Environmental Management Systems

A Guidebook for Improving Energy and Environmental Performance in Local Government

2004

Edward G. Rendell, ***Governor***

Kathleen A. McGinty, ***Secretary***

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- Patrick McDonnell, Executive Assistant to the Special Deputy Secretary, DEP
- Libby Dodson, Chief, Pollution Prevention/Energy Efficiency (P2E2) Division, Environmental Sustainability Bureau (ESB), OETD
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- John W. Borland, Sanitarian Program Specialist, Bureau of Water Supply and Wastewater Management, Division of Wastewater Management
- John Herigan, Environmental Program Analyst, P2E2 Division, ESB, OETD
- Glenn Stephens, Environmental Policy Analyst, P2E2 Division, ESB, OETD
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Pilot Project Participants

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- Amy Jo Labi-Carando
  Director of Recycling and Solid Waste
  Lawrence County, Pennsylvania
- Peter Bender & James Hilton
  Hill View Manor long-term care facility
  New Castle, Pennsylvania
- Doug Pomorski, Director of Operations
  Mary Simmons, Chief Financial Officer
  Tom Maggio, Grant Administrator
  Erie-Western Pennsylvania Port Authority
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  Two Mile Run County Park
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  Diane Campbell, Biosolids Coordinator
  Hampden County Wastewater Treatment Plant
  Mechanicsburg, Pennsylvania
- Scott McGrath, Environmental Planning Manager
  Solid Waste Collection Operations and NW Transfer Station
  Philadelphia, Pennsylvania

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1 About this Guidebook

The Environmental Management Systems (EMS) Guidebook for Improving Energy and Environmental Performance in Local Government was prepared in order to provide a tool that would walk municipalities through the EMS implementation process with a minimum of outside support. The multi-step process, tools and template documents contained herein were tested and refined through a Pilot Program that involved seven Pennsylvania municipalities. It is expected that, by using the tools and templates presented in this guidebook, a municipality can implement a complete EMS without outside assistance. It is, however, recommended that any municipality or organization interested in environmental management systems seek out as much relevant information on the subject as possible. The additional sources of EMS information presented in Section 6 of this Guidebook are included for this reason, and the reader is encouraged to explore the sources provided as a starting point for their own research.

Structure of this Guidebook

The Guidebook is divided up into several sections.

Section 1: About this Guidebook is the introduction to the guidebook and discusses how to use this guidebook.

Section 2: Environmental Management Systems – provides an overview of environmental management systems, a discussion of the elements on the ISO 14001 standard, and describes three levels of EMS implementation.

Section 3: Environmental Management Systems in Municipalities – discusses the application of environmental management systems in a municipal setting, the benefits that municipalities can realize through an EMS, the key success factors to implementing an EMS in a municipal setting, and the level of effort required to complete an EMS implementation.

Section 4: Is an EMS right for you? – proposes a logical methodology for determining whether or not to proceed with an EMS at your municipality, and what level of EMS implementation makes sense.

Section 5: EMS Tools and Implementation Plan – discusses the tools available for improving environmental performance in municipalities and presents an overview of the 24 steps to full EMS implementation developed in the Pennsylvania Municipal EMS Pilot Project.

Section 6: Additional Sources of EMS Information – provides additional information sources for the reader, many of which can be found online.

Annex A: Glossary of Terms – provides definitions for many EMS terms that may be new to the reader.

Annex B: Case Studies – presents the case studies from the Pilot Project in detail.

Annex C: Phase 1 - Policy Development and Management Commitment - Checklists and Tools – contains the EMS development checklists and associated tools required to complete phase 1 of the EMS process, policy development and management commitment.

Annex D: Phase 2 - Planning and Information Management - Checklists and Tools – contains the EMS development checklists and associated tools required to complete phase 2 of the EMS process, planning and information management.

Annex E: Phase 3 - EMS Manual Preparation, Training and Implementation - Checklists and Tools – contains the EMS development checklists and associated tools required to complete phase 3 of the EMS process, EMS manual preparation, training and implementation.

Annex F: Phase 4 EMS - Initiate Continuous Improvement - Checklists and Tools – contains the EMS development checklists required to complete phase 4 of the EMS process, initiate continuous improvement.

Annex G: EMS ISO 14001 Gap Analysis Protocol – presents a sample EMS Gap Assessment Protocol template keyed to the requirements of the ISO 14001 standard.

Annex H: Sample EMS Manual – presents a sample EMS manual that can be used as a template, if desired. (This manual is provided as a separate, standalone reference from PA DEP).

Note: The guidebook focuses on the ISO 14001 EMS framework and uses the acronym "EMS" in reference to this framework.

How to Use This Guidebook

While it is not critical to read the entire guidebook, it is recommended that the reader explore the main text in order to develop an appreciation of environmental management systems and their application in a municipal setting.

The reader who is unfamiliar with environmental management systems should start at Section 2. The reader who is familiar with environmental management systems, but not their application in a municipal setting, should begin at Section 3. Section 3 contains numerous examples taken directly from the EMS Pilot Project conducted by the Commonwealth of Pennsylvania, and quantitative information from other studies on the implementation of environmental management systems in a municipal setting.

The reader wishing to engage directly in a decision process of whether an EMS would be useful in their municipality should begin reading at Section 4. Finally, the reader who is ready to implement an EMS and only wishes to understand the required steps should begin at Section 5.

Because the guidebook is intended to facilitate the stepwise implementation of a full EMS, the tools are presented within the context of the implementation steps. Thus a municipality implementing a full EMS will begin with Annex C and a municipality implementing only a few of the tools may begin with a different Annex. In most cases, however, it is still recommended that a municipality complete Phase 1 (Policy Development and Management Commitment) and Phase 2 (Planning and Information Management), regardless of how far they decide to go with respect to implementing a complete EMS. The discussion of the EMS implementation steps in Section 5 will be particularly useful to a municipality that is not implementing a complete EMS as it will guide them to the necessary tools.

Please note that a Sample EMS Manual is available as a separate, standalone document from PA DEP and, while not required until later in the [complete] EMS implementation process, it is a good reference to review periodically in order to maintain perspective on how the various implementation steps fit together.

2 Environmental Management Systems

An Environmental Management System (EMS) is a systematic approach for incorporating energy and environmental goals and priorities (such as energy use and regulatory compliance) into routine operations. While some sort of *de facto* system is inherent to any organization that must meet energy and environmental requirements as part of daily operations, it is generally accepted as a valuable step to formalize the approach by documenting it. Not only does documentation of the system ensure consistency over time and across employees, there is a growing body of evidence indicating that there is considerable value in defining a systematic approach to managing energy and environmental goals.

Please note that, while this guidebook refers to "Energy and Environmental" in many locations, it is understood that an EMS encompasses a wide perspective, including the consumption of natural resources such as water, air and various energy sources, as well as the more traditional concepts of waste generation and disposal, pollution and use of human resources. The US EPA defines an EMS as "a set [or system] of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency." This focus on processes and practices is common to all EMSs, which are generally founded on the "Plan, Do Check, Feedback" cycle[1] of continuous improvement (see Figure 1).

Figure 1:
Plan, Do, Check, Feedback Cycle

EMS Models

More than one model or conceptual framework for an EMS exists. Probably the most well known of EMS models is the ISO 14001 international standard. Other models include the following:

- European Eco-Management and Audit Scheme (EMAS);
- Responsible Care model developed by the American Chemical Council (ACC);
- US Department of Justice (DOJ) "Seven Key Compliance Program Elements;" and
- EPA National Enforcement Investigation Center (NEIC) "Compliance Focused" EMS.

EMS Models

- ISO 14001
- EMAS
- ACC Responsible Care
- DOJ 7 Key Elements
- EPA NEIC Compliance Focused EMS
- DEP College & University EMS and Best Practices Manual
- National Biosolids Partnership EMS

[1] The "Plan, Do, Check, Act" (or Feedback) Cycle was originally illustrated by Walter Shewhart for the continuous improvement of product quality, and [most notably] implemented by W. Edwards Deming in post-WWII Japan.

In the United States, the most commonly accepted model is that set forth by the ISO 14001 standard. There are also variations of the ISO 14001 model that have been developed for organizations that do not wish to certify to the ISO 14001 standard, such as the DEP EMS for Colleges and Universities, and the National Biosolids Partnership EMS. As noted above, all EMS models are based on a "Plan, Do, Check, Feedback" cycle that is primarily concerned with the *process* an organization uses to incorporate environmental concerns into routine operations and not the operations themselves.

Complementary Systems and Tools

Growing industrial and government interest in energy and environmental management has led to the development of a number of concepts and tools that enable organizations to understand, evaluate and manage the environmental implications of their operations, services and products. Some tools are:

- Green procurement;
- Sustainable community planning;
- Life cycle management;
- Life cycle assessment; and
- Sustainable design.

In practice, many of these tools can be applied within Environmental Management Systems as well as existing quality, energy, or health and safety management systems such as:

- ISO 9001, QS 9000;
- ANSI/MSE 2000 - Management System for Energy; and
- OHSAS 18001 – Occupational Health and Safety Assessment Series.

In addition several management systems are emerging that are more encompassing of multiple business issues such social, ethical, stakeholder, accountability and reporting performance. Some of these *"sustainable management systems"* are:

- SA8000 - Social Accountability Management System; and
- AcountAbility 1000 Framework

The "plan, do, check, feedback" cycle is often common to these systems. In addition many of these systems are designed to be compatible with ISO 9000, QS 9000 and ISO 14001. Whether an organization adopts one of these more encompassing systems depends largely on the nature of their organizational activities and risks associated with specific issues. An organization with a range of risks and issues across an number of these areas, including environmental, may consider these systems as a means towards more comprehensive risk management and continuous improvement. On the other hand, municipalities with some social, ethical or accountability risks that overlap with their environmental issues may choose to address these within their existing management practices or an EMS.

The ISO 14001 EMS Model

According to the international standard, ISO 14001, an Environmental Management System (EMS) is "the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy." While this is a more complex definition than previously provided, it still implies the same cycle of "Plan, Do, Check, Feedback." The ISO 14001 EMS standard consists of five sections, Environmental Policy, Planning, Implementation & Operations, Checking and Corrective Action, and Management Review, as presented in Figure 2 below.

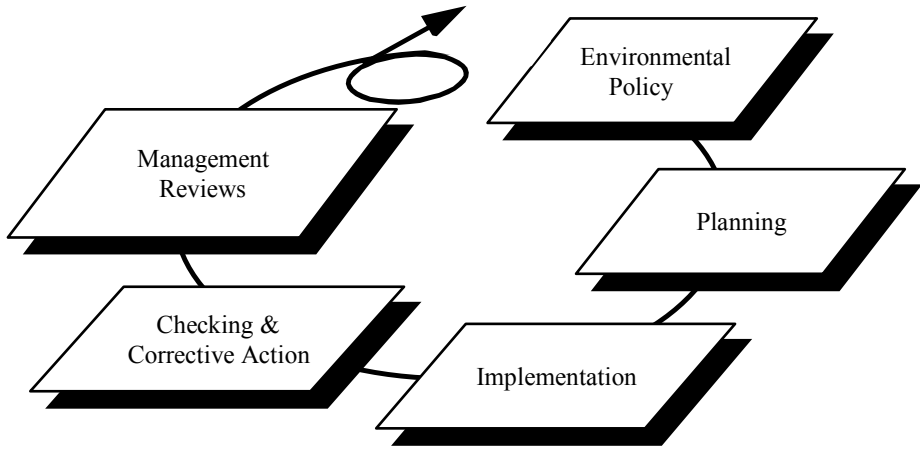


Figure 2: The ISO 14001 EMS Model

The boxes shown in Figure 2 are considered to be the five major sections of the ISO 14001 EMS Model, and are described in the standard as follows:

Environmental Policy – Establishes and communicates an organization's position and commitment as it relates to energy and the environment.

Planning – Identifies energy and environmental issues and requirements, and defines the initiatives and resources needed to achieve the environmental policy and economic goals.

Implementation & Operations – Describes the procedures, programs and responsibilities necessary to implement the key initiatives to achieve goals.

Checking and Corrective Action – Regularly monitors and assesses the effectiveness of energy and environmental management activities.

Management Review – High-level evaluation of the management system as a whole to determine its overall effectiveness in terms of driving continual improvement and achieving business goals.

The ISO 14001 Seventeen Elements

The ISO 14001 standard then breaks the five major sections down into seventeen elements described below:

Environmental Policy – The policy drives the commitment of the municipality to maintain and potentially improve its environmental performance. By documenting and publicizing the policy, the municipality demonstrates a commitment to the management of environmental issues from the highest management levels.

Environmental Aspects – Environmental aspects are the municipal activities that have the potential to interact with the environment in some way, potentially posing a risk if they are not managed appropriately.

Legal and Other Requirements – The legal and other requirements are those requirements the municipality is expected to comply with on a continual basis. Besides legal requirements, these could be the expectations of the local community or other local municipalities.

Objectives and Targets – Objectives and targets form the goals of a municipality's EMS. Drawing on the information gained in the Aspects study, a municipality develops goals for improving its performance in regard to specific activities.

Environmental Management Programs – These programs define the methods a municipality will use to achieve its objectives and targets.

Structure and Responsibility – Much like an organizational chart, the structure and responsibility of the municipality defines the authority structure in place. The definition of responsibility takes it another step further, defining who is responsible for what within municipal operations.

Training, Awareness & Competence – This element of an EMS defines what training and minimum competence levels are required to ensure that environmental risks are managed appropriately, who receives the training, and how often.

Communications – The communications element of an EMS defines how internal and external communications with respect to environmental issues are handled. This can be quite useful in regards to requests for information from the local community.

EMS Documentation – The documentation element defines the structure of the EMS itself. This is typically only needed if a full EMS is implemented.

Document Control – This element focuses on the maintenance and control of EMS documents required to maintain the EMS.

Operational Control – The operational control element focuses on the level of operation control that is applied to environmental risks within the municipality. Many municipalities find this element particularly useful in the documentation of standard operating procedures that have previously not been written down.

Emergency Preparedness and Response – This EMS element outlines the procedures by which the municipality responds to environmental emergencies, and the maintenance of a minimum level of preparedness.

Monitoring and Measurement – This element describes how a municipality monitors its environmental performance, what procedures are used to measure the appropriate data sources, and how often they are measured.

Nonconformance & Corrective and Preventative Action – This EMS element outlines how a municipality investigates and corrects non-conformances.

Records – The EMS records element describes how the municipality handles and controls the larger scope of documents related to the EMS, such as training records, compliance reports, and letters to regulators.

EMS [internal] Audit – The auditing element of the EMS outlines how a municipality audits its environmental performance

Management Review – This element of the EMS describes how the municipality coordinates performance reviews by top management and drives the process of continual improvement.

Levels of EMS Implementation

While one of the most common levels of EMS implementation is through third party certification, other levels of EMS implementation exist. For example, a municipality may wish to forego the cost of certification and self-declare that it has met the ISO requirements without seeking certification through a third party audit. Alternatively, a municipality may implement a complete EMS but have a third party provide independent verification that it has meet the ISO requirements. Finally, some municipalities may decide that only certain elements of an EMS need to be implemented to improve their performance or reduce risks. It is important to recognize however, that full, long-term benefits such as on-going risk management and continuous improvement can only be realized if all of the EMS elements are implemented.

These three levels of EMS implementation are described below in more detail.

Level One - Third Party Certification to ISO 14001

In order to demonstrate conformance to the ISO 14001 standard, many organizations choose to implement and then certify their EMS using a third-party auditor (or "registrar"). The auditor performs an independent validation that the EMS conforms to the ISO 14001 standard, and that it is *"in place, complete and sufficient."* A number of auditing firms provide this service, all of which must be certified as qualified auditors.

Information on registrars can be found on the Pennsylvania DEP's website.

Level Two – Complete EMS Implementation Without Certification

The second level is full EMS implementation without choosing to certify the EMS through a third party audit. In this case, the municipality typically chooses to self-declare that its EMS is in conformance to the ISO standard. Self-declaration allows a municipality to demonstrate and communicate its environmental commitment to regulators and the public without incurring the additional costs of certification. However, a third party might be used to strengthen the self-declaration by providing some level of independent verification and/or advice.

In some cases, a municipality may choose to simply implement a complete EMS and not to publicize their efforts or benefits to regulators or the public, but instead focus on internal stakeholders, employees and other levels of government.

A municipality with an extremely large number of dispersed facilities may rule out certification because the registrar costs outweigh the benefits. However, choosing not to certify does not reduce the internal benefits that a municipality can realize through an EMS. It may allow for increased flexibility in implementation. For example, some organizations may identify priority sites or activities that require a complete EMS, while other sites or activities only require an implementation of specific EMS elements (e.g. training but no operational controls). This approach allows a municipality to quickly realize the full benefits of having an EMS for these sites or locations where it is appropriate and giving them a longer period to assess whether or not the other sites require additional elements. Limiting the initial investment in EMS implementation also makes it easier to modify plans in the future.

The major weakness of non-certification is that it removes the confirmation inherent in the regular, biannual review and assessment that a third party registrar provides. Many organizations see this external review as the "boot" that kicks them into action and guards against complacency. Non-certification is un-common in industry because most companies desire the additional benefits gained from certification to the ISO standard (e.g. meeting customer expectations). However, in a municipal setting, self-declaration or full implementation without certification may be a desirable and cost-effective option.

Level Three - Partial EMS Implementation Strategies

While a complete EMS is recognized as the most effective manner to integrate environmental concerns into daily work activities, an organization does not always possess the resources to implement a complete EMS. Furthermore, a complete EMS does not always make sense for every municipality. In these cases, partial implementation of an EMS through some of the elements – such as training programs and/or assessment of legal and other requirements – can be a desirable alternative for municipalities.

Even if a municipality determines that a complete EMS is not appropriate, it is still recommended that they consider the first two phases of implementation that involve policy development, management commitment, planning and information management (described in Section 5). Municipalities may find it particularly helpful to assess the aspects of their operations that have the potential to impact energy use and the environment (within Phase 2). This assessment will often indicate whether the municipality has adequately protected the environment from any risks presented by its operations. Often, the municipality identifies one or two aspects of its operations that need attention, but do not warrant the implementation of a complete EMS. Municipalities often choose to:

- Enhance training programs around those aspects to increase employee awareness and participation;
- Implement standard operating procedures around those operations to ensure they are managed appropriately;
- Define the structure and responsibility of the environmental group in order to ensure that all staff understand the tasks they are responsible for;
- Develop an emergency response and preparedness plan to prepare for unanticipated catastrophic events; and/or
- Define how it deals with notices of violations and implements corrective actions in response to them.

Note that while it is recommended that a municipality perform an analysis of its significant impacts (to determine which activities have the biggest environmental risk), it is possible that they already understand those risks, and can proceed directly with implementation of the appropriate EMS element.

Historically, municipal environmental departments have been driven by both statutory requirements and the requirements of the local community – possibly due to the "tradition" of

environmental law being set most broadly by the highest (Federal) level of government and then being made increasingly more restrictive by lower levels of government (State, County, Township, Borough, etc.) to insure that the overall environmental objectives of the law are achieved.

In order to develop a concrete understanding of those requirements, the municipality may wish to develop and maintain a register or database of all "Legal and Other Requirements" to which it is subject. This register can then be used as an internal auditing tool to determine if the municipality is, in fact, maintaining compliance with all of those requirements, and stay up to date on additional requirements that may develop over time.

3 Environmental Management Systems in Municipalities

Since its publication in 1996, the manufacturing industry has embraced the concept of Environmental Management Systems. However the ISO standard was not designed specifically for implementation in manufacturing, or even just for-profit businesses; it specifically uses the word "organization" to imply any group of individuals that come together for a specific purpose under a specific administrative structure. The benefits of the EMS approach – which will also be discussed in this section – have led to its application in other locations, such as local governments, with similar success. Several pilot studies have been commissioned at the International, Federal and State levels to demonstrate this, and the evidence is clear that municipalities can realize benefits at least equal to those achieved by business.

