have your auditor on site for two days once a year or for one day twice a year. There are pros and cons for each option.

Q. Can I lose my registration?

A. Yes you can, but if you diligently address all issues identified during the surveillance audits in order to maintain and improve your EMS, this is unlikely to occur.

Section 5: Maintaining Your EMS

Congratulations! You have developed an EMS at your wastewater facility and have successfully completed the initial audit of your system. You have established a clear policy that sets the stage for your EMS, thoroughly analyzed your environmental “footprint,” and set measurable objectives and targets for your EMS. You have also trained your employees on their responsibilities under the EMS, modified a number of operational procedures and controls, performed an internal audit of the system, and conducted at least one management review. It is now time to maintain and update the EMS foundation that you put in place.

As part of maintaining and improving the groundwork that you put in place, you will be testing, reviewing, and updating your EMS policy and procedures, continuing to train and communicate with employees and the public, reviewing your environmental impacts, and checking and improving your system through internal audits and management reviews. Also, you will continue to maintain the enthusiasm and buy-in from employees, the public, and management by tracking and reporting on the performance and benefits of your EMS.

The table below presents the stages of EMS development, from developing and implementing your system, to engraining the EMS as the way you do business.

The Stages of EMS Development¹

	-- Beginning -- EMS Under Development	-- Deploying -- EMS Registered/In Conformance	-- Maturing -- EMS as a Business Practice
Timeline	0-2 years	2-5 Years	5+ Years
Goals	Develop an EMS - build on policies, procedures, and programs that are in place Complete initial third party audit	Strengthen linkages among the EMS elements Demonstrate the performance and (cost) benefit of the EMS, both internally and to key stakeholders	Continue to define and meet stakeholder needs Achieve/maintain high level of environmental performance and demonstrate real business value
Activities	Strengthen compliance and other programs Understand ISO 14001 requirements and the systems approach Learn how to communicate the EMS to the public; train employees Building foundation policies, procedures, and programs	Use the EMS to integrate and align existing programs and systems: <ul style="list-style-type: none"> ● quality/health & safety ● Asset Mgmt., CMOM, QualServ ● resource allocations ● operational controls ● information and support systems ● training ● communication and reporting Continue to develop and enhance metrics for EMS and other performance tracking	Improve efficiency through process improvement <ul style="list-style-type: none"> ● Streamline systems ● Consolidate documentation Include EMS and other environmental data in the strategic planning process and in daily business decisions Tracking of nonconformances with emphasis on prevention (“find, fix, and prevent”). Corrective/preventive action process is well established.
Characteristics	Energy/resource intensive Management provides resources, but direct involvement may be limited Use available or very simple metrics to measure EMS performance	Corrective (and particularly preventive) action processes in development EMS is still being refined Focus is still on the present, not the future EMS is becoming part of the business process Cultural change starting Management understanding and use of EMS in key decisions increases	High level of management involvement EMS serves as a launch pad for new environmental initiatives Use of environmental metrics is well established, metrics continue to improve, and clearly support business goals Linkages within the EMS and with other management systems are well established and understood Cultural change continues as the EMS becomes the way the organization does business

¹ Adapted from NSF International

Section 6: Conclusion

In this Handbook, we have attempted to give other wastewater agencies and public entities a clear sense of the steps needed to put an effective EMS in place, based in large part on the experiences of agencies that have successfully done so and are now seeing the benefits of their efforts. Clearly, there is much more information that could be provided, but one of the strengths of this project is the enthusiasm of these agencies and their willingness to share information and insights with their colleagues. With this in mind, we urge you to contact these individuals for more information as you develop your own EMS. They are the true "experts." Here is their contact information:

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