Much like businesses, municipal governments have a complex system of organizational management and are subject to large number of regulatory requirements. However, unlike many businesses, municipalities typically have a very wide scope of activities that encompass power generation, water and wastewater treatment, solid waste collection and disposal, maintenance of the local infrastructure, and enforcement of numerous federal, state and local codes. Further, many of these operations interact directly with the environment and have a high potential for significant impact if a problem occurs. For these reasons, an EMS may in fact be more useful for protecting the environment in a municipal setting than in a business setting.

Municipal EMS Pilot Project

The Pennsylvania Department of Environmental Protection (DEP), in conjunction with Five Winds International, conducted a Municipal EMS Pilot Project with seven Pennsylvania municipalities from 2001 – 2003. The materials used by those municipalities form the core of this guidebook, having been refined based on their experiences and recommendations. Case studies documenting the experiences of seven of the municipalities are provided in Annex B; contact information for the lead EMS team members is also provided in Annex B.

EMS Benefits in Pennsylvania: Lucent Technologies & Mott's, Inc.

Lucent Technologies Microelectronics Group (Allentown, PA) certified iits EMS to the ISO 14001 Standard in 1997. As a result of the EMS implementation, the company now recovers over 155,000 gallons of de-ionized water per day, and realizes an energy savings of over $500,000 annually. Lucent received the 1998 Governor's Award for Environmental Excellence for this effort.

Motts, Inc. (Aspers, PA) certified iits EMS to the ISO 14001 Standard in 1998. As a result of the EMS project, the company diverted 17,000 tons of waste from landfill, and realized a 2.3% reduction in energy use per cubic meter of product. Motts also estimates an annual savings of $45,000 in wastewater treatment costs.

Municipalities Participating in the PA EMS Pilot Project

- Brockway Borough – Wastewater Treatment Facility
- Crawford County – Crawford County Correctional Facility
- City Of Erie – Erie-Western Pennsylvania Port Authority
- Hampden Township – Wastewater Treatment Facility
- Lawrence County – Long-Term Care Facility
- City of Philadelphia – Solid Waste Collection Operations and NW Transfer Station
- Venango County – Two Mile Run County Park

Examples from these case studies are included throughout this section to illustrate the benefits of implementing an EMS *as have been realized* by Pennsylvania municipalities. Additionally, success factors for implementation identified by pilot municipality participants are described.

Benefits of a Municipal EMS

Multiple studies have been performed to examine the benefits of the EMS approach, several of which are referenced in Section 6. The evidence indicates that the systems approach to managing environmental issues that is fundamental to an EMS causes a deep, cultural shift in how the organization addresses these issues. Every employee must incorporate environmental considerations into their daily job functions. Thus the documented benefits of implementing an EMS range from improved compliance with environmental regulations (and often a reduction in fines) to increased management efficiency, and even a reduction in waste production and energy consumption. The systematic EMS approach to the daily management of energy and environmental objectives leads to benefits that can only be created by an integrated effort across the entire organization, and are typically difficult to foresee prior to the implementation of the EMS.

Primary EMS Benefits For Municipalities

- Positive effect on environmental performance and compliance
- Improved EHS/ emergency response training, awareness, involvement & competency
- Increased management and operational efficiency
- Improved relationships with regulators and the community
- Reduced waste production & energy consumption
- Process for inclusion of multiple stakeholder requirements
- Increased transparency and ability to respond to community requests for information
- Demonstration of management control over highly complex and varied activities.

A particularly useful element of an EMS is the incorporation of stakeholder requirements and external communications. Because municipalities are pubic entities designed to serve local communities, the increased transparency and ability to respond to the needs of the community typically improves relationships between the municipality and its various stakeholders. The increased management and operational efficiency gained with an EMS also improves the ability of the municipality to provide its services to the community inexpensively and with greater effectiveness.

The Pennsylvania EMS Pilot Project Participants anticipate realizing many of the benefits common to EMS implementation, however it is still relatively early to predict whether long-term benefits, such as improved relationships with regulators and regulatory compliance, will be achieved. Despite this, numerous benefits *have* been noted by Pilot Project Participants, including:

- Capturing Institutional Knowledge;
- Streamlining Operations;

- Regulatory Fine and Cost Avoidance;
- Improved Emergency Response Procedures; and
- Increased Awareness and Participation.

Each of these benefits is discussed below in more detail.

Capturing Institutional Knowledge

All municipalities involved in the Pilot Project strongly agreed that the most significant, initial benefit they recognized from the EMS implementation process was to capture the institutional knowledge contained in the heads of employees. By consulting with employees and documenting the "how-to" of routine municipal operations, the participants found that the time required training new staff decreased, and that they were protected from the loss of critical operating knowledge when senior employees retire. Additionally, the documentation of ongoing maintenance efforts required of the EMS has allowed many municipalities to coordinate municipal activities with greater efficiency and improve service delivery in some instances.

From the case studies . . .

Hampden Township was "apprehensive at first, but an EMS is a great way to translate the old 'verbal' way of doing things into documented written procedures. It forced us to organize and write everything down, something we talked about doing for years but never accomplished."

Streamlining Operations

By documenting the processes used to complete routine municipal duties, many Pilot Project Participants also found that they were able to reduce the number of steps involved in the process, saving time, energy *and* money. Further, the documents allowed them to standardize the way routine tasks were performed, improving processes and creating additional savings. The EMS implementation process also forced participants to document training, compliance and maintenance schedules, which helped them to stay current with these items, plan staff schedules more effectively, and avoid schedule conflicts with other municipal activities.

From the case studies . . .

The *Hampden Township* EMS effectively "caught" information that a pump was out of service at a lift station and allowed corrective action to begin before a total loss of pumping capability occurred.

Regulatory Fine and Cost Avoidance

Pilot Project participants observed significant savings through the *avoidance* of fines and costs that it could have incurred had the EMS not been in place. Specific cost savings resulted through reducing incidents due to improper maintenance, reducing the need for on-the-job training, and retaining and communicating of critical information over time. One participant even cited a reduction in regulatory fines due to increased employee awareness from EMS training programs.

From the case studies . . .

The *Lawrence County* long-term care facility effectively reduced solid waste disposal by 1.5 tons per year by switching to a coffee concentrate that was brewed on demand, reducing staff time and waste coffee sent to the wastewater collection system.

Improved Emergency Response Procedures

Several Pilot Project participants benefited from making improvements to their emergency preparedness and response plans that came about as a function of the EMS implementation process. In one case, an emergency response plan allowed a participant to respond quickly to conditions that would have caused a major fuel spill. The participant felt that the spill would not have been avoided prior to the pilot project, and that *this alone* justified their efforts. Besides the financial and environmental burden to the municipality of such an event, the damage to regulatory, public and insurance relationships would have been significant and long lasting.

Increased Awareness and Participation

All Pilot Project participants reported an increased awareness of environmental issues and activities that have the potential to impact the environment within their municipality as a result of the pilot project. In some cases, this has led individuals *not associated* with the EMS implementation process within the municipality to suggest additional improvements, generating excitement and additional, voluntary participation in the municipality.

Key Success Factors

Several important lessons were learned in the course of the Pennsylvania EMS Pilot Project that will be useful to other municipalities seeking to improve their environmental performance through an EMS approach. The experience to date suggests that while there are many operations/facility-specific factors that influence the success of EMS development and implementation, there are some key factors in determining success that apply to almost all operations/facilities. Some of these factors include:

- Commitment from senior management;
- A clear project team and dedicated project manager;
- Routine meetings;
- Publication of the municipal commitment to improved environmental performance;
- Integration into existing municipal systems;
- Recognition that an EMS is a continuous commitment that does not end with implementation; and

Key Success Factors from the Pennsylvania EMS Pilot Project

- Obtain clear commitment from senior management
- Clearly define the project team and dedicate a project manager
- Conduct routine meetings
- Publicize the EMS Project
- Integrate existing program elements as much as possible
- Recognize that an EMS is an ongoing commitment that doesn't end with implementation
- Understand the resource requirements for EMS development

- A realistic understanding of resource requirements for EMS development.

These key success factors are described below in more detail.

Senior Management Commitment

The commitment of senior managers to the development and implementation of an EMS is perhaps the most important factor in determining the overall success of an EMS. Without high-level commitment, the efforts of the EMS team will be constrained to the point of probable failure. This commitment must be based upon an understanding of the business value of an effective EMS and the importance of integrating an EMS into day-to-day operations. To be valuable, this commitment must also be effectively communicated so that the EMS implementation team, as well as other employees, understand what is entailed by senior management commitment. It is significant that one of the first tasks in implementing the scenario is securing and documenting senior management commitment.

From the case studies . . .

Senior management commitment varied across the municipalities. *Brockway Borough* and *Crawford County* received endorsement from senior management in the early stages of the Pilot. *Hampden Township* experienced initial skepticism from senior management followed by strong buy-in. *Venango County's* senior managers were actively committed, and showed support, by participating directly on the EMS Core Team.

Senior management support should go beyond initial written statements and should include identifiable activities. Senior management can demonstrate its support by personally participating in training sessions, actively monitoring the EMS implementation process, ensuring that adequate resources are available, and participating in the establishment of EMS goals for the organization and for individuals. At the very least, senior management is encouraged to request routine updates from the EMS team, and the inclusion of a report on the EMS team progress in regular senior management meetings.

Who is "senior management"? For ISO 14001 it is the individual(s) who has/have control over all the operations that will be covered under the certification. This could be the County Commissioner, the City Administrator or Manager, and/or the Township Manager.

Clearly Define the Project Team and Dedicate a Project Manager

By clearly defining the project team and dedicating a project manager, municipalities can ensure that the EMS project does not fall by the wayside. A project team of at least 2-3 individuals, depending upon the size of the municipality, should be assigned responsibility in order to make use of the benefits of teamwork. In any case at least two individuals should participate

in the implementation to balance workloads and to ensure continued movement when other commitments demand an individual's time. A solid project manager should outline the schedule and hold the team accountable to its stated milestones and deliverables.

Conduct Routine Meetings

A common comment from Pilot Project participants was that they did not meet often enough, and that this approach led to large deliverables due at each meeting. By holding routine meetings with smaller deliverables, the EMS team will not be overwhelmed by the implementation process. Participants suggested weekly meetings, at least during the first two Phases of EMS implementation, to be effective.

Publicize the EMS Project

By publicizing the EMS project, some municipalities found that additional benefits were gained through the interest of non-EMS team employees. In many cases teams found that employees were excited to work on procedures in their area, and had given considerable thought to the development of procedures prior to being approached by the EMS team. As an additional benefit, managers within the organization began to monitor progress of the EMS project, further motivating the team to follow through on their commitment to implement the EMS.

Integration into Existing Municipal Systems

Most existing municipalities already have many of the elements needed to meet the requirements of the ISO 14001 standard in place, although these frequently require additional development and/or documentation. Therefore, it is important to identify existing operational practices or systems in the municipality that the EMS element can integrate, and focus on enhancing these elements rather than recreating them. It is especially important to consider opportunities to improve energy efficiency and to include available renewable energy sources in the initial stages of EMS development. Maintaining this additional focus during the Gap Assessment will help to facilitate the implementation planning that follows.

It is also important to note that the EMS can be integrated into existing management systems within the municipality and not the reverse. Fundamental to the systems approach of environmental management systems is the integration of

From the case studies . . .

The *City of Philadelphia Sanitation Division* realized significant improvement in the documentation and consolidation of Standard Operating Procedures and creation of a comprehensive training program.

The *Erie-Western Pennsylvania* Port Authority EMS core team has recognized the need for on-going commitment in order to realize the full benefits of its EMS, and has decided to continue to meet on a regular basis even though the pilot project has concluded.

environmental concerns into the daily activities of employees throughout the municipality. Thus, existing procedures will only need to be edited to add in the concerns identified by the EMS process rather than recreated in their entirety. EMS-specific activities that need to be developed, such as the annual management review and evaluation of objectives, targets and performance improvement programs, should be integrated into the annual budgeting and planning cycle that already exists within the municipality. Similarly, training programs identified by the EMS can be integrated into existing training programs already coordinated by the human resources group.

Recognition of Need for On-going Commitment

The strongest benefits of EMS implementation are typically achieved through the continual improvement of the EMS elements. An effective EMS should be predicated upon the principle of continuous improvement, which is inherently an on-going process. Completion of the EMS involves establishing a system that provides for continuous improvement in environmental management, but many of the benefits that result from continuous improvement often occur after the system is implemented. Thus, municipalities that develop an EMS must recognize that completion of EMS implementation is an important milestone, but it is not the end of the process. An The integration of environmental and energy issues into the existing municipal management system that is part of the EMS process will influence the way operations are conducted from that day forward.

From the case studies . . .

Both *Erie-Western Pennsylvania* and *Hampden Township* experienced challenges in obtaining the necessary time and human resources to commit to the EMS. At times the EMS Core Teams were caught between their regular work, and the work necessary to complete the Pilot.

Understanding of Resource Requirements

While a well-developed EMS should save money, reduce energy use, minimize risk and improve overall environmental performance in the long run, it requires a significant commitment of resources during the development stage. The initial development process is an investment made to generate medium term and long-term benefits, although several municipalities indicated that short-term benefits were realized even during the Pilot Project phase of EMS implementation

Some municipalities have embarked upon EMS implementation without a realistic understanding of the resources required and have found that, two years later, they have not completed their EMS. Development of an EMS requires a commitment of time from a number of individuals throughout a municipality and if their managers do not recognize the need for this time

Municipal EMS: Londonderry, NH

A participant in the 1997 EPA EMS Pilot Project, the town of Londonderry, New Hampshire implemented an EMS within its Public Works Department. The EMS clarified responsibilities for compliance with legal requirements, improved communications between Public Works divisions, and documented the procedures and controls in place to manage environmental risks. As a result of the EMS, the Public Works Department immediately noted improved worker safety and reduced water consumption. The entire implementation project cost $27,000, the majority of which was staff time.

commitment, implementation will be slow and arduous. Therefore it is important to present realistic estimates of resource requirements and the potential benefits or savings to senior management prior to implementation.

Implementation Cost and ROI

In an effort to quantify the costs and benefits of environmental management systems using rigorous research methods, several long-term studies have been performed in the United States. In 1997, the US EPA sponsored the *EMS Initiative for Local Governments,* a two-year pilot program intended to assess the resources, applicability and benefits of EMSs in local governments. Because of the success of this program, a second pilot was conducted and a third is currently underway. The following table illustrates level of effort for EMS implementation based on the results of the first two pilot programs that involved 23 municipal operations ranging in size from 15 to 15,000 employees.

EPA Municipal Pilot Study: Level of Effort

	Hours Committed (Over 2 Years)	Cost (over 2 Years)
Average	3,232	$ 97,062
Low	716	$ 27,000
High	6,267	$195,565

In 1996, the National Database on Environmental Management Systems (NDEMS) was established to provide long-term, facility-level comparative data on the performance changes associated with EMS implementation. The 5-year study collected data from a sample of 83 facilities on a wide variety of performance indicators before, during, and after the implementation of an EMS. Results of the study demonstrated that the implementation of an EMS creates broad-based improvements in environmental performance, standard operating procedures, record keeping, identification and correction of non-compliance situations and other compliance-related management practices. The study also found that organizations did not have to certify the EMS to the ISO 14001 standard to realize these benefits. The NDEMS data illustrates potential EMS implementation costs for government organizations on a per employee basis:

NDEMS Government Organizations:

Municipal EMS Benefits: New York City Transit

New York City Transit (NYCT) is responsible for moving over 6 million passengers per day, utilizing some 44,000 employees in 27 departments. NYCT certified its Capital Program Management Department to the ISO 14001 Standard in 1999. This department of 1,700 employees is responsible for an annual capital expenditures budget of approximately $2 billion. The EMS implementation was accomplished for $280,000. As a result of the EMS, NYCT has noted a significant increase in efficiency in the collection ad storage of records, improved communication between departments, increased employee awareness and participation, and an improved public image.

Cost of Effort per Employee		
Item	**Cost**	**Percent**
Labor	$ 822	59.8 %
Consultants	$ 499	36.3 %
Travel/Training	$ 50	3.6 %
Equipment	$ 0	0.0 %
Materials	$ 1	0.1 %
ISO Registration	$ 0	0.0 %
Average Cost / Employee	$ 1,441	100 %

Cost of ISO 14001 Registrar

The cost of certification through the use of a third party registrar depends on a variety of factors including the amount of time the registrar works with a municipality. This time is usually dependant upon:

- the size of the organization;
- the scope of the registration;
- the number of facilities being registered and their location; and
- whether the organization already has an ISO 9000 system in place and whether that ISO 9000 system is registered.

A list of registrars operating in Pennsylvania is provided on DEPs website.

Return on Investment

EMS implementation within municipalities and local government organizations has shown returns on investments that often outweigh the costs of implementation. The *US EPA EMS Initiative for Local Government* mentioned above documented some examples of positive return on investment:

Tri-County Metropolitan Transportation District, Five Maintenance Facilities - Over the two-year project period, Tri-County Metropolitan Transportation District, Oregon's largest public transit agency committed $89,241 in direct labor costs. In just over one year into EMS implementation, Tri-Met was able to identify $300,000 in operating savings, $66,000 of which was directly attributable to meeting their defined EMS energy conservation objectives and targets.

The City of San Diego, Refuse Disposal Division - The Division committed $213,908 in direct labor costs over two years of implementation. With an annual operating budget of almost $18.7 million, the Division expects an on-going annual cost savings of approximately $868,000 from the successful implementation of the EMS. The majority of the savings have been achieved through more efficient use of heavy equipment, fuel, and water. The Division was the first public refuse disposal division in the U.S. to achieve ISO 14001 certification.

Details of these pilots are available in *An Environmental Management Systems Troubleshooter's Guide for Local Government* listed in Section 6.

4 Is An EMS Right For You?

It is recommended that a municipality follow a systematic process when deciding whether it should implement an EMS. It is all too easy to decide that an EMS is not required simply because the task seems difficult or one is not familiar with the terminology. Figure 3 proposes a step-wise process to support this decision that involves:

1) **Gather Information:** Assembling the pertinent information and aligning the decision-makers to decide if an EMS makes sense for the municipality;
2) **Assess Drivers:** Discussing your municipalities internal and external drivers for moving forward;
3) **Estimate Cost & Benefits:** Estimating the potential costs and benefits of the EMS approach to managing energy and environmental issues; and,
4) **Set Goals**: Establishing the level and goals for implementation and deciding if and how the organization wishes to publicize its efforts.

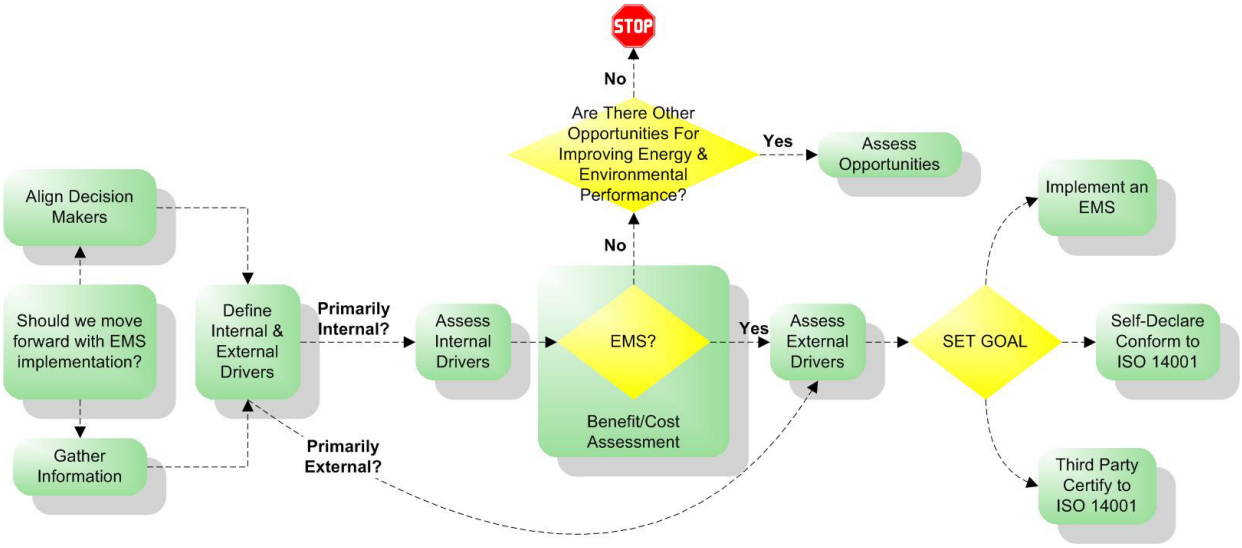


Figure 3. A decision framework for determining whether to move ahead with a complete or partial EMS, how to publicize the completed EMS, and/or to not do anything at all

Gather Information

As a first step in the process illustrated in Figure 3, the following questionnaire can help you capture your understanding of key issues as well as identify areas where you may need more information.

EMS Implementation Questionnaire

1	Have key stakeholders of your municipality [such as regulators, county commissioners, or local residents] required or requested that you develop an Environmental Management System?	**Yes / No / Don't Know**
2	Is public perception and acceptance, i.e. relations with regulators, local businesses and the community, of importance to your municipality (i.e., would it be valuable for your municipality to announce that you have an EMS)?	**Yes / No / Don't Know**
3	Could your municipality benefit from establishing a process to prioritize and incorporate stakeholder requirements into municipal operations?	**Yes / No / Don't Know**
4	Do you see value in developing a system and procedures to identify and address energy and environmental risks, liabilities and potential impacts?	**Yes / No / Don't Know**
5	Do you see value in developing a system and procedures to ensure regulatory compliance?	**Yes / No / Don't Know**
6	Could your municipality benefit from establishing a procedure to monitor its operations, set objectives and targets, track its performance and evaluate compliance with environmental laws and statewide energy goals?	**Yes / No / Don't Know**
7	Are other municipalities in your region pursuing an Environmental Management System?	**Yes / No / Don't Know**
8	Do you feel your municipality has sufficient resources available, in terms of personnel and funds, to pursue an EMS?	**Yes / No / Don't Know**

Answering "Yes" indicates possible drivers for EMS implementation are in place (e.g. interest by key stakeholders) or opportunities for support exist (e.g. sufficient resources). Answering "No" to most of these questions can indicate that an EMS may not be appropriate for your municipality, or identify potential barriers to implementation. Any "Don't Knows" may indicate areas where more information needs to be gathered as you move forward in making a decision.

Talking to key decision-makers within your municipality can give you important insights into the opportunities and/or potential challenges of EMS implementation. It can also provide

you with an opportunity to discuss the benefits of an EMS to align these key individuals around your efforts.

Talking to managers from other organizations and municipalities who have already gone through an EMS implementation can also help you gather additional information about benefits, drivers, challenges and success factors. Contact information for the municipalities participating in the Pennsylvania Pilot Project is included in Annex B of this guidebook. A number of additional EMS information sources are also provided in Section 6.

Assess Drivers

After assembling the correct information, it is important to decide whether there are key external or internal drivers for EMS implementation facing the municipality. The relative degree of importance between external and internal drivers will help an organization determine the level of implementation (e.g. whether to implement specific elements of an EMS or a complete EMS). The choice will be based upon your own business climate, culture and existing practices.

The presence of strong external drivers (e.g. stakeholder requirement or negative media coverage) to implement an EMS will typically be the primary determinant as to whether a complete EMS makes sense for a municipality. The only remaining decisions are then how to publicize the EMS and whether or not to certify to the ISO 14001 standard. If, however, the drivers are primarily internal, or the external drivers can be satisfied without implementing a complete EMS, it may make sense to implement only specific elements of an EMS (i.e. partial implementation). Regardless of the balance between internal and external drivers, it may be effective to include a structured process such as a cost / benefit assessment in the decision-making.

Estimate Costs and Benefits

By quantifying predicted direct cost savings over existing management practices, and relating the cost savings to implementation costs, cost / benefit assessments give objective insight into the true value an organization will receive. However, it is important to also consider indirect benefits, especially if self-declaration or certification will be considered. Such factors, while not included in the numerical cost / benefit assessment, may still be even more important to the final

decision. A final item to consider is the effect of continual improvement on the benefits that are anticipated. While some municipalities do not see significant immediate benefits from implementing an EMS in whole or in part, the continued refinement of the EMS elements and associated culture change within municipal operations creates synergistic long-term benefits that can be difficult to estimate and predict. However, if you decide to move forward, incorporating lessons learned from the experiences of previous organizations can provide direction and/or focus on the EMS elements that enabled substantial benefits. See Section 3 for a more detailed discussion and examples of the costs and benefits of EMS implementation.

Set Goals

Once it has been established that an EMS would be beneficial to your municipality, the next step is deciding the level of implementation for your EMS:

- Third Party Certification to ISO 14001.
- Implementation of a Complete EMS Without Certification.
- Partial Implementation.

If the municipality chooses to implement a complete EMS without certification, it must then decide if and how it wishes to publicize the EMS. The most common method of publicizing a non-certified EMS is through self-declaration, where a municipality announces that it has an EMS in place that conforms to the ISO 14001 standard. It is highly recommended that a municipality choosing not to certify their EMS self-declare conformance to the ISO 14001 standard in order to obtain the indirect benefits the EMS can have on relationships with regulators and the public. The municipality must publicize the EMS in some way to demonstrate and communicate the commitment to environmental performance represented by the EMS to regulators and the public. Section 2 provides a discussion around the pros and cons for each of these options for municipalities.

PA EMS Pilot – Levels of Implementation

Of the seven municipalities involved in the study, four chose to implement a complete EMS:

Hampden Township - wastewater treatment operations, including all biosolid operations

Crawford County - correctional facility, focusing on solid waste management at the facility

Lawrence County - long-term care facility

City of Erie - Erie-Western Pennsylvania Port Authority – port operations, including the shipyard, dry dock, marinas, maintenance and administration offices.

The municipalities that sought partial EMS implementation included:

Borough of Brockway utilized the EMS pilot project to assess pollution issues associated to their wastewater treatment facility, and developed a program to reduce the amount of infiltration and inflow (I&I) to the collection system, pump station and treatment facility.

The City of Philadelphia Sanitation Division utilized the EMS pilot project to implement a comprehensive training and awareness program around solid waste collection and transfer activities.

Venango County took quite possibly the most innovative approach of all, using the EMS process as a discussion tool to evaluate the potential environmental risks and associated controls for operations at Two Mile Run County Park.

See Annex B Municipality Case Studies.

5 EMS Tools and Implementation Plan

This section will guide you to tools that will be useful in evaluating opportunities for improvement within your municipality's operations. The tools are organized around a 24-Step EMS Implementation Plan for those municipalities intending to move forward with either a self-declared or third-party certification to ISO 14001 EMS.

For those municipalities engaging in partial implementation, the tools can be used independently. Municipalities should examine the steps and tools described in the next section of the Guidebook, to determine the tools they need. Annexes C-F provide many useful checklists, template documents and evaluation processes for municipalities

Other Implementation Approaches

A number of other complimentary EMS implementation approaches have also been published. These include:

The *EMS Pilot Program for Local Government Entities* developed for the US EPA by the Global Environment and Technology Forum.

The Best Practices Guide for Application of ISO 14001 Environmental Management Systems (EMS) in Municipalities developed for the US Agency for International Development by the Lexington Group.

Implementing an Environmental Management System in Community-Based Organizations developed for the US EPA by NSF International.

Links to these are provided in Section 6.

Other Management Oriented Tools

Significant complimentary management tools also exist that may be useful to a municipality desiring to improve its environmental performance. Many of these techniques and tools utilize a systems approach, and can be useful for municipalities seeking to understand the key components of their operations, processes, management issues, etc. They include the following:

- *Process Mapping:* Primarily a visual tool that allows organizations to identify their processes, inputs and outputs involved in completing a task, project, activity or delivering a service.
- *Pareto Analysis:* The 80:20 rule[2] states that 80% of your results are produced by 20% of your efforts. This tool assists in determining which activities within an organization represent the "vital few" and which represent the "trivial many."
- *Root Cause Analysis:* This common problem solving approach often utilizes "Fishbone", "Cause and Effect" or "Failure Mode and Effect Analysis" diagrams to reveal gaps in existing knowledge and help people reach a common understanding of organizational challenges.
- *Brain Writing:* This approach to identifying a range of alternative solutions facilitates discussion and allows for constructive criticism while considering alternatives that

Using Other Management Oriented Tools in the Development of Your EMS

A number of the management-oriented tools described here – and others – are discussed at length in the US EPA's publication titled: *An Organizational Guide to Pollution Prevention*. A link to this document, and other sources on how to use these tools, are provided in Section 6.

[2] Vilfredo Pareto, an Italian Economist, first published the 80:20 rule in 1906. The concept has since been broadly applied to leadership and management, most notably by Joseph M. Juran, and is commonly referred to as "Pareto's Law".

may be overlooked in traditional "brainstorming" sessions.

- *Bubble Up / Bubble Down:* An iterative prioritizing process that draws on the results of a Brain Writing session to identify "quick wins" versus "preferred solutions" that may take longer to implement.

There is significant literature regarding the use and implementation of these tools, particularly from the field of quality management; and the reader is encouraged to pursue this information to supplement the tools provided in this guidebook. Useful links of this nature is provided in Section 6.

The Four Phase EMS Implementation Plan

The Implementation Plan is organized around four key phases:

Phase 1: Policy Development and Management Commitment

Phase 2: Planning and Information Management

Phase 3: EMS Manual Preparation, Training and Implementation

Phase 4: Initiate Continuous Improvement of EMS

Each Phase in the Plan is broken up into a series of tasks that guide municipalities to develop the various elements of the EMS in a sequential and systematic manner. Each task is described briefly for the reader in this section, and presented fully as checklists in Annex C, D, E and F. The checklists outline the inputs required for the task, the EMS tools that are provided to complete it, a complete description of the task itself, and the expected output (or deliverable) the task will produce. Each checklist is immediately followed by the EMS Tools provided to complete that specific Task.

Because of their length, the EMS ISO 14001 Gap Assessment Protocol and Sample EMS Manual have been placed in Annex G and H, respectively. It is suggested that the Core Team refer to the Sample EMS Manual (available as a separate, standalone document from PA DEP) periodically in order to maintain perspective on how the various EMS elements fit together into an overall system. The Sample EMS Manual is also a template from which municipalities can develop their own EMS manual, if desired (Task 19).

EMS Implementation Tasks

Each EMS Implementation Task is provided in Annex C, D, E & F is presented in a tabular format that outlines:

1. Inputs that will be required to complete the Task
2. EMS Tools provided in this guidebook to complete the Task
3. A complete description of the subtasks that must be completed (in checklist format)
4. Expected outputs (or deliverables) the Task will produce

The EMS Tools provided for the completion of that Task follow immediately after, including examples of completed tools in many cases.

Implementation Timeline

The first three phases of the EMS Implementation Plan take approximately one year and represent the bulk of the effort and costs. This fits conveniently into typical municipal budgeting cycles. Phase 4, which includes a self-audit of the EMS and the first EMS management review cycle, typically takes place directly after the Completion of the EMS. The second year then focuses on refinement of the system and, if desired, certification of the EMS by a third party. Figure 4 presents the proposed schedule and the approximate progression of the four Phases of EMS Implementation.

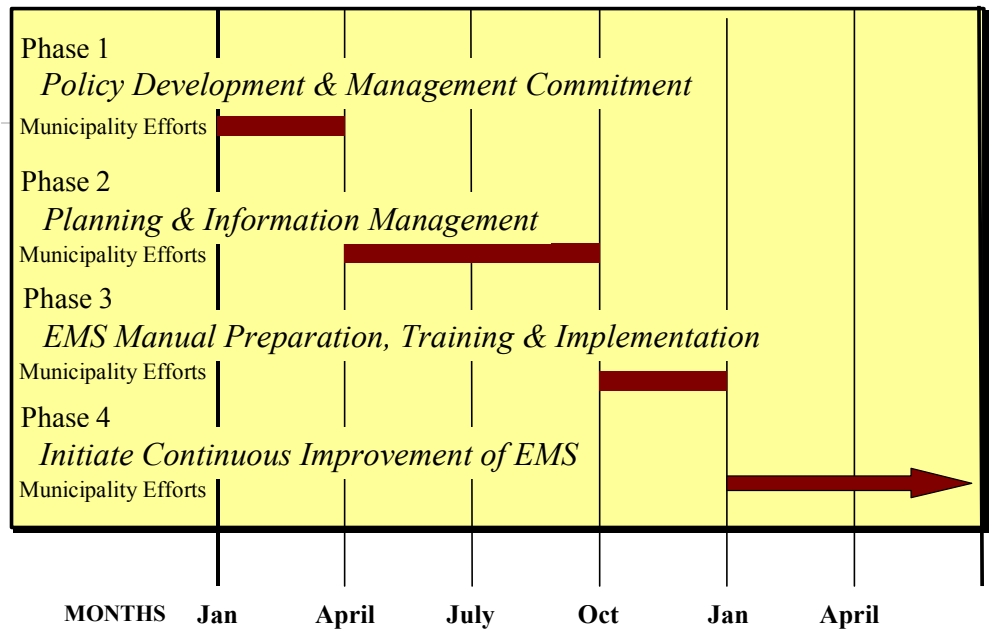


Figure 4: Proposed EMS Implementation Schedule

Phase I: Policy Development and Management Commitment (Detailed Checklists in Annex C)

Task 1: Secure Management Commitment, Resources & Publicize

This initial Task initiates the EMS process by generating buy-in from top management, identifying the scope of the project and securing the resources required to complete it. By publicizing this commitment, the entire municipality is notified and additional

momentum is generated. While there are many sub-tasks in this step, achieving the necessary buy-in maximizes successful implementation and commitment.

Task 2: Train Core Team

Training the Core Team (identified in Task 1) is the official EMS project kick-off, and ensures that the entire team understands the level of effort and timeline involved in the project, as well as the potential benefits they should expect to see as a result of their work.

Task 3: Define the EMS Boundary

Definition of the EMS boundary refines the scope of the EMS project agreed upon by top management (performed in Task 1) and identifies the specific operations that take place within that boundary. The Core Team will focus primarily on these activities during the implementation process.

Task 4: Perform a Gaps Assessment

Task 4 is particularly important to the EMS process in that the Core Team will identify the elements of the EMS that ***already exist*** *in the organization, in whole or in part. By identifying these items, the Core Team identifies the existing systems in the organization that the EMS will integrate into, and identifies "early wins" in the project.*

Gap Assessment Methodology

Often, in other EMS approaches, the gap assessment is an initial task performed in order to develop a concrete EMS implementation plan and support the EMS go/no-go decision process. Our experience is that most organizations without an EMS in place have few, if any, of the required elements in place during the gap assessment. This is because an EMS is a *management system*, and not a compliance program. It is therefore recommended that that the gap assessment NOT be used to support the EMS go/no-go decision, instead using it as an initial implementation tool to develop a greater awareness of the EMS requirements and what, if any, existing programs can be built upon in the implementation process.

Task 5: Develop/Review Energy and Environmental Policy

The Energy and Environmental Policy forms the core of the EMS by publicly stating the organization's commitment to energy and the environment. It also demonstrates management commitment to the EMS, further aiding the Core Team in getting support within the organization.

Task 6: Develop an Implementation Plan and Schedule

The final implementation plan and schedule outlines the phases and milestones the Core Team can expect, and gives other members of the organization an idea of what to expect in the coming months. Many organizations also choose to include basic awareness training in the schedule instead of waiting until Task 20 and 21 to develop and implement training. By doing this, members of the organization are included in the EMS early on and additional momentum is created within the culture of the organization.

Phase 2: Planning and Information Management (Detailed Checklists in Annex D)

Task 7: Identify Key Stakeholders and Requirements

By identifying the key stakeholders in the municipality, including local citizens groups and other non-regulators, the Core Team identifies the success factors they will need to fulfill through the project and builds a foundation for a successful EMS.

Task 8: Perform Aspects and Impacts Analysis

The aspects and impacts analysis involves identifying which of the activities performed within the EMS boundary have the potential to interact with the environment or consume energy, and the potential impacts of those interactions. While it is potentially the most difficult of the steps, it is also one of the most significant. This aspects and impacts analysis focuses the EMS by identifying which activities have the highest potential for significant impact and forces the Core Team on determining if they are managed appropriately and efficiently.

Task 9: Develop Objectives and Targets

Objectives and Targets are measurable goals set by the Core Team for creating specific benefits with the EMS and exerting a greater level of management control over significant aspects of the municipalities operations.

Task 10: Develop/Revise Energy and Environmental Management Programs

This Task allows the Core Team to supplement existing energy and environmental programs already in place within the organization and add new programs where appropriate for achieving the stated objectives and targets. The information gained in the Gaps Analysis is particularly important in this Task as the Core Team will look to existing programs first before seeking to implement new ones..

Determining the Significance of Aspects

Organizations frequently use some sort of ranking process to define the aspects with the highest risk. Common elements considered in the aspect ranking process are:

- Regulatory requirements;
- Magnitude of potential impact;
- Probability of potential impact;
- Financial liabilities/opportunities; and
- Stakeholder interests.

Developing Objectives and Targets: Screening Criteria

It is important to realize that not ALL significant aspects of municipal activities require the development of objectives and targets. Organizations frequently use additional screening criteria in the development of objectives and Common screening criteria include:

- Significance Level of aspect(s);
- Technological options; and
- Resource availability.

Phase 3: EMS Manual Preparation, Training and Implementation
(Detailed Checklists in Annex E)

Task 11: Develop Procedures for Operational Control

Again drawing upon the information generated in the Gaps Analysis, the Core Team identifies what additional procedures will be required to ensure an appropriate level of operational control based on the potential impacts of the activities identified in Task 8.

Task 12: Develop Monitoring and Measurement Procedures

Monitoring and measurement procedures allow the organization to track the progress of the various EMS programs in achieving their stated objectives and targets. There can be no confusion of success when the objectives and targets are clear and the method and frequency of measurement has been clearly identified.

Task 13: Develop EMS Auditing Procedures

The continual improvement of the EMS is dependant upon the periodic reviews (or audits) of the performance of the system. By clearly defining these procedures up front, the Core Team ensures that future EMS participants will continue to review the EMS in the same method and that nothing will "fall through the cracks."

Task 14: Develop Procedures for Implementing Corrective and Preventive Actions

Similar to Task 13 above, by clearly identifying corrective action procedures, the Core Team ensures that all EMS participants will act in the same way to resolve issues that are discovered either as a part of routine operations or in an EMS audit, and that the lessons learned will be incorporated into the EMS.

Task 15: Develop Emergency Preparedness and Response Procedures

Emergency preparedness and response plans are the most frequently encountered "already existing" items in EMS development. A review of these materials allows the Core Team to ensure that they are clear, complete, and effective.

Task 16: Develop Management Review Procedure

The management review procedure outlines the process by which top management will review the effectiveness of the EMS and make adjustments. This is typically performed annually.

Developing Operations Control Procedures

Many organizations have found it valuable to include the individual(s) responsible for the operations or functions as early possible in the development of control procedures as they will have to implement them!

Task 17: Assemble Existing Documentation

Prior to compiling an EMS manual, the Core Team must gather the documents that have been generated to date and determine if they are sufficient. Frequently, a small amount of additional documentation is required to draw the EMS documents together into a complete system.

Task 18: Develop Any Necessary Additional Documentation

(Self-explanatory)

Task 19: Assemble EMS Manual

By assembling an EMS manual, the Core Team prepares for the process of rolling the EMS out into the organization.

Task 20: Develop Training Modules

While this Task may have been initiated earlier in the implementation process, the Core Team will want to complete their activities by preparing a general training module that introduces new and existing employees to the EMS(at a minimum). Additional training modules may be developed in this Task as well, such as procedural training.

Task 21: Deliver Training to Staff

(Self-explanatory)

Task 22: Implement EMS

In this Task, the EMS is announced as "in effect" and the Core Team has completed its task. This task is frequently accompanied by a formal announcement by top management and public congratulation of the Core Team.

Phase 4: Implement Continuous Improvement of EMS (Detailed Checklists in Annex F)

Task 23: Perform Self-Audit of the EMS

This is the final step to completing the EMS. A thorough self-audit of the EMS identifies any gaps remaining in the system, and initiates the process of continual improvement of the EMS. If certification is a goal, the auditors will expect to see that a self-audit cycle, including use of the corrective action log, has been completed.

Task 24: Perform First EMS Management Review Cycle

Using the results of the self-audit of the EMS, the next task is to provide a complete update to management on the EMS. This initiates the cycle of continuous improvement of the EMS and results in the development of an annual plan. At this point the municipality can choose to self-declare the EMS, or seek certification under a third party.

Task 25: (Optional) Pursue Certification

While this may not be a goal for every municipality, it is advised that some form of external audit of the EMS be performed – perhaps by or in consultation with State government (DEP) resources – in order to provide external validation of the EMS.

6 Additional Sources of EMS Information

Complimentary Guidebooks, Studies and Tools on EMS Implementation

An Environmental Management System Troubleshooters' Guide for Local Governments

An EMS guidance workbook, complete with phase-specific sample documentation examples, case study materials, and troubleshooting guidance. Prepared by the PEER Center.

http://www.peercenter.net/troubleshooters.cfm

Best Practices Guide for Application of ISO 14001 Environmental Management Systems (EMS) in Municipalities

This guide is for senior and mid-level technical staff (facility managers, directors of engineering or technical services, directors of capital planning) from municipal agencies, utilities and institutions who are interested in implementing an EMS. The guide provides enhanced technical, management and analytical tools for the development of a broader Municipality EMS and a more narrowly structured Municipal Facility EMS.

http://www.iie.org/programs/energy/pdfs/applic%20ISO%2014000%20for%20Municipalities.pdf

Or contact:
The Lexington Group
110 Hartwell Ave
Lexington, MA 02421
Phone: (781) 674-7306
Fax: (781) 674-2851

EMS Evaluation Tool

EMS-Plus is one of a number of efforts that are currently underway to find ways to evaluate EMSs. EMS-Plus helps organizations evaluate their EMSs based on whether they incorporate components known to promote environmental improvement. EMS-Plus leads you through a series of questions about your EMS, and then provides a report based on the key EMS components, such as whether the EMS is oriented towards regulatory compliance and control technologies, or whether it is more comprehensive and Pollution Prevention -oriented.

http://ems.rti.org/

Environmental Management Tools for SMEs

This handbook looks at the way SMEs can use environmental management to improve their business performance. It looks at environmental management systems (including ISO 14001 and EMAS) and at a number of other tools that firms can use to manage their environment.

http://reports.eea.eu.int/GH-14-98-065-EN-C/en

Implementing an Environmental Management System in Community-Based Organizations

This project report details the implementation experiences of 10 community-based organizations in southeast Michigan. Prepared by NSF International

http://www.nsf-isr.org/forms/emspublication_request.html

Implementing ISO 14001 Environmental Management Systems at the Municipal Level

A one-page information sheet on the U.S. EPA Local Government EMS Initiative: August 1997 - July 1999

http://www.resourcesaver.com/file/toolmanager/O73F21869.pdf

An Organizational Guide to Pollution Prevention

Available in hard copy or CD-ROM, this manual applies multiple management oriented tools to the concept of Pollution Prevention, and discusses their application in the development of quality and environmental management systems.

www.p2pays.org/ref/19/18328.htm

Reprints of papers describing the use of the Pollution Prevention tools included in this Guide, along with other similar tools, have also been made available by the author, Dr. Robert B. Pojasek.

http://www.pojasek-associates.com/

Implementing Environmental Management Systems in Public Entities

The Global Environment and Technology Foundation (GETF) has prepared two reports on the US EPA Environmental Management Systems Pilot Program for Local Government Entities. The reports detail the challenges and successes of municipalities participating in the Pilot Project.

http://www.getf.org/projects/muni.cfm

National Database on Environmental Management Systems (NDEMS)

The NDEMS was established to measure the performance of a wide range of private and public organizations before, during and after the implementation of an EMS. The five-year longitudinal study is presented in the final report published in January of 2003.

http://ndems.cas.unc.edu/

Supporting Organizations and Additional EMS Information Sources

American National Standards Institute (ANSI)

ANSI provides a wealth of ISO 14000 information, some free, some by subscription.

http://web.ansi.org/

EMS Auditors listed by the Registrar Accreditation Board (RAB)

EMS auditors listed by Registrar Accreditation Board (RAB).

http://www.rabnet.com/ea_main.shtml

The International Council for Local Environmental Initiatives (ICLEA)

The ICLEA is an international association of local governments implementing sustainable development.. The website contains a considerable information clearinghouse of publications and tools, as well as information on community initiatives around the world

http://www.iclei.org/

Local Government Environmental Assistance Network (LGEAN)

The LGEAN website serves as an information clearinghouse, providing environmental management, planning, funding and regulatory information for local government elected and appointed officials, managers and staff. The site also facilitates peer communication and has an "ask the experts" feature.

http://www.lgean.org/

Cleaner Production

Dr. Burton Hamner has created a website known as "CleanerProduction.com" This website has a number of resources that are useful to anyone seeking to expand their understanding of pollution prevention, environmental management systems, and sustainable development. It also offers a CD-ROM of Dr. Hamners "greatest hits collection" of over 400 papers and guides.

http://www.cleanerproduction.com

Five Winds International

Five Winds delivers a full range of EMS design, training, and implementation services aimed at leveraging existing management programs to develop a strong yet flexible system. Five Winds has access to a wide range of individuals with excellent expertise, to assist clients with EMS activities.

http://www.fivewinds.com/services/services_manageSystems.cfm

ISO Online

The International Organization for Standardization is a network of national standards institutes from 140 countries working in partnership with international organizations, governments, industry, business and consumer representatives. Information about ISO 14000 can be found here.

http://www.iso.ch/iso/en/ISOOnline.openerpage

NSF International Strategic Registrations, Ltd.

NSF-ISR is a wholly owned subsidiary of NSF International, whose mission is to provide superior third-party standardization services in public health and safety and environmental quality. This website has a number of documents and guidebooks on management systems, many of which are free to download

Management Systems Registration and Services:
http://www.nsf-isr.org/services/ems_registration.html

PEER Center

The PEER Center is the Public Entity Environmental Management System Resource Center. A virtual clearinghouse, it is specifically designed to aid local, county, and state governments that are considering implementing or have implemented an environmental management system (EMS) and want to access the knowledge and field experience of other public entities that have done so.

http://www.peercenter.net

US Environmental Protection Agency Environmental Management Systems Home Page

The US EPA EMS home page contains significant links and resources concerning environmental management systems. The site also has many free downloadable guidance documents.

http://www.epa.gov/ems

Pennsylvania Department of Environmental Protection ISO 14001 Home Page

The State of Pennsylvania has an extensive amount of information on ISO 14001 and management systems with a number of outstanding links and guidance documents that are all free to download.

EMS in Pennsylvania:
http://www.dep.state.pa.us/dep/deputate/pollprev/Iso14001/iso14000.htm

US Environmental Protection Agency Mid-Atlantic Region 3 EMS Home Page

The US EPA Region 3 EMS Home Page contains many useful links and documents concerning environmental management systems, including an overview and description of the Region 3 EMS.

http://www.epa.gov/region03/ems

Annex A – Glossary of Terms[3]

Accreditation: Formalized procedure by which an authoritative body formally recognizes that an organization or facility is competent to carry out specific tasks and/or meets specific accreditation requirements.

Audit: A planned, independent and documented assessment to determine whether agreed-upon requirements are being met within an organization.

Audit Cycle: The period of time in which all the activities in a given site/facility are audited.

Audit Team: Group of auditors, or a single auditor, designated to perform a given audit; the audit team may also include technical experts and auditors-in-training. Note: One of the auditors on the audit team performs the function of lead auditor.

Certification: The environmental management system of an organization is certified for conformance with ISO 14001 after it has demonstrated such conformance through a formal audit process through a third party.

Certification Body: A third party that assesses and certifies/registers an organization's environmental management system with respect to published environmental management system standards and any supplementary documentation required under the third party's certification system.

Compliance: An affirmative indication or judgment that the supplier of a product or service has met the requirements of the relevant specifications, contract, or regulation. Comparable to Conformance.

Conformance / Conformity: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation. In terms of ISO, conformance to ISO 14001 certification requirements - comparable to Compliance.

[3] This glossary of terms was compiled from definitions within the ISO 14001 standard, as well as an EMS glossary from the PEER Center (downloaded from. http://www.peercenter.net/ewebeditpro/items/O73F1605.pdf on 12/03/2003). The PEER Center is the Public Entity Environmental Management System Resource Center. A virtual clearinghouse, it is specifically designed to aid local, county, and state governments that are considering implementing or have implemented an environmental management system (EMS) and want to access the knowledge and field experience of other public entities that have done so.

Continual improvement: The process of enhancing an organization's environmental management system to achieve improvement in overall energy and environmental performance in line with the organization's environmental policy. This widely adopted principle is intended to ensure that an organization does not simply adopt an environmental management system for cosmetic purposes and thereby remain static, without commitment to reduce its impact on the environment.

Emergency Response Plan: A formal, detailed plan that describes an organization's specific logistics and reporting requirements in the event of an emergency, such as fires, erosion or spills. A fundamental element of an environmental management system.

Energy Efficiency: An increase in the energy efficiency is when either energy inputs are reduced for a given level of service, or there are increased or enhanced services for a given amount of energy inputs (downloaded from www.eia.doe.gov/emeu/efficiency/definition.htm on 12/18/2003). Also, a nomenclature given to products or systems that use less energy and have the same or better performance than conventional products or systems (downloaded from www.tahoesolar.com/Definitions.htm on 12/18/2003).

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 (definition from ISO 14001).

Environmental Impact: Any change to the environment, whether adverse or beneficial, wholly or partly arising from an organization's activities, products or services (definition from ISO 14001).

Environmental Management Representative (EMR): The clearly-identified environmental management system team leader who has responsibility for planning and facilitating an organization's environmental management system from start to finish and has the designated authority of senior manager to get the job done.

Environmental Management System (EMS): A management approach, which enables an organization to identify, monitor and control its energy and environmental aspects. An environmental management system is part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the energy and environmental policy. Specifically, an EMS ensures that energy and environmental programs and operations are enhanced through a commitment to continual improvement, a focus on aligning processes and procedures with goals and objectives, and a clear definition of responsibilities for energy and environmental issues from the top to the bottom of the organization. The ISO 14001 standard for EMS is a voluntary standard for environmental management.

Environmental Management System Audit: A systematic, documented verification process of objectively obtaining and evaluating an organization's environmental management system to determine whether or not it conforms to the environmental management system audit criteria pre-defined by the organization, and for communication of the results of this process to management.

Environmental Objective: Overall environmental goal, arising from the energy and environmental policy, that an organization sets itself to achieve, and which is quantified where practicable. Objectives are based on specific significant aspects.

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

Environmental Policy: Statement by the organization of its intentions and principles in relation to its overall energy and environmental performance, which provides a framework for action and for the setting of its energy environmental objectives and targets (modified definition from ISO 14001).

Environmental Target: Detailed performance requirement, quantified where practicable, based on an organization's defined energy and environmental objectives and that must be met in order to achieve those objectives.

EMS Boundary (Fenceline): The area in which an organization chooses to implement its environmental management system – a department, division or specific operation.

Interested Party: Individual or group concerned with or affected by the energy or environmental performance of an organization.

ISO: The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from some 140 countries, one from each country. ISO is responsible for the development of ISO 14001.

ISO 14001: An international voluntary standard for environmental management systems.

This is one standard in the ISO 14000 series of International Standards on environmental management.

Lead Auditor: Person qualified to manage and perform environmental management system audits.

Non-Conformity: The non-fulfillment of a specified requirement. Any or all of the following: a) one or more environmental management system requirements have not been addressed; or b) one or more environmental management system requirements have not been implemented; or c) several nonconformities exist that, taken together, lead a reasonable auditor to conclude that one or more environmental management system requirements have not been addressed or implemented.

Observation: A practice within an organization's operations, while not in strict violation of environmental management system requirements that can make conformance difficult or potentially provide an opportunity for error. Examples include overly difficult processes, poor housekeeping, and inadequate personnel training.

Prevention of Pollution: Use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution.

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.

Renewable Energy: Refers to electricity supplied by energy sources that are naturally and continually replenished, such as wind, solar power, geothermal, hydropower, and various forms of biomass (downloaded from www.tahoesolar.com/Definitions.htm on 12/18/2003).

Registrar: Third-party entity who audits and registers an organization's environmental management system with respect to the ISO 14001 environmental management system standard.

Stakeholders: Those groups and organizations having an interest or stake in an organization's environmental management system program (e.g., regulators, shareholders, customers, suppliers, special interest groups, residents, competitors, investors, bankers, media, lawyers, geologists, insurance companies, trade groups, unions, ecosystems and cultural heritage).

Verification: The act of reviewing, inspecting, testing, checking, auditing, or otherwise establishing and documenting whether items, processes, services, or documents conform to specified requirements.

Waste Minimization: The use of source reduction and/or environmentally sound methods and practices that reduces the quantity and/or toxicity of pollutants entering a waste stream prior to recycling, treatment, or disposal. Examples include equipment or technology

Annex B – Municipality Case Studies

Pennsylvania DEP EMS Pilot Project Participants		
Municipality	**Contact Information**	**EMS Boundary**
Brockway Borough	**Robert L. Fustine,** Borough Manager, Brockway Borough Tel: (814) 268-6565 E-mail: bbmb@penn.com	Wastewater Treatment Facility
Crawford County	**Etienne Ozorak** Executive Director, Solid Waste Authority Tel: (814) 333-7366 E-mail: etozorak@toolcity.net	County Correctional Facility
City of Erie	**Tom Maggio** Grant Administrator, Erie-Western Pennsylvania Port Authority Tel: (814) 455-7557 E-mail: tmaggio@porterie.org	Erie Port Authority – harbors, marina dredging and Mountfort Terminal (includes shipyard, dry-dock, marinas, maintenance and administration offices)
Hampden Township	**Lew Massie** Assistant Superintendent **Diane Campbell** Biosolids Coordinator Tel: (717) 761-7963 E-mail: lmassie@hampdentownship.us E-mail: dcampbell@hampdentownship.us	Wastewater Treatment Plant
Lawrence County	**Amy Jo Labi-Carando** Director, Lawrence County Recycling/Solid Waste Department Tel: (724) 668-6925 E-mail: lawrecyc@ccia.com	Hill-View Manor Long Term Care Facility
City of Philadelphia	**Scott McGrath** Environmental Planning Manager, Sanitation Division Tel: (215) 686-5905 E-mail: Scott.McGrath@phila.gov	Solid Waste Collections Operations and NW Transfer Station
Venango County	**Martin Rudegeair** Park Manager, Two Mile Run County Park Tel: (814) 676-6116 E-mail: twomile@csonline.net	Two Mile Run County Park

Borough of Brockway

Overview

The Borough of Brockway is located in Northwest Pennsylvania, Jefferson County. Brockway is 8 miles north of Interstate 80 off Exit 97. The borough has a population of approximately 5,000 people.

Wastewater issues have become a priority for Brockway due to hydraulic overload conditions resulting from the expansion of the borough's wastewater collection system and treatment facility. The infiltration experienced by the sewer system was large enough to cause overload and surcharge conditions. Neither Brockway Wastewater Treatment Plant's (WTTP) wastewater clay tile collection system, which was installed in the 1940s through the 1960s, nor the pump station to the facility, was able to handle this type of loading, and occasionally discharged these extreme flows as a sewer system overflow. The flows that were reaching the wastewater facility positioned the treatment plant into an overload condition and ultimately into non-compliance of its National Pollutant Discharge Elimination System (NPDES) permit.

Flow monitoring, smoke testing, and television inspection of the collection system confirmed that the sewer system was deteriorating. Three major areas with Infiltration & Inflow (I&I) problems were identified.

As part of its signed commitment in 2002 to implement an environmental management system (EMS), the Brockway Wastewater Treatment Plant's infiltration of sewer collection system became the focus of the Pennsylvania's Department of Environmental Protection's (DEP) local government EMS pilot-program.

Experience in EMS Pilot-Program

From the beginning, this EMS pilot-program received continued support and commitment from the Brockway Borough Council. This commitment was articulated via a letter of resolution.

The initial EMS GAP Assessment showed that Brockway has a deteriorating wastewater collection system and antiquated sewer system rules and regulations. To address this, the Borough of Brockway developed current rules and regulations and formed the Brockway Area Sewage Authority (BASA). This Authority is responsible for the collection and treatment of industrial, commercial, and domestic wastewater, not only for the Borough of Brockway, but also for Snyder and Horton Townships. BASA will own and operate the collection and treatment facility to ensure wastewater discharged to surface waters meet state and federal requirements. Brockway's deteriorating sewer system led BASA to conduct a progressive attack on its wastewater collection system.

BASA's objective is to reduce the impact of excessive Infiltration and Inflow (I&I) to the collection system and treatment facility. BASA is trying to identify the locations of the major sources of (I&I) with the data compiled through a flow-monitoring program. This EMS pilot-program provided assistance in prioritizing areas that may need television inspection with an end result of sewer line replacement to those areas. As lines are replaced, visual inspection and air testing of the property

owner's lateral will be tested for leakage. An I&I study comprised of dye testing, flow monitoring and smoke testing is currently being completed.

The goal of the BASA is to reduce the potential for pollution by reducing the amount of I&I to the collection system, pump station and treatment facility. The following table depicts the plan of reduction and five year goals.

Table 1: BASA's Reduction Plan

Average daily water usage (960 edu's)	138,000 gpd
Average daily flow to wastewater facility	330,000 gpd
Total reduction of I&I	192,000 gpd
2003-2007 Reduction (15%)	28,800 gpd
2008-2012 reduction (15%)	28,800 gpd
2013-2017 reduction (15%)	28,800 gpd

A lack of time and human resources posed some challenges to the Borough of Brockway in completing this project, however it still holds firm to achieving major reductions in I&I which would lead to further savings in treatment and higher quality of discharge at the WWTP.

Benefits

One major benefit of this EMS pilot-program for the Borough is the opportunity to learn from the experience of other communities in terms of approaching and managing their environmental challenges. Exposure to this knowledge along with the continued support from the Borough Council has also helped to broaden the thinking around addressing environmental deficiencies in Brockway.

In terms of direct financial benefits, the Borough indicated that some cost savings in wastewater treatment have already been realized through I&I work and yards of sewer main replaced. These benefits have not yet been quantified the time of writing this document.

Contact

Robert L. Fustine

Borough Manager

501 Main Street

Brockway, Pennsylvania, 15824

Tel: (814) 268-6565

Fax: (814) 265-1300

E-mail: bbmb@penn.com

Crawford County

Overview

Crawford County has a population of some 90,000 residents and borders on the State of Ohio. The EMS pilot-program was developed for the Crawford County Correctional Facility (CCCF), which is located in Saegertown, about 6 miles north of Meadville and 30 miles south of Erie. The Correctional Facility is one of the largest departments of Crawford County government and houses some 200 inmates. The pilot was developed to address facility-wide environmental planning.

The Crawford County Commissioners have long maintained a policy of innovativeness and developing efficiencies in government programs. As part of their Act 101 Municipal Waste Management Plan, the County adopted an environmental policy, which covered reducing waste and energy use. The pilot program and training provided County staff with the opportunity to develop initiatives that would support the policy. It is hoped that, once implemented in the Correctional facility, the program can be extended to other county facilities.

Experience in EMS Pilot-Program

The County Commissioners endorsed the project from the very beginning. They appointed the County Recycling Coordinator to oversee the project. The jail Warden was brought in later on in the project. In retrospect, perhaps the Commissioners should have appointed both individuals to oversee the project from the beginning in order to minimize differences in approach by the two agencies.

All operational aspects at the Correctional Facility were included in this pilot.

In the initial Gap Assessment, a lack regarding most procedures regarding energy use, pollution prevention, waste minimization and recycling was identified. The Maintenance Supervisor had started a number of initiatives aimed at reducing environmental impacts and operational costs. These initiatives included electronically-measured detergent dispensing, reducing the toxicity of materials used in lawn care as well as composting of all organic food waste.

Benefits

The most important benefit that has accrued under this pilot was in consensus building. The EMS approach requires teamwork, which can be somewhat sporadic in local government. This teamwork is being developed not only within the Correctional Facility staff, but also between the County Commissioners, Correctional Facility Administration and the Solid Waste Authority. The focus on consensus building challenges the more usual autocratic approach.

In the facility itself, it is hoped that implementation of the EMS program will result in the institutionalization of a waste and resource minimization ethic. While the Maintenance Supervisor has initiated many cost and resource saving ideas based on his expertise, his replacement would have a hard act to follow. More so, it is hoped that a secondary impact of EMS implementation will be to

inculcate in the staff a sense that quality of work life hinges on a greener and smarter work environment.

Contact

Etienne Ozorak

Executive Director

Solid Waste Authority

231 Chestnut St., Suite 310

Meadville, Pennsylvania, 16335

Tel: (814) 333-7366

Fax: (814) 366-3521

E-mail: etozorak@toolcity.net

Erie-Western Pennsylvania Port Authority

Overview

The Erie-Western Pennsylvania Port Authority is a municipal authority operating under the third class city act. The Port Authority, located in the northwest corner of the state on Lake Erie, is controlled by a board of nine directors, seven of whom are appointed by the mayor of the city of Erie. The Port Authority controls most of the waterfront property on Erie's Presque Isle Bay. The Port's operations consist of two marinas, three public boat-launches, the port of Erie international marine terminal, the largest shipyard and dry-dock on the Great Lakes, parks, public piers, a ferry operation, and other property which is leased to private businesses. There are over 104,000 people living within three miles from the waterfront and 180,000 within 10 miles. Additionally, the waterfront draws tourists from neighboring cities including Pittsburgh, Buffalo, and Cleveland. The Port Authority's mission is to promote commerce and recreation with respect to the natural resources that make those things possible.

Experience in EMS Pilot-Program

The Port Authority decided to take a leadership position with respect to reducing its environmental footprint, in advance of future changes in environmental safeguards and regulations. The Port Authority also wanted to implement an EMS with the aim that the permitting process could be expedited and that its funding applications might receive additional consideration.

The Port Authority became involved with Pennsylvania Department of Environmental Protection's (PA-DEP) Local Government EMS pilot-program. One of the first steps of this pilot-program was assembling an EMS core team from the Port Authority.

The Port Authority's Executive Director supported the core team's efforts during the pilot-program. The team members benefited from the discussions about how the Port Authority could reduce its impacts on the environment, reduce costs, and become a more efficient operation. The brainstorming sessions were vital to establishing not only a list of aspects and impacts, but solutions and other preventive measures.

Although the Port Authority had no formal environmental policy prior to beginning the EMS process, it did have a mission statement, which stressed *the balance of development and protection of the natural environment*. In addition, the Port Authority is regulated on a number of environmental issues both at the state and federal levels. Some of the environmental issues include:

- Dredging of the harbor and marinas;
- Stormwater discharge;
- Sewage;
- Hazardous Waste;
- Brownfields;
- Spill Prevention & Response;

- Clean Air Act;
- Clean Water Act; and
- Clean Vessel Act.

Other related permitting is made through PA-DEP, United States Coast Guard and the Army Corps of Engineers.

During meetings with the EMS core team it was agreed that the lack of a written environmental policy and procedure manual for the various activities along the waterfront was a barrier for employees wishing to reduce the Port's impact on the environment. The meetings on the subject were very productive and team members were interested in implementing procedures for all aspects and impacts of the Port's operations. The EMS core team also felt that there was a need to educate the public about its impact on the environment - especially with regards to boating.

DEP staff encouraged the Port Authority to include all of its properties and operations in its EMS boundary. Although the decision to incorporate all of the Port Authority's properties and operations proved to be considerable work, after several meetings the EMS core team was able to list dozens of impacts requiring action. To address all these impacts more efficiently, the Port Authority decided to combine significant impacts to create ten (10) umbrella programs:

- Utility Use Reduction Program;
- Chemical and VOC Reduction Program;
- Chemical Management Program;
- Solid Waste Reduction Program;
- Air Pollution Reduction Program;
- Buy Recycled Program;
- Fuel Management Program;
- Hazardous Waste Collection and Disposal Program;
- Cleaning Supplies and Process – Chemicals Reduction Program; and
- Clean Marina and Bay Program.

The Port Authority has already taken steps to implement programs to reduce water pollution and prepare for emergency situations. One of the biggest challenges for the Port Authority was extensive time and staff resources necessary to complete the EMS manual. The EMS for the Port Authority was complex and required significant time to develop.

Benefits

As hoped at the outset of the EMS pilot program, it does not yet appear that the development of the EMS and the Port Authority's participation in the pilot program will influence permitting and grant proposals by DEP (this possibility is still being evaluated), however significant benefits have been realized. For example, the Port has significantly enhanced safety and emergency protocols for sensitive areas such as fuel stations. The EMS pilot program has also led to increased internal discussions on reducing potential environmental problems of the Port Authority. Once all of the programs are fully in place the calculation of cost savings will be possible.

The Port Authority has developed an extensive EMS for all of its properties and activities. The 10 programs that were developed will form the basis for future cost savings, reductions in energy and chemical use, and afford waterfront users such as boaters an environmentally friendly alternative to past practices. The EMS core team has continued work to complete the EMS manual and continues to meet on a regular basis.

Contact

Tom Maggio

Grant Administrator

Erie-Western Pennsylvania Port Authority

208 East Bayfront Parkway, #201

Erie, Pennsylvania 16507

Tel: (814) 455-7557

Fax: (814) 455-8070

E-mail: tmaggio@porterie.org

Hampden Township

Overview

Hampden Township is located in Cumberland County, in south central Pennsylvania near Harrisburg. It has been a First Class township since 1960 and has a population of 24,000 residents. It is composed of multiple public works departments including: highway, recreation, golf, police, emergency services, administration, building and codes and wastewater. An elected Board of Commissioners and an appointed sewer authority governs Hampden Township. The Wastewater Department, which consists of 20 employees, is the only department that participated in the Pennsylvania Department of Environmental Protection's (PA-DEP) Local Government EMS pilot-program.

Experience in EMS Pilot-Program

Hampden Township Wastewater Department was initially asked to participate in the PA-DEP Biosolids BMP pilot-project. The DEP's Office of Pollution Prevention and Compliance Assistance (OPPCA) got involved and six other municipalities were chosen to participate in a broader EMS pilot-program. The Wastewater Department had a keen interest in the EMS pilot-program since it wanted to develop a better public acceptance of its biosolids program. The Wastewater Department thought that if it followed a strategy to move beyond compliance with requirements, it would help to gain the public's acceptance of biosolids.

Through participation in this EMS pilot-program, Hampden Township Wastewater Department hoped to improve:

- Written operational procedures;
- Training schedule;
- Emergency preparedness and response; and
- Communication between employees.

The EMS pilot-program's boundaries encompassed four areas: transportation of biosolids, the collection system, treatment of wastewater and handling of grout chemicals.

The Wastewater Department's upper management was skeptical from the onset of the pilot-program. There was concern that the PA-DEP was using the Wastewater Department to write a manual that the PA-DEP would take and use for training. There was also the concern that the PA-DEP could discover some potential violations and undertake enforcement actions. Upper management also shared concerns about the time requirements of this pilot-program on an "already busy department". Costs associated with the pilot-program were also discussed. Once upper management approval was obtained, there was initially strong commitment for the project, however this commitment waned towards the end of the pilot-program. Upper management was again becoming concerned with the costs of travel and the time it was taking away from Wastewater Department's regular jobs. Support seemed to weaken also due to a lack of visible evidence that the Wastewater Department had produced tangible results. From its own experience the Wastewater

Department suggested that its upper management will more likely endorse a program if there was a tangible way to show that the extra time spent on EMS was worthwhile, and not an administrative burden that competes with other work. Demonstrating benefits to upper management (e.g. re-permitting ease, NOV leniency, public relations, potential grant bonus points, etc.) at the beginning of the program would be helpful.

A core team was assembled and the EMS pilot-program moved forward. The initial EMS gap analysis of the Wastewater Department showed that only minor items were addressed. The lack of answers during this exercise proved to be frustrating. Only Wastewater Department's chlorine emergency plan seemed to have sufficient information for the gap analysis.

The EMS pilot-program helped the Wastewater Department to correct two issues:

Pump Replacement: A pump at one of the Township's pumping stations was removed from service, without proper notification to the appropriate persons. Shortly after this event, another pump began to malfunction and the pump that was removed had not yet been repaired. This presented a potential problem since high flows were anticipated. To rectify this problem, a "*pump out of service*" form was created This form must be filled in and circulated throughout the chain of command in order to better communicate and correct future problems in a timely manner.

Written Procedures: There were no written procedures for putting the plants into high-flow operation in the absence of operators. The program provided both plants with a step-by-step written procedure that other employees can use.

Time was a limiting factor in the success of this pilot-program, since the Wastewater Department's other projects competed for time with the EMS program. The Wastewater Department's employees identified that a lack of motivation coupled with procrastination added an extra challenge. They suggested that more consistent contact with the PA-DEP and the EMS facilitators would have helped encourage them to forge ahead. Some of these latter issues were exacerbated by the lack of single point of contact to help the municipalities.

During the training sessions, some of the terminology used in EMS examples provided some challenges to the Wastewater Department since these were geared more towards industries (that create products) rather than municipalities. In the beginning this was a bigger challenge since it was the first time that many of the participants had heard about an EMS. Now that there is an increased level of awareness, the task of obtaining buy-in for the EMS should be easier. The Wastewater Department suggested that an EMS handbook specifically for municipalities could help to address some of these issues at an earlier stage.

The Wastewater Department is still not convinced that certification to ISO 14001 is a necessary step for municipalities, mainly due to audit and certification costs. However they are interested in having an external third-party verify their EMS.

The Wastewater Department expressed overall satisfaction with the EMS pilot-program and the results produced to date. The Department is anticipating more results over the next year and has already expressed an interest in participating in the PA-DEP's EMS outreach program.

Benefits

The EMS pilot-program helped Hampden Township's Wastewater Department to become more organized by promoting teamwork within the Department. It forced the different foremen to come together to coordinate projects and talk more about their individual jobs. The pilot-program also helped to increase the clarity of responsibilities assigned to different job functions at the Wastewater Department.

Cost savings are expected once the EMS has been fully implemented in March 2004. In the interim the Department has already begun to use the checklists and procedures, and is currently working towards completing its EMS manual by January 2004.

Contact

Lew Massie

Assistant Superintendent

Diane Campbell

Biosolids Coordinator

4200 Roth Lane

Mechanicsburg, Pennsylvania, 17050

Tel: (717) 761-7963

Fax: (717) 763-9639

E-mail: lmassie@hampdentownship.us

E-mail: dcampbell@hampdentownship.us

Lawrence County

Overview

The County of Lawrence is located in Northwest Pennsylvania, 65 miles north of Pittsburgh. It is a 5th class county with a population of 96,000. The counties long-term care nursing facility, Hill View Manor, and the Lawrence County Recycling/Department jointly participated in the Pennsylvania Department of Environmental Protection's (PA DEP) Local Government EMS pilot-program. Hill View Manor is a 136-bed facility that was built in 1925, and owned and operated by the county. It is located in Shenango Township. The goal of the pilot program was to improve efficiency, reduce costs and pursue pollution prevention opportunities.

Experience in EMS Pilot-Program

The Hill View Manor pilot project began by organizing the core team. Because time had not been allocated from routine job duties the core team found it difficult to set aside time to meet on a weekly basis, but did so for many months. The Board of County Commissioners demonstrated their support by passing a resolution to sign the letter of commitment to the project, and approve the environmental policy for Hill View Manor. The project was widely advertised to the public.

The policy stated, in part, that the facility "…is committed to sustain a healthy environment for its employees, residents, and the community." Additionally, Hill View would "…serve as a standard bearer for other County Departments through the efficient utilization of financial and human resources by recycling and practicing cost containment. Just as we continually improve upon our goal of the highest level of resident care, so shall we continue to improve our environmental efforts by evaluating our successes and modifying our goals in light of our mission. The pride we take in providing quality services to our residents will also be reflected in our efforts to preserve and protect the environment."

The EMS boundary encompassed the entire physical facility. The areas of operation included food service; water, sewage, and utility waste; medical and general supplies; and medical waste. The various health regulations and policies governing nursing home facilities were of great assistance during gap analysis, since much of the required information was in existing documents.

The broad scope of the EMS boundary gave rise to a wide variety of environmental aspects and impacts, and assessment of these consumed much of the core team's time. The first EMS program focused on waste reduction in the area of food service, specifically coffee usage. After research and a blind taste testing on staff and residents, the method of purchasing and making coffee was changed. The facility switched from buying coffee grounds to purchasing concentrated liquid coffee and using an on-demand dispenser.

The project's next program focused on the increasing amount of document destruction required by changing regulations. After discussion of various options, the team chose to shred office papers and located a local farmer interested in using the waste material as animal bedding.

During the course of the EMS project, several challenges were encountered:

- The County replaced the administrator for Hill View Manor four (4) times.
- Staff turnover at both Hill View Manor and the Recycling/Solid Waste Office. and
- The County put the facility up for sale halfway through the project.

During the privatization negotiations, the EMS project was suspended. When the sale failed to come to fruition, the Core Group did not reconvene due to budgetary and time constraints. The changes implemented during the pilot project are still in effect at the facility.

Benefits

The Hill View Manor management, EMS core team and the County of Lawrence benefitted greatly from participation in the EMS pilot program, even though the EMS process was interrupted in the middle of the project by the privatization initiative. The aspects and impacts study revealed several areas where the financial and environmental aspects of operating the long-term care facility could be reduced. To date, only two of these have been addressed – waste coffee grounds and waste paper from document destruction.

The resulting changes to food service procedures demonstrated savings financially, environmentally, and socially. By changing the management of coffee, a beverage in significant routine demand at the facility, an annual reduction of 1½ tons of waste coffee grounds was realized. This significantly reduced solid waste disposal costs and use of local landfill space. Additionally, the liquid coffee was cheaper than ground coffee adding to the financial savings. The liquid coffee containers are also recyclable and operate as part of an on-demand system, resulting in a near-zero waste effect and 100% reduction in product loss. Thus further savings were realized from reduced staff time required to set up, clean, and recycle the containers. This resulted in increased efficiency and service to the residents using a product that they liked better.

The paper shredding/animal bedding project resulted in considerable avoided disposal costs, also. While less information is available on this program, costs have been avoided by reducing solid waste disposal volumes, as well as the resulting landfill space and transportation that would have been required to dispose of it. The farmer has also avoided costs by obtaining this material for free.

The staff found it exciting when the benefits showed positive results, and were increasingly willing to devote time to the project. Even though the EMS project is no longer progressing, the process demonstrated the benefits of having staff involved in implementing continuous improvement to the facility operations. The future of the facility and the involvement of any other County departments is uncertain at this time.

Contact

Amy Jo Labi-Carando
Director
Lawrence County Recycling/Solid Waste Department
430 Court Street
New Castle, PA 16101

Tel: (724) 668-6925
Fax: (724) 656-2287
E-mail: lawrecyc@ccia.com

City of Philadelphia Sanitation Division

Overview

Philadelphia is the second largest city on the East Coast and ranks fifth in the nation, with a metropolitan population of 5.8 million. The City of Philadelphia Streets Department's Sanitation Division provides refuse and recycling collection services for about 530,000 households. The Sanitation Division also provides mechanical street cleaning services along commercial corridors, litter basket collections, household hazardous waste drop-off services and illegal dumping clean-up services. The Sanitation Division uses 170 compactor trucks and 45 recycling trucks on a daily basis, and operates one transfer station. Approximately, 700,000 tons of refuse and 47,000 tons of recyclables are collected annually. The Division has about 1,400 employees.

Experience in EMS Pilot-Program

When the Pennsylvania Department of Environmental Protection (PA DEP) approached the Sanitation Division to participate in the Environmental Management System (EMS) pilot-program, the Division saw this as an opportunity for it to develop a process to provide environmental training focused on minimizing the environmental impacts of its operations. Additionally the training would provide City workers, who work with refuse and recycling, with a heightened sense of awareness of environmental health, safety and regulatory issues. This training was targeted beyond supervisors and managers to include individual laborers, drivers, mechanics, and other workers who may come into contact with potentially harmful materials.

With the support of the Streets Department's Commissioner, the Sanitation Division formed a planning committee to help steer the development of its *Environmental Training and Awareness Program*. This planning committee comprised of five individuals (including the Commissioner) from the following groups: engineering, environmental planning, operations and safety.

The planning committee articulated a general policy statement, which commits the Sanitation Division to *"the continuous training of its employees to protect themselves from environmental hazards and to make them aware of the impacts their actions have on the environment."*

Based on this policy statement, the following overall objectives were established for the training program:

- Create a culture focused on safety;
- Provide tools and knowledge to help employees protect themselves from environmental hazards;
- Develop procedures to encourage employees to protect themselves and the environment; and
- Develop procedures to assure compliance with environmental regulations

In order to better co-ordinate the development of the training program, the planning committee identified and generated a matrix of its stakeholder groups with accompanying descriptions and roles

for each group. The EMS boundary outlined for this project, included: Sanitation Division collection operations, citizen drop-off sites for trash and recyclables, dispatch yard operations and transfer station operations.

The major challenge in developing the training program centered on what should be included /excluded from the curriculum, in order to maximize the use of the training sessions.

To date, the Division has developed a comprehensive manual with descriptions of each system aspect, including an overview of operations relative to environmental impacts, regulatory impacts, etc. The Division does not expect to pursue a complete EMS.

The Sanitation Division is continuing to develop training processes for its *Environmental Training and Awareness Program*, and plans to implement this program in 2004.

Benefits

A major benefit of the DEP Pilot Project process has been the guidance delivered to the Sanitation Division's environmental training program design through the aspects and impacts assessment process. This process allowed the Division to identify minor, major, and critical training needs in the design process, increasing the effectiveness of the training. The training itself is also considered a benefit, as it will lead to a heightened awareness of environmental and safety issues in trash collection and management. This is expected to lead to reduced costs as workers are trained to identify and respond to issues appropriately – for example, prior to this training program a response contractor was called for every abandoned vehicle gas tank located in collection areas; this practice can now be preceded by the use of LEL (Lower Explosive Limit) detectors by workers to identify tanks that no longer contain residual fuel and do not require a response contractor for collection.

Contact

Scott McGrath

Environmental Planning Manager

Sanitation Division

1401 JFK Boulevard, 703 MSB

Philadelphia, Pennsylvania, 19102

Tel: (215) 686-5905

Fax: (215) 686-7812

E-mail: Scott.McGrath@phila.gov

County of Venango

Overview

The County of Venango is located in Northwest Pennsylvania. It is a 6th class County with a population of 57,000. The Two Mile Run County Park participated in Pennsylvania Department of Environmental Protection's (PA-DEP) Local Government EMS pilot-program. The Park, located in both Oakland Township and Sugarcreek Borough, consists of 2,700 acres complete with a 144-acre man-made lake, campgrounds, pavilions, houses, beach, etc. If it were a State park, it would rank in the top third in size.

Experience in EMS Pilot-Program

The regional office of the PA-DEP invited Two Mile Run County Park to apply for this EMS pilot-program. This invitation was timely since the Park was in the process of updating its Master Plan. The initial draft of the Master Plan provoked a community-wide discussion over the issues of development versus environmental sensitivity. From those discussions it was decided that the ISO 14001 certification process should be pursued to prove that development can happen with sensitivity to the environment. The Park strives to be a model in its development, operations, forest management, etc.

The County Commissioners approved the Park's "*A Sustainable Future for Two Mile Run*" in January of 2002. Part of the section entitled "*A Commitment to Planning*" states:

> *"…has always been committed to conducting all of its activities in an environmentally responsible manner. Toward that effort, we have recently been selected as one of eight model sites within the state to begin ISO14001 training. This international standard certification process focuses on the creation of environmental management systems. By doing this, we will embark on an approach to managing our environmental issues in a systematic manner that allows for continual improvement. Implementation of this plan will be addressed through this new environmental management system."*

The document further outlines Two Mile Run County Park's vision:

> *"To become a model site for sound environmental management methods, smart growth strategies and green-building technologies so as to offer our visitors a hands-on experience of how man and environment can co-exist and benefit each other."*

The EMS pilot-program enjoyed (and the process continues to enjoy) the support of the Venango Conservation District (VCD) – the agency is housed in the Park office – and the Northern Allegheny Project (NAP) – whose mission is environmental education for the northern Allegheny River.

Senior Park Management in consultation with the County Commissioners assembled the Core EMS Team. To further its commitment to the EMS pilot-program, Senior Park Management is also a part of the Core EMS Team.

Following this, the EMS boundary, which encompasses the entire acreage of Two Mile Run County Park, was outlined to include the following areas of operation:

- **Land Management** (e.g. the Park land is State certified as a Stewardship Forest);
- **Staff Training** (e.g. to instill a sense of environmental awareness in daily Park operations);
- **Waste Disposal** (e.g. a focus on recycling and waste prevention);
- **Wastewater Management** (e.g. the permit parameters for the Park's 20,000 gpd treatment plant);
- **Energy Management** (e.g. a specific emphasis on fuel cell or co-generation and wind, solar and hydro-electric power); and
- **Development Management** (e.g. an overall view towards green building technology in new development as well as renovation).

The first EMS gap analysis indicated almost none of the elements of an EMS. The Park's approach to management has always been more environmentally sensitive than realized even by Park staff. In retrospect, the Park believes that it, "*did not understand how much of an environmental focus the Park had*". The largest gap identified from this analysis was in the actual documentation of the Park's environmental approach.

Despite this the Core EMS Team indicated that a more in-depth understanding of the Gap Analysis might have positioned the Park to be further along in the EMS process. The Park is still working on developing its objectives and targets, operational control procedures, and monitoring and measurement procedures.

Initially there were some challenges caused by changes in the Core EMS Team as the environmental education staff of the VCD and project contacts at DEP experienced some staff turnover. Other challenges to the Team included some fundamental problems with the EMS pilot-program process and difficulty with the specific EMS terminology (e.g. *aspects and impacts*, *activity and operations*, *inputs and emissions* etc.).

In addition to these challenges, there were many time issues that diverted the attention of the Core EMS Team, including:

- 2002 and 2003 Summer operating seasons for the Park;
- July 21, 2003 microburst – which damaged 600 acres or a third of the Park's forest;
- Changeover of Park management from a private non-profit to a Park Authority have; and
- Other time issues (i.e. EMS resource personnel changes) also affected VCD, NAP and DEP involvement.

The Core EMS Team also expressed that having the Sample EMS Manual at the initial stages of the EMS pilot-program would have helped them in placing priority to the program.

Benefits

The Senior Park Management and the Core EMS Team have a greater level of understanding, respect and commitment to the EMS process. While no financial savings have been realized to date, the Park expects that future operational costs will be reduced through green buildings, waste management and recycling.

Two Mile Run County Park plans to continue the EMS process throughout the 2003-2004 winter months with the ultimate goal of achieving ISO 14001 certification.

Contact

Martin Rudegeair

Park Manager

Two Mile Run County Park

RD #5 Box 320

Franklin, Pennsylvania, 16323

Tel: (814) 676-6116

Fax: (814) 678-1190

E-mail: twomile@csonline.net

Annex C – Phase 1 Policy Development and Management Commitment Checklists and Tools

Task 1: Secure Management Commitment, Resources & Publicize

Input:

None – this is initial task

Tools:

None

	Completed?
Identify managers within the municipality who need to approve of EMS development in order to ensure resource allocation and implementation.	☐
Provide those managers with an overview of the EMS and business benefits associated with implementation.	☐
Discuss what the boundary will be for the EMS. The EMS boundary will be finalized in Task 3, however it is important to identify this in a general sense as early as possible so that individuals' expectations can be managed.	☐
Discuss resource needs and the schedule for implementation. This needs to be a frank and open discussion about the fact that EMS implementation is going to be competing for people's time with their other responsibilities and how that can best be managed.	☐
Get explicit and formal approval for EMS development. The approval from the municipality manager should state the specific business rationale for development of the EMS.	☐
Explicitly designate the individual who will have primary responsibility to ensure implementation of the EMS. It is critical that this person be personally committed and enthusiastic about EMS development and has the ability to communicate well with others who will be involved in the effort.	☐
Review with senior management the level of resource commitment needed from other staff who will be involved in EMS implementation.	☐
Identify approximately 2- 8 individuals who will make up the EMS Core Team, depending on the size of the operations. This team will provide the bulk of support for EMS development. This team should be identified by the Team Leader and confirmed by senior management.	☐

Discuss the time commitments needed from the Core Team members. Identify potential conflicts between EMS implementation and other responsibilities.	☐
Resolve and identify conflicts with senior management to ensure that the necessary arrangements are made to allow all of the Team members to commit the time necessary for EMS implementation.	☐
Meet with key staff throughout the organization to ensure that they know of management's commitment to proceed with EMS development.	☐
Publicize the EMS commitment through newsletters, bulletin boards, discussion at meetings and other forums.	☐

Output:

Memorandum (ideally signed by the highest possible level of municipality management – e.g., supervisor, council president, mayor, operations manager) describing management commitment to EMS development and formally designating EMS Implementation Leader, and team, description of responsibilities, the expected EMS Boundary and commitment of resources. Newsletters, announcements, and notes from forums.

HINT: The EMS Team should include staff from a cross-section of the organization, including, at a minimum, staff from the environmental and operational departments. Personnel from other departments such as maintenance, human resources, purchasing and marketing departments should also be involved. Human resources staff is particularly important since the EMS may involve changing job descriptions or responsibilities. Purchasing staff can also provide useful input because many of the environmental impacts are related to the type of materials or equipment purchased.

Task 2: Train Core Team

Input:

Training requirements as defined in ISO 14001.

Tools:

None

	Completed?
Train the Core Team on ISO 14001 requirements, EMS implementation, and business benefits associated with EMS implementation, strategic environmental management, and management commitment to EMS implementation. This training should stress the implementation process and understate the specific ISO 14001 EMS requirements since the Core Team needs to be able to understand and visualize how the EMS will be developed over time. Discussion of the specific EMS requirements can be confusing and the Core Team will develop a deep understanding of these requirements experientially during the implementation process.	☐
Identify any additional staff that may require training.	☐

Output:

Documentation of training, including listing of personnel attending each training session, agendas for each training session and any training materials utilized.

Task 3: Define the EMS Boundary

Input:

Guidance from senior management from Task 1 and in-depth knowledge of the municipality's operations from the EMS Core Team.

Tools:

EMS Tool 1: Identifying Operations in the EMS Boundary

	Completed?
Develop the EMS boundary **Note:** Some of the issues that may need to be addressed to finalize the EMS boundary include the consideration of contractors and tenants. Contractors may perform certain operations for the municipality with potentially significant environmental impacts that would be within the boundary of the EMS but may not be as easy to control as activities performed directly by staff. It is often helpful to hold conversations(s) with your EMS auditors to solicit their perspectives early in the implementation process. These issues need to be discussed during finalization of the EMS boundary.	☐
If issues regarding the EMS boundary become complex (such as whether or not to include contractors) an acceptable option is to create a simple boundary initially, with the intent to re-visit the boundary periodically and make a decision about whether to add potentially complicated factors.	☐

Output:

Written description of EMS boundary.

EMS Tool 1
Identifying Operations in the EMS Boundary

Instructions:

This EMS Tool is used to describe the operations that lie within the defined EMS boundary for an organization. Operations include all activities, products, and services.

1. Consider a way of categorizing operations to suit your specific organization. Some examples of categorization are:
   - Using a flowchart to follow materials or activities through processes;
   - Divide operations by departments; and
   - Any categories that capture all operations in the EMS boundary

2. Identify and list all activities, products, and services within the EMS boundary
   - Review the EMS boundary when deciding which operations to include
   - Based on the results of your EMS boundary review, start separate lists of activities, products and services, as needed
   - Start with as comprehensive a list as possible grouped into categories and consider anything that may have been missed by these categories

NOTE:

Ensure input is received from staff involved in all parts of the organization.

When describing operations make sure they are large enough for meaningful examination and small enough to be sufficiently understood.

When categorizing operations be sure to include a category for 'Other' to capture anything that you may otherwise miss.

Activities, products or services are operations that an organization undertakes within its EMS boundary. Examples include:

- Facility Maintenance
- Vehicle Maintenance
- Purchasing
- Waste Disposal
- Administration
- Construction
- Operations
- Chemical Management
- Wastewater Management
- Land Management
- Energy Management
- Food Handling

EMS Tool 1
Operations in the EMS Boundary

Use this worksheet to describe the operations (activities, products, and services) that lie within the defined EMS boundary. List operations using the categories you defined.

Municipality: _____

Prepared by: _____

Date: _____

	Activity	Description
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Note: List operations using the categories you have defined. Be sure to capture all operations within the EMS Boundary. Consider creating a separate table of activities for each category.

Create new pages as needed

Task 4: Perform a Gap Assessment

Input:

Any documentation of existing energy and environmental management practices.

Tools:

EMS ISO 14001 Gap Assessment Protocol

(This tool is located in Annex G because of its length)

	Completed?
Conduct a gap assessment of current practices and procedures against the requirements for ISO 14001 and the energy and environmental strategy and policy. During this analysis it is helpful to identify existing energy and environmental programs and procedures, which can be used in the EMS. Existing programs or procedures may require some modification to be consistent with the ISO 14001 requirements.	☐
Review gap assessment results with EMS Core Team. Note that the gap assessment results will not tell you directly how much or exactly what work needs to get done to complete your EMS. It will, however, provide a sense of what existing programs and documentation can be utilized and where the most effort will have to be spent in EMS development.	☐

Output:

Documentation of results of gap assessment. In many cases the results are documented as part of the implementation plan developed in Task 6, along with their order of priority to be addressed.

Task 5: Develop / Review Energy and Environmental Policy

Input:

Existing energy and environmental policy (if any) and direction from senior management from Task 1.

Tool:

Sample EMS Policy in the Sample EMS Manual

(This tool is available as a separate, standalone document from PA DEP)

	Completed?
Develop or revise an energy and environmental policy using policy requirements identified in ISO 14001 as an initial starting point.	☐
Time should be spent in awareness building with key operations.	☐
Based upon their feedback, revise and finalize Energy and Environmental Policy.	☐

Output:

Written Energy and Environmental policy, signed by appropriate senior management.

Task 6: Develop Implementation Plan and Schedule

Input:

Gap Assessment results from Task 4.

Tools:

None

	Completed?
Determine which EMS requirements need further development or refinement.	☐
Identify resource needs for completing all EMS requirements.	☐
Assign lead staff person for each step or each component of the EMS to be further developed or refined.	☐
Identify key communication (e-mails, intranet, bulletin boards…) and information management approaches with responsible individuals – agreement on common formats, fonts right at the beginning will eliminate considerable amount of redoing the EMS manual towards the end when time is always short.	☐
Develop a schedule for completing the remaining steps and all EMS requirements, including follow-on activities, such as EMS manual development, and training. We recommend a weekly meeting of the EMS team to discuss actions, obstacles that may affect the ability of the team to meet deadlines, and actions to over come those obstacles. Occasionally – e.g., monthly, it is recommended that a longer meeting be held to review draft procedures and outputs from the steps.	☐

Output:

Implementation schedule identifying steps that must be accomplished, target due dates and persons responsible for their implementation. A Gantt chart is often helpful to clearly outline the tasks, due dates, and meeting dates.

Annex D – Phase 2 Planning and Information Management Checklists and Tools

Task 7: Identify Key Stakeholders and Requirements

Input:

EMS boundary from Task 3 and Energy and Environmental Policy from Task 5.

Tools:

EMS Tool 2: Registry of Stakeholders and Their Expectations

	Completed?
Identify key stakeholders, based on the boundaries of the EMS and the knowledge of the municipal practices and policies. In developing the list of key stakeholders, consider internal groups (e.g. employees, specific departments), and external groups (e.g. unions, communities, and regulators).	☐
Identify key energy and environmental requirements of each stakeholder group. For instance, regulators would be interested in compliance-related information.	☐
Identifying concerns for a variety of stakeholders does not mean that they all need to be considered equally within the EMS. Obviously, compliance with the requirements established by a regulatory body need to be considered essentially without question, whereas issues of concern to another stakeholder group, like the local community, would be considered along with other factors in determining how to respond.	☐
As part of this process, assemble a list of legal or regulatory requirements associated with energy and environmental management, since these are requirements of a key stakeholder.	☐

Output:

Listing (Register) of stakeholders and their key energy and environmental requirements, and registration of regulatory requirements. Listing of regulatory requirements (federal, state, or local) should include all requirements, not just the requirements that have a reporting component, such as operator licensing and EPCRA Hazardous Materials Inventory tracking.

EMS Tool 2
Register of Stakeholders and Their Expectations

Instructions:

1. Use the table to list as many stakeholders as are deemed relevant
2. Describe the nature and structure of the stakeholder group
3. Identify the energy and environmental expectations for each stakeholder
4. Confirm if the expectations include a regulatory or other requirement:

   Note: You can answer Yes, No or Unknown but if the answer is 'unknown' make an action point to find out and report back.

Stakeholders are those organizations or individuals with an interest in the energy and environmental performance of the operations within your EMS boundary.

Regulatory and Other Requirements include anything regulated as well as requirements outlined in legal contractual agreements or as part of internal policy.

Engage your entire EMS Team in this process to ensure you capture all possible stakeholder groups.

When completing the table, work across the rows filling in all of the information on each stakeholder before moving to the next.

Some stakeholder categories to consider are:

- Regulators (local, State and Federal);
- Internal groups including management, departments and employees;
- Associations and Unions;
- Customers (such as your local businesses);
- Suppliers;
- Sub-contractors;
- Local community and Interest Groups; and
- Neighbors.

EMS Tool 2: Register of Stakeholders and Their Expectations

Municipality: _____ Page __ of _____

Prepared by: _____ **Create new pages as needed**

Date: _____

Name of Stakeholder Group	Description of Stakeholder Group	Description of Energy or Environmental Expectations	Is it a Regulatory or Other Requirement?

Note: An expectation is a Regulatory or Other Requirement if: it is a regulatory requirement or required under internal Policy or a Contractual Agreement. A list of citations should be developed for all regulatory requirements so they can be easily tracked for changes in the future.

Task 8: Perform Aspects and Impacts Analysis

Input:

EMS boundary from Task 3 and identification of stakeholder requirements from Task 7.

References:

EMS Tool 3: Identifying Energy and Environmental Impacts

EMS Tool 4: Assigning Impacts to Aspects and Determining Significance

	Completed?
Determine activities, products and services that can impact energy use and the environment, and their specific impacts on energy use and the environment.	☐
Develop and apply a process for determining which aspects and impacts are considered significant. Utilize the requirements of key stakeholders, as identified in Task 7, to help develop the criteria for determination of significance. **Note:** In the evaluation of aspects and impacts, normal, periodic and potential emergency conditions should be considered. Normal operations are those that typically occur on a day-to-day basis. Periodic operations are activities such as routine maintenance or other operations that only occur at certain times. Emergency conditions are those that could exist if some type of failure or accident occurred. Each type of condition should be evaluated.	☐

Output:

Documentation of aspects and impacts analysis, including all aspects and impacts considered, the process by which significant aspects and aspects were determined, and the resulting list of significant aspects and impacts.

Hint: **The aspect and impact analysis, and determination of significance are critical elements of EMS development** because significant aspects and impacts must be considered in the determination of objectives and targets (Step 9), which in-turn lead to programs (Step 10) and procedures (Step 11). The scope of programs and procedures required in the EMS is determined in the aspects and impacts analysis process. Note that this process tends to be one of the most resource-intensive components of the entire EMS development.

EMS Tool 3
Identifying Energy and Environmental Aspects

Instructions:

This EMS Tool is used to identify the energy and environmental aspects for each operation described on the table in EMS Tool 1.

1. For each activity, product and service identified, list all energy and environmental aspects associated with that activity, product or service

   "An Environmental Aspect is an element of an organizations operations (activities, products and services) that can interact with the environment. An Energy Aspect is an element of an organization's operations (activities, products and services) where either energy inputs may be reduced for a given level of service or where services for a given amount of energy inputs may be increased or enhanced."

2. For each activity, product or service, there may be more than one aspect. In defining aspects consider interactions that creates release into the environment, involving:

   - Air emissions
   - Releases to water
   - Solid waste management
   - Contamination of land

   or which uses materials, resources (e.g., water), energy, including:

   - Use of raw materials and natural resources

   Also consider interactions that affect uses or consumption of energy, including:

   - Lighting
   - Motors
   - HVAC systems
   - Building design
   - Cogeneration opportunities
   - Use of renewable energy sources
   - Passive Solar

- Energy Use Policies (room occupancy sensors, computers left on or off, etc.)
- Vehicle use
- Compressed air production
- Fossil Fuel dependence
- Electronic equipment

3. Using an input/output diagram for each activity can help - see attached

List of Example Aspects

Note: Each aspect should be associated with a specific activity

- Fuels
- POTW discharge
- Biosolids
- CFCs / HVAC refrigerants
- Paint waste
- Chemical containers
- Solvents
- Stack emissions
- Biohazardous /medical waste
- Pesticide
- Water use
- Electricity use
- Food container disposal
- Food disposal
- Cardboard scrap
- Metal scrap
- Compressed gasses
- Propane
- Waste oil & lubricants
- Oil mist from equipment

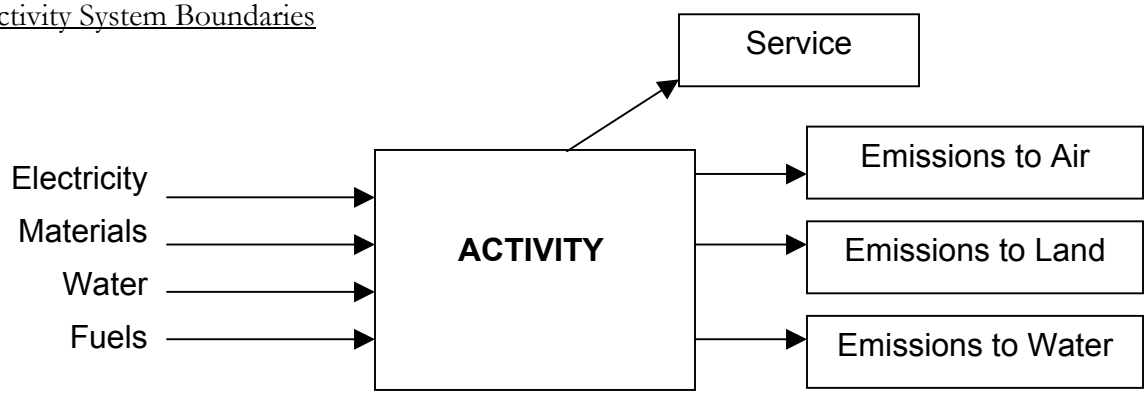
ISO 14001:
Environmental Aspect: "An element of an organization's activities, products or services that can interact with the environment."

Example:

Activity:
Electroplating

Aspects:
1. Energy Consumption
2. Wastewater Production
3. Fugitive Air Emissions
4. Use of Plating Materials
5. Sludge Production

Activity System Boundaries



EMS Tool 3: List of Energy and Environmental Aspects for One Activity

Municipality: _____

Prepared by: _____

Date: _____

Activity: _____

Use the categories defined in the table to list all Energy and Environmental Aspects for the Activity named above:

Inputs: What are the interactions occurring or done that use:
Electricity:
Materials:
Water:
Fuels:
Other:
Emissions: What are the interactions occurring or done that create releases to:
Air:
Water:
Land:
Other: (e.g. noise/odor):
Energy Use: What are the interactions occurring in the use of energy:
Lighting:
HVAC:
Motors:
Vehicle Use:
Energy-Related Policies:
Building Design:
Use of Equipment:

Outputs: What are the interactions occurring or done by the resulting product/service:
Service:
Product:

Note: Complete a separate Aspects List for each Activity identified within your EMS Boundary.

EMS Tool 4
Assigning Impacts to Aspects & Determining Significance

Instructions:

Step One is the association of each aspect to a specific impact

1. Transfer all of the Energy and Environmental Aspects for one selected Activity from completed EMS Tool 3 onto Tool 4. You will prepare a separate Tool 4 for every Activity.
2. Identify a specific Impact for each Aspect

Note: If more than one Impact exists for a specific Aspect you must redefine the Aspect so that there is only one Impact (this makes the evaluation of significance much easier)

3. In determining the Energy and Environmental Impact associated with each Aspect note the impact category into which it falls. Impacts will fall into one of four categories:

Resources: consumption of natural resources; i.e. water, energy, materials, land

Air: potential degradation of air quality

Water: potential degradation of water quality

Land: potential land contamination

4. Use the table headings to list the Impact of each Aspect for the given activity

Step Two is the determination of Aspect/Impact Significance

5. For each Aspect/Impact answer the 'questions for significance' Yes or No
6. Once the questions have been answered for each Aspect/Impact, determine if the Aspect/Impact is significant by apply the significance guidance, see attached
7. Use the Tool 4 Table to record the results of your evaluation

8. Assign each completed table a distinct document number, e.g., AIE001

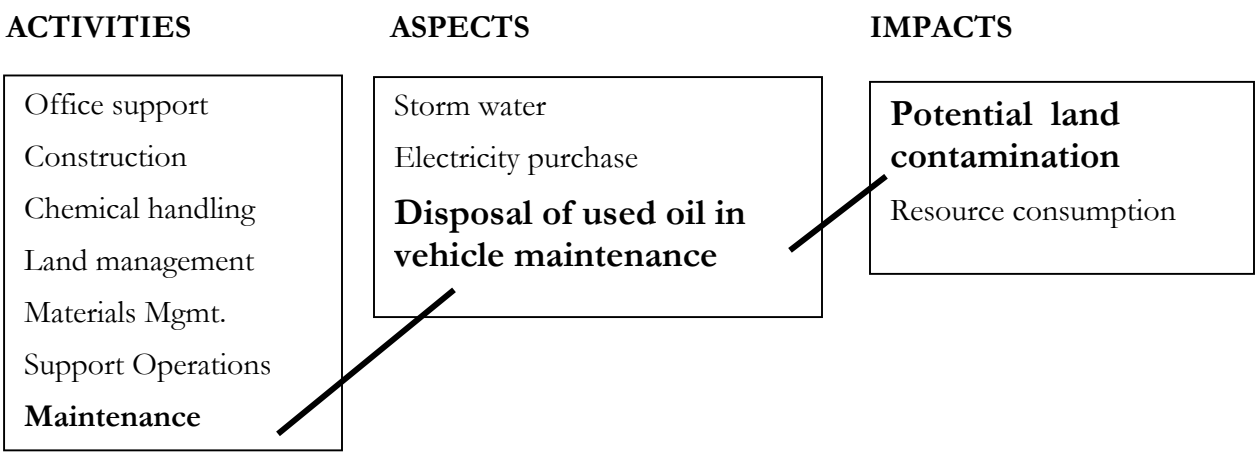
See Guidance and Examples (Next Page)

Guidance and Examples

ISO 14001 definition of Impact:
"Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services."

Example:	ASPECT	IMPACT
	Energy use	Consumption of natural resources
	Wastewater production	Potential degradation of water quality
	Fugitive air emissions	Potential degradation of air quality
	Use of paper products	Consumption of natural resources
	Disposal of solid waste	Potential land contamination

Example: Relationship between Activities, Aspects and Impacts:



Each unique combination of activity/aspect/impact is then evaluated to determine significance.

Note: There is considerable flexibility within ISO 14001 regarding the evaluation of significance. The criteria selected should reflect the organizations judgment regarding what is important. Therefore ensure criteria result in identifying as significant those aspects and impacts which are important to your organization. After applying the evaluation criteria to several activities, review results to see if adjustments are needed.

Example Guidance for Determining Significance

KEY NOTE: The significance process defined here and outlined in the attached flowchart is an example of a significance process. You are welcome to use this process but are also free to develop your own process provided it satisfies your needs and ensures that all regulated aspects are counted as significant!

Is it regulated?

Yes: if it is regulated at the federal, state or municipal level

No: if it is not regulated

Future: if there is knowledge of pending regulations based on the stakeholder analysis

Does the aspect pose a potential energy or environmental impact?

Yes: if the aspect is known to create energy or environmental impacts or is likely to create impacts; severe consequence to environment

No: if the aspect is not known to create energy or environmental impacts or has negligible consequence to environment

Unknown: if there is insufficient knowledge about the potential for the aspects to create energy or environmental impacts

Is there significant stakeholder interest?

Yes: high potential for concern documented and expressed by several stakeholders

No: no or little concern

Unknown: if there is insufficient knowledge about the level of stakeholder concern

Is there significant financial opportunity or risk?

Yes: costs to currently manage the aspect is significant or potential to create significant cost savings exists

No: currently little or no cost to manage the aspect; little to no potential for cost savings or revenue generation

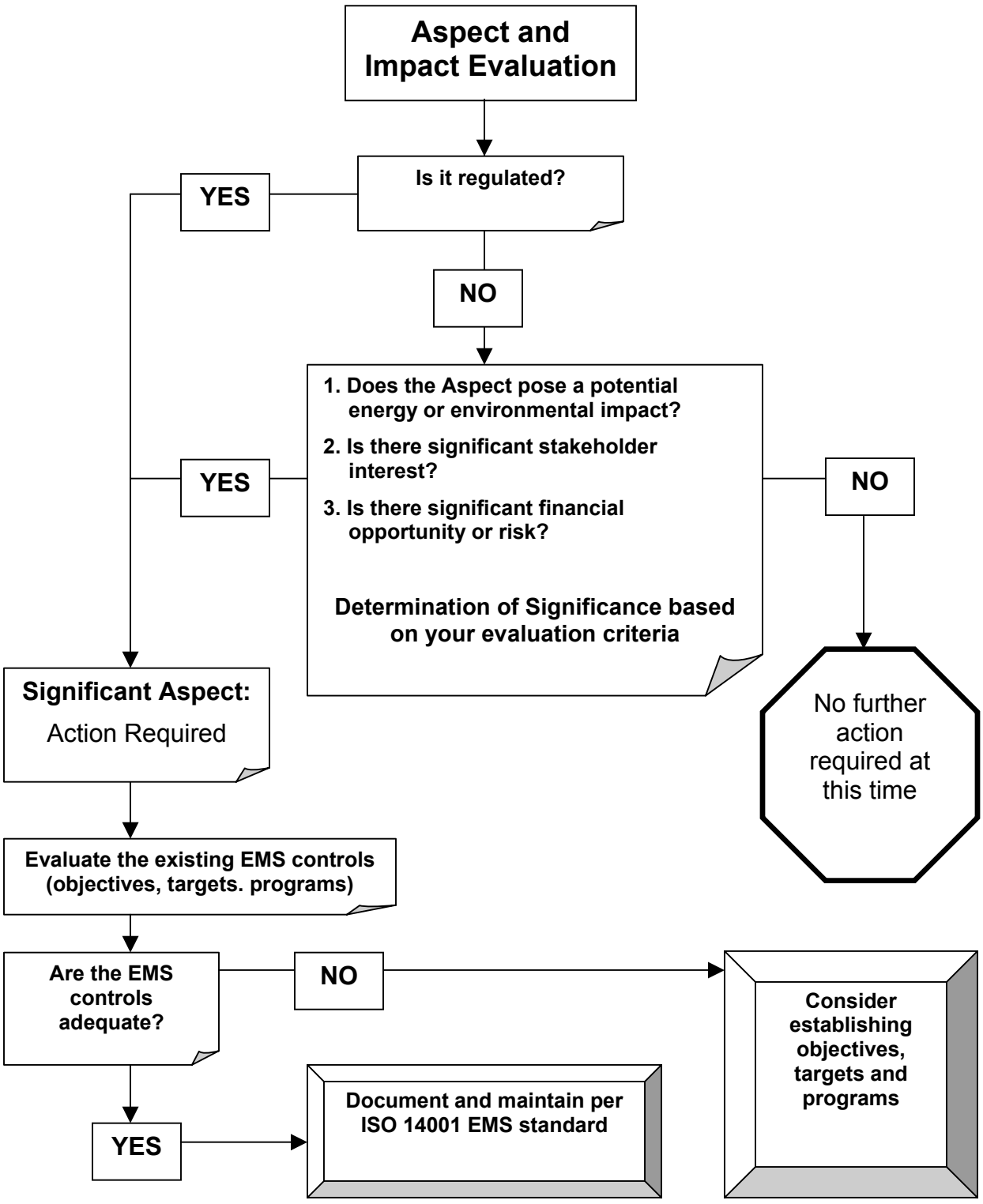
Unknown: potential for cost savings or revenue generation or costs to manage the aspect is unknown

Is it a significant aspect? Each municipality should make this determination themselves, examples include:

Yes: 1) if the aspect is regulated; and 2) if the answer is Y*es* for at least two of the other three questions.

No: 1) if not regulated; and 2) only 1 of the other questions to answer is a *Yes*

In situations where most or all of the answers are Unknown (or Future) – additional information gathering may be necessary.


Aspect and Impact Evaluation
Is it regulated?
YES
NO
1. Does the Aspect pose a potential energy or environmental impact?
2. Is there significant stakeholder interest?
3. Is there significant financial opportunity or risk?
Determination of Significance based on your evaluation criteria
YES
NO
Significant Aspect:
Action Required
No further action required at this time
Evaluate the existing EMS controls (objectives, targets. programs)
Are the EMS controls adequate?
NO
Consider establishing objectives, targets and programs
YES
Document and maintain per ISO 14001 EMS standard

Tool 4: Assigning Impacts to Aspects & Determining Significance

Municipality: _____ Page __ of _____

Prepared by: _____ Doc. Control no. _____

Date: _____

Activity: _____ **Create new pages as needed**

Aspects	**Impacts**				**Questions for Significance**				**Is it a significant aspect?**
	Air	Water	Land	Resource	Is it regulated	Does the aspect pose a potential energy or environmental impact	Is there significant stakeholder interest	Is there significant financial risk or opportunity	**Yes/No**

Note: Aspects are significant if they are regulated and based upon your own established evaluation method.

Task 9: Develop Objectives and Targets

Input:

Significant aspects and impacts from Task 8.

Tools:

EMS Tool 5: Setting Objectives and Targets

	Completed?
Consider all significant aspects. If an objective and target is not to be developed for a significant impact the rationale for that decision must be documented (and it is acceptable for that rationale to be that there are financial or logistical constraints that do not allow development of an objective and target). When objectives and targets are developed, one impact may require one or more objectives to be managed appropriately, or there may be an objective that covers several impacts. However, there must be a direct link between aspects/impacts and objectives/targets and the municipal Energy and Environmental Policy.	☐
Ensure that all targets are measurable. If a target ideally captures the goal for a particular objective, but there is no way to determine if that target has been met, a different target needs to be identified. For example, if a goal is to reduce energy consumption by 10% over baseline, it is important to demonstrate your ability to measure that baseline and changes to it. (See Task 12 for development of Monitoring and Measurement Procedures)	☐

Output:

Listing of objectives and targets.

EMS Tool 5
Setting Objectives and Targets

Instructions:

This EMS Tool is used to evaluate each Significant Aspect to assess whether or not an Objective and Target should be established.

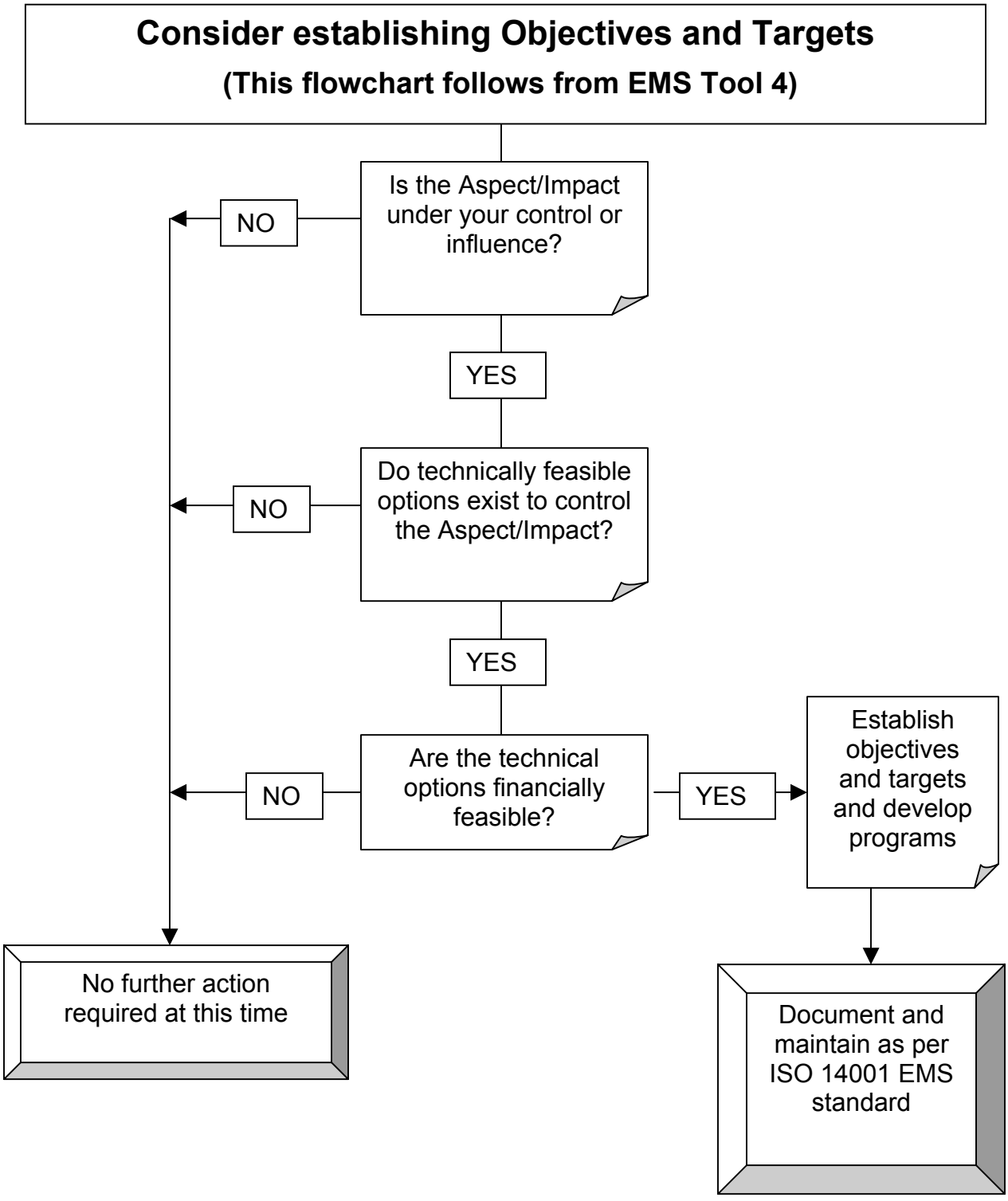
1. Transfer all Significant Aspects identified using EMS Tool 4 onto EMS Tool 5. You will be able to complete the first three columns (Activity, Significant Aspect and Document Number) using the information on EMS Tool 4.
2. For each Significant Aspect answer three questions shown in the attached flowchart:
    a. Is the aspect under your control or influence?
    b. Do technical feasible options exist to control the aspect?
    c. Are the technical options financially feasible?
3. Once the three questions have been answered for each Aspect, determine whether an Objective and Target should be established using the decision logic from the attached flowchart.
4. Use the Table to record the results of your evaluation

Note: Once it is determined that an Objective and Target should be established for a specific Significant Aspect, each municipality will have to evaluate options.

Objectives and Targets should be set so that they represent a valuable but achievable goal to base your EMS Programs around.

For example:

- **100% compliance with regulations**
- **Zero hazardous chemical releases or spills**
- **10% reduction in electricity use**
- **25% reduction in solid waste disposal**
- **Etc…**


Consider establishing Objectives and Targets
(This flowchart follows from EMS Tool 4)
Is the Aspect/Impact under your control or influence?
NO
YES
Do technically feasible options exist to control the Aspect/Impact?
NO
YES
Are the technical options financially feasible?
NO
YES
Establish objectives and targets and develop programs
No further action required at this time
Document and maintain as per ISO 14001 EMS standard

EMS Tool 5: Setting Objectives and Targets

Municipality: _____ Page __ of _____

Prepared by: _____ **Create new pages as needed**

Date: _____

Activity	Significant Aspect (from Tool 4)	Document Control Number (from Tool 4)	Is the Aspect/Impact under your control or influence?	Do technically feasible options exist to control the Aspect/Impact?	Are technical options financially feasible?	Objective and Target should be developed

Task 10: Develop / Revise Energy and Environmental Management Programs

Input:

Listing of objectives and targets from Task 9.

Tools:

EMS Tool 6: Energy and Environmental Management Programs

EMS Tool 7: Register of Environmental Management Programs

	Completed?
Establish an environmental management program for each objectives and targets established in Task 9. One program may address more than one objective or target. Examples of environmental management programs include operation of a wastewater treatment facility, or SARA Title III (a U.S. environmental regulation) reporting program.	☐

Output:

Documentation of environmental management programs that address all objectives and targets established.

EMS Tool 6
Environmental Management Programs

Instructions:

This EMS Tool is used to document all developed Environmental Management Programs to allow the organization to manage the actions necessary to meet the Objectives and Targets.

1. For each Significant Aspect identified on EMS Tool 5 for which an Objective and Target has been developed, complete an EMS Tool 6.

   Note: If there are 5 Objectives and Targets, there will be 5 Environmental Management Programs defined in a separate EMS Tool 6.
2. Assign each completed EMS Tool 6 a distinct document number, e.g. EMP001
3. Use the Table on EMS Tool 6 to record the results of your evaluation

Note: Environmental Management Programs shall include:

- Designation of responsibility;
- Resources available (budget, staff and technology); and
- Time frame for execution.

A continual improvement process shall be in place to amend Environmental Management Programs when necessary

Example of Completed EMS Tool 6

<table>
<tr><td colspan="2">Subject:
Reduce Waste Stream to Landfill</td><td>Document No:
ABC 4.3.4-0001</td></tr>
<tr><td colspan="2"></td><td>Page: 1 | of: 1</td></tr>
<tr><td>Facility:
ABC Location
All Facilities</td><td>Responsible Person:
Facility Manager,
EH&S or their Designee</td><td>Start Date:
June 1, 2002</td></tr>
<tr><td colspan="3">Goal Statement: (Describe how this program meets the commitment made in the Energy and Environmental Policy)
Reduce trash, cardboard & other possible recyclables going to a landfill. Increase recycling.</td></tr>
<tr><td>Objective:
Reduce volume and costs of materials being disposed of in landfills.</td><td colspan="2">Target and Completion Date:
Plant wide reduction of materials going to landfills by 20% over 2001 reported figures, and a 10% reduction cost costs related to landfill disposals over the 2001 reported figures.
Completion by 12/31/2003</td></tr>
<tr><td colspan="3">Strategy:
Evaluate the waste streams of trash and target high volume disposal items for recycle or reduction.</td></tr>
<tr><td colspan="3">Tasks for Achieving Objective and Target:
• Evaluate cardboard for recycle program.
• Evaluate office paper for recycle.
• Evaluate a greater use of refillable containers for product to the customers.
• Formulate ways to reduce incoming packaging or the use of other paper products.
If above evaluations are justifiable, install and implement equipment or necessary items for a recycling program by January 2003.</td></tr>
<tr><td colspan="3">Metrics and Measurement:
Pounds of waste materials disposed of in landfills</td></tr>
<tr><td colspan="3">Importance relative to Other Environmental Programs:
Medium Priority, Some operational changes may be needed to handle paper and cardboard for disposal in a different method.</td></tr>
<tr><td colspan="3">Comments / Process Towards Completion:</td></tr>
</table>

Tool 6: Environmental Management Program

Subject:		**Document No:**
		Page: **of:**
Facility:	**Responsible Person:**	**Start Date:**
Goal Statement: (Describe how this program meets commitments made in the Energy and Environmental Policy)		
Objective:	**Target and Completion Date:**	
Strategy:		
Tasks for Achieving Objective and Target:		
Metrics and Measurement:		
Importance relative to Other Environmental Programs:		
Comments / Process Towards Completion:		

EMS Tool 7
Register of Environmental Management Programs

Instructions:

This EMS Tool is used to document the results from completion of Tasks 7 to 10 into a single registry. It will become part of the overall management system manual.

1. Use the Environmental Management System Registry Table to record the results of your EMS process.

Note: Often this planning process (Tasks 7 – 10) is completed annually or within the normal budgeting period of your organization.

EMS Tool 7: Register of Environmental Management Programs

Municipality: _____ Page __ of _____

Prepared by: _____ **Create new pages as needed**

Date: _____

Activity	Aspect Document No. (From Tool 4)	Aspect	Impact	Objective	Target	Management Program Document No. (From Tool 6)	Operational Control

Example of a completed Registry

Municipality: Example

Prepared by: John Doe

Date: March 6, 2002

Activity	Aspect Document No. (Tool 4)	Aspect	Impact	Objective	Target	Program Doc. No. (Tool 6)	Operation Control
Wastewater operations	AIE 001	POTW discharge	Water	Proper operation	Zero violations	EMP 001	
		Sludge handling	Land	Proper handling and storage	Zero spills	EMP 002	
		Potential spill	Land	No accidental spill	Zero	EMP 003	
Chemical Handling	AIE 002	Potential release to air	Air	No accidental release	Zero	EMP 004	
		Potential release to land	Land	Proper handling	Zero spills	EMP 005	
Office/Admin	AIE 003	None					
Operations of facility	AIE 004	Storm water	Water	NPDES Compliance	Zero violations	EMP 006	
		Bio-haz/Medical	Land	Proper handling/disposal	No exposure	EMP 007	
		Metal scrap	Land	Recycle	100% recycled	EMP 008	
		Pesticides use	Water and land	Compliance	Licensed contractor	EMP 009	
		Filters, used oil/oil impregnated items	Land	Proper disposal and handling	Zero spills	EMP 010	
		Propane storage	Air	No accidental release	Zero	EMP 011	
		Noise	Air	OSHA Compliance	No threshold shift	EMP 012	

Annex E – Phase 3 EMS Manual Preparation, Training and Implementation Checklists and Tools

Task 11: Develop Procedures for Operational Control

Input:

Description of environmental management programs from Task 10.

Tools:

EMS Tool 8: Procedures for Operational Control

	Completed?
For each Environmental Management Program established in Task 10, procedures need to be developed that describe how each program will be implemented, and who has responsibility for implementation. It should be noted that in some quality management systems, procedures are referred to as "work instructions". These are essentially equivalent, but the terminology used in ISO 14001 is "procedures" so that is what will be used hereafter.	☐

Output:

Written procedures.

EMS Tool 8
Procedures for Operational Control

Instructions:

For each Environmental Management Program established in Task 10, procedures need to be developed that describe how each program will be implemented, and who has responsibility for implementation. These requirements must be detailed in written Operational Control Procedures.

- Operational Control Procedures must explicitly describe how environmental management activities will be implemented.

- Operational Control Procedures must link operations to significant energy or environmental aspects, policy, objectives and targets.

Operational Control Procedures primarily describe work practices and cover the environmental control of specific operational activities. These are activity-specific in their application.

Operational Control Procedures can also cover management operations. These System Procedures cover the management and control of both the EMS and the principal environmental aspects, which the system manages. These procedures are Facility/Plant wide in their application.

See examples below.

Example Operational Control Procedure

Operation: Bulk Material Loading and unloading

This is a Controlled Document **Document Control Number: __**

Owner: _____ **Revision Date: _____**

1 When a bulk material transport arrives at the facility, an area or department representative will direct the transport driver to the appropriate tank.

2 The transport driver and department representative will follow this transfer procedure:

- 2.1 The transport driver is responsible for ensuring that the vehicle has appropriate DOT placards prior to entering the facility;
- 2.2 The transport driver is instructed by the area or department representative regarding the facility's bulk material transfer protocol;
- 2.3 The area or department representative indicates proper tanker spotting;
- 2.4 The area or department representative verifies that the volume available in the bulk storage tank is greater that the volume of product to be transferred from the delivery tank. The transport driver is responsible for ensuring the capacity of the tank truck is not exceeded;
- 2.5 The area or department representative will remove pipeline caps or blanker flanges and assure connection to the correct delivery transfer lines;
- 2.6 The area or department representative inspects facility transfer connections for damage or material leaks;
- 2.7 The transport driver makes all connections necessary for material transfer;
- 2.8 The area or department representative stays alert and has a clear unobstructed view of the operation at all times during the transfer;
- 2.9 The area or department representative will verify the transport driver is in attendance monitoring the transfer operations;
- 2.10 The area or department representative is authorized to order the transport driver to terminate the transfer and have the driver move the tanker during an emergency;
- 2.11 The transport driver will remove transfer lines such that excess material will flow back toward the receiving tank or catchment basin;
- 2.12 The area or department representative will monitor the termination process.

3 The appropriate area or department retains copies of shipping manifests. The Environmental Management Representative or designee retains waste manifests.

4 The appropriate area or department head inspects the bulk material storage area weekly and completes an inspection log.

Example Operational Control Procedure for Management Operation

Operation: Energy and Environmental Review of New Projects

This is a Controlled Document **Document Control Number: __**

Owner: _____ **Revision Date: _____**

1 Purpose: Method to identify and evaluate the energy and environmental issues of new projects to:

a) Ensure that appropriate consideration is given to energy and environmental issues prior to project approval and funding;

b) Ensure that new energy and environmental aspects generated by projects are identified and their significance evaluated; and,

c) Provide a mechanism for the amendment of EMS programs, where relevant, to ensure that the environmental management system applies to such projects.

2 Activities Affected: All areas and departments

3 References: Energy and Environmental Aspects, Objectives, Targets, and Management Programs

4 Procedure:

4.1 Departments initiate Project Appropriation Requests when the need for project funding becomes apparent;

4.2 The initiating activity identifies and evaluates energy and environmental issues associated with the project. A summary of this shall be documented on a Project Energy and Environmental Checklist form and the form added to the Appropriation Request;

4.3 The initiating activity shall submit the Appropriation Request and completed Project Energy and Environmental Checklist for review to the EMS Representative;

4.4 The EMS Representative shall review the proposed project to ensure that all relevant energy and environmental issues have been identified, and if incomplete shall return the Appropriation Request to the initiating activity for alteration.

4.5 The Environmental Management Representative, or designee, shall review the energy and environmental aspects of the project, considering their significance;

4.6 The EMS Representative may then approve the project or if unacceptable, the initiating activity will coordinate any necessary actions to satisfy concerns. The initiating activity in conjunction with the EMS Representative will coordinate any necessary prevention, mitigation or control activities associated with the project.

5 General Rules

5.1 The Cross Functional Team evaluates significance of energy and environmental aspects associated with projects;

5.2 Facility/Plant Management Team approves any needed changes to the EMS.

6 Records: Records shall be retained consistent with record retention procedures

Task 12: Develop Monitoring and Measurement Procedures

Input:

Significant aspects and impacts (Task 8), objectives and targets (Task 9) and key stakeholder & regulatory requirements (Task 7).

Tools:

EMS Tool 9: Measuring and Monitoring

	Completed?
Develop procedures, as needed, for the four main areas in which monitoring and measurement are required. The procedures should: • Ensure that objectives and targets are being met (e.g. measuring energy consumption per unit production to determine if a target of 10 percent reduction is being met). • Respond to stakeholder demands, to the extent these are not reflected in the objectives and targets (e.g. tracking number of complaints regarding noise in response to a stakeholder request to reduce noise impacts). • Meet regulatory and legal requirements regarding performance tracking (e.g. measuring biological oxygen demand (BOD) in wastewater discharge, as required by permit), and reporting requirements. • Address the needs for operational control of equipment and processes. The procedures should specify: • Means by which the appropriate data will be gathered. • How that data will be transferred to the other processes in which it will be used, such as corrective and preventive action and management review.	☐
Develop and include calibration procedures for all measuring equipment.	☐

Output:

Written procedures for monitoring and measurement. (When monitoring and measurement is actually performed, the outputs will include the measurement results).

EMS Tool 9
Measuring and Monitoring

The EMS requires the establishment and maintenance of documented procedures to monitor and measure, on a regular basis, the key characteristics of operation and activities that can have a significant impact on the environment (including the recording of information to track performance, relevant operational controls and conformance with energy and environmental objectives and targets). Monitoring and measuring equipment must be calibrated and maintained, records of this process must be maintained according to the procedures.

Develop procedures, as needed, for the four main areas in which monitoring and measurement are required. The procedures should:

- Ensure that objectives and targets are met (e.g. measuring energy consumption per unit production to determine if a target percent reduction is being met);
- Respond to stakeholder demands, to the extent these are not reflected in the objectives and targets (e.g. tracking number of complaints regarding noise in response to a stakeholder request to reduce noise impacts);
- Meet regulatory and legal requirements regarding performance tracking (e.g. measuring biological oxygen demand (BOD) in wastewater discharge, as required by permit), and reporting requirements; and
- Address the needs for operational control of equipment and processes.

The procedures should specify:

- Means by which the appropriate data will be gathered;
- How that data will be transferred to the other processes in which it will be used, such as corrective and preventive action and management review; and
- Develop and include calibration procedures for all measuring equipment.

Example Monitoring and Measurement Procedure

I. Purpose

The purpose of this procedure is to document the process for monitoring and measuring operations affecting achievement of energy and environmental objectives and targets.

II. Scope

This procedure applies to all operations and activities conducted by the organization.

III. General

Monitoring and Measurement are intended to provide data on the appropriate units of measurement for the energy and environmental objectives and targets.

IV. Procedure

1.1 Measuring and Test Equipment used for acceptance shall be controlled, calibrated and maintained in conformance with documented procedures;

1.2 Equipment shall be used in a manner that ensures that measurement uncertainty is known and is consistent with the required measurement capability;

1.3 The control system shall:

a. Identify the measurements to be made, the accuracy required and select the appropriate inspection, measuring and test equipment;

b. Identify and calibrate all monitoring, inspection, measuring and test equipment and devices that can affect the energy use, the environment and product quality at prescribed intervals, or prior to use, against certified equipment having a known valid relationship to recognized national or international standards - where no such standards exist, the basis used for calibration shall be documented;

c. Establish, document and maintain calibration procedures, including details of equipment type, identification number, location, frequency of checks, check method, acceptance criteria and the action to be taken when results are unsatisfactory;

d Ensure that the inspection, measuring and test equipment is capable of the accuracy and precision necessary;

f. Maintain calibration records for inspection, measuring and test equipment;

g. Ensure that the handling, preservation and storage of inspection, measuring and test equipment is such that the accuracy and fitness for use is maintained.

Table 1. Linking Operations, Aspects, Controls and Monitoring

Source	Significant Aspect(s)	Regulated (Yes/No)	Associated Controls	Associated Monitoring or Measurement
Operations				
Parts painting	• Air emissions (VOCs) • Solvent waste generation	• Yes • Yes	• Limits on VOC content in paints and operating hrs • SOP for HW generation	• Paint use records, log of operating hours • Waste tracking sheet
Parts plating	• Waste generation • Water discharges	• Yes • Yes	• SOP for HW generation • Notification to site effluent treatment plant	• Waste tracking sheet • Pre-discharge sampling
Other Activities				
Raw material storage	• Potential spills	• Yes	• Storm water Pollution Prevention Plan	• Weekly inspection of storage area
Fleet maintenance	• Waste oil generation • Potential spills	• Yes • Yes	• *SOP for HW generation* • Stormwater Pollution Prevention Plan	• Waste tracking sheet • Weekly inspections of storage area
Products				
Pumps	• Energy Use • Chromium content	• No • No	• None • None	• None • None
Services				
Equipment servicing at customer sites	• Waste generation • Fuel use	• No • No	• SOP for equipment service • None	• Waste tracking sheet • Fuel dispensing records

Table 2. Linking Monitoring Processes to Operational Controls

Operation with Significant Environmental Aspect	Operational Controls	Key Characteristics of Operation or Activity	Monitoring or Measurement Methods	Equipment Calibration Needs
Surface Coating Operation (Significant aspect is VOC emissions)	• Approved list of coatings	• Type of coating	• Compare to approved list	• None
	• Coating work instruction	• Rate of application	• Measure quantity applied	• Flow meter
		• Frequency of application	• Use coating log book	• None
		• Emissions of VOCs	• Calculate based on use	• Flow meter
	• Permit report procedure			
Liquid Waste Storage (Significant aspect is potential for spills)	• Generator procedure	• Use of proper containers	• Inspections of storage area	• None
		• Segregation incompatibles	• Inspections of storage area	• None
	• Storage area procedure	• Availability of spill equipment	• Inspections of storage area	• None

Task 13: Develop EMS Auditing Procedures

Input:

EMS Boundary (Task 3), Policy Statement (Task 5), Environmental Management Programs (Task 10), Procedures for Operational Control (Task 11), and Monitoring and Measurement Procedures (Task 12).

Tools:

EMS Tool 10: EMS Audit Procedure

	Completed?
Develop internal audit procedures goals which: • Ensure that the procedures incorporated into the EMS are being followed; and • Determine if the EMS itself requires revision or restructuring. The auditing procedures must address the following: • The frequency of auditing; • What information will be gathered; • Who will perform the audits; and • How the audit results will be recorded and communicated. The EMS internal audit procedure should include or provide for the following: • Review of the monitoring and measurement to determine, among other things, that objectives and targets are being met; and • Discussions with personnel to determine if they know and follow EMS procedures.	☐
Review of the regulatory compliance auditing procedure to ensure that it is assessing the status of regulatory compliance, identifying corrective and preventive actions and that those actions are being completed. (The EMS audit is not intended to be a compliance audit. An EMS audit is intended to evaluate whether your compliance-auditing procedure is working, and identifying ways the compliance auditing procedure may be improved). The outputs from the audit go into two separate processes: Management Review (where senior managers can review and approve any changes to the EMS itself) and Corrective and Preventive Action (where corrections are made to address non-conformances and to avoid future non-conformances). Since ISO 14001 certification or self-declaration may be a potential goal, the audit procedures must not only be developed, but have actually been used through an internal EMS audit process before the implementation can be considered complete. In general, it is recommended that at least one individual from the municipality attend ISO 14001 Lead Auditor training to ensure sufficient knowledge to properly implement an EMS audit.	☐

Output:

Written procedures for auditing. (When the auditing procedures are implemented, the outputs will include written audit results).

EMS Tool 10
EMS Audit Procedure

EMS Audit Procedures must be developed and documented with goals which:

- Ensure that the procedures incorporated into the EMS are being followed;
- Determine if the EMS itself requires revision or restructuring.

The documented Audit Procedures must address the following:

- The frequency of auditing;
- What information will be gathered;
- Who will perform the audits; and
- How the audit results will be recorded and communicated.

The EMS internal audit procedure should include or provide for the following:

- Review of the monitoring and measurement to determine, among other things, that objectives and targets are being met;
- Discussions with personnel to determine if they know and follow EMS procedures; and
- Review of regulatory compliance auditing procedure to ensure that it is assessing the status of regulatory compliance, identifying corrective and preventive actions and that those actions are being completed.

The EMS audit is not intended to be a compliance audit, but is intended to evaluate whether your compliance-auditing procedure is working, and identify ways the compliance auditing procedure may be improved.

The outputs from the audit go into two separate processes: Management Review and Corrective and Preventive Action. Since ISO 14001 certification is a potential goal, prior to the certification audit, the audit procedures must not only be developed, but have actually been used through an internal EMS audit process. In general, it is recommended that at least one individual from the municipality attend ISO 14001 Lead Auditor training to ensure sufficient knowledge to properly implement an EMS audit.

Example EMS Audit Procedure

I. Purpose

The purpose is to define the process for conducting periodic audits of the EMS. The procedure defines the process for scheduling, conducting, and reporting of EMS audits.

II. Scope

This procedure applies to all internal EMS audits conducted at the site. The scope of EMS audits may cover all activities and processes comprising the EMS or selected elements.

III. General

Internal EMS audits help to ensure the proper implementation and maintenance of the EMS by verifying that activities conform to documented procedures and that corrective actions are undertaken and are effective.

Trained auditors conduct all audits. Auditor training is defined by Procedure #. Records of auditor training are maintained in accordance with Procedure #.

When a candidate for EMS auditor is assigned to an audit team, the Lead Auditor will prepare an evaluation of the candidate auditor's performance following the audit.

The ISO Management Representative is responsible for maintaining EMS audit records, including list of trained auditors, auditor training records, schedules and protocols, and reports.

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

The ISO Management Representative is responsible for notifying EMS auditors of any upcoming audits a reasonable time prior to the scheduled audit date. Plant areas and functions subject to the EMS audit will also be notified a reasonable time prior to the audit.

The Lead Auditor is responsible for ensuring that the audit, audit report and any feedback to the plant areas or functions covered by the audit is completed per the audit schedule.

The ISO Management Representative, in conjunction with the Lead Auditor, is responsible for ensuring that Corrective Action Notices are prepared for audit findings, as appropriate.

IV. Procedure

Audit Team Selection - One or more auditors comprise an audit team. When the team consists of more than one auditor, a Lead Auditor will be designated. The Lead Auditor is responsible for audit team orientation, coordinating the audit process, and the preparation of the report.

Audit Team Orientation - The Lead Auditor will assure that the team is adequately prepared to initiate the audit. Pertinent policies, procedures, standards, regulatory requirements and prior audit reports are made available for review by the audit team. Each auditor will have appropriate audit training, as defined by Procedure #.

Written Audit Plan - The Lead Auditor is responsible for ensuring the preparation of a written plan for the audit. The Internal EMS Audit Checklist may be used as a guide for this plan.

Prior Notification - The plant areas and / or functions to be audited are to be notified a reasonable time prior to the audit.

Conducting the Audit

1. A pre-audit conference is held with appropriate personnel to review the scope, plan and schedule for the audit.
2. Auditors are at liberty to modify the audit scope and plan if conditions warrant.
3. Objective evidence is examined to verify conformance to EMS requirements, including operating procedures. All audit findings must be documented.
4. Specific attention is given to corrective actions for audit findings from previous audits.
5. A post-audit conference is held to present audit findings, clarify any misunderstandings, and summarize the audit results.

F. Reporting Audit Results

1. The Team Leader prepares the audit report, which summarizes the audit scope, identifies the audit team, describes sources of evidence used, and summarizes the audit results.
2. Findings requiring corrective action are entered into the corrective action database.

G. Audit Report Distribution

1. The ISO Management Representative is responsible for communicating the audit results to responsible area and / or functional management. Copies of the audit report are made available by the ISO Management Representative.
2. The ISO Management Representative is responsible for ensuring availability of audit reports for purposes of the annual Management review (see Procedure #).

H. Audit Follow-up

1. Management in the affected areas and / or functions is responsible for any follow-up actions needed as a result of the audit.
2. The ISO Management Representative is responsible for tracking the completion and effectiveness of corrective actions.

I. Record keeping

1. Audit reports are retained for at least two years from the date of audit completion. The ISO Management Representative is responsible for maintaining such records.

Example EMS Audit Plan

Name: _____ **Date:** _____

Controlled Document **Control Number:** _____

Area or Department Audited	Function or Operation	Lead Auditor	Audit Team Members	Date	Special Instructions

Example EMS Audit Summary Sheet

Municipality: _____ **Facility:** _____

Lead Auditor: _____ **Date:** _____

Element Number and Description		Audit Results	
		No. of Majors/ Minors	A, N, X*
4.2	Energy and Environmental Policy		
4.3	Planning		
4.3.1	Energy and Environmental Aspects		
4.3.2	Legal and Other Requirements		
4.3.3	Objectives and Targets		
4.3.4	Environmental Management Program(s)		
4.4	*Implementation and Operation*		
4.4.1	Structure and Responsibility		
4.4.2	Training, Awareness, and Competence		
4.4.3	Communication		
4.4.4	EMS Documentation		
4.4.5	Document Control		
4.4.6	Operational Control		
4.4.7	Emergency Preparedness and Response		
4.5	*Checking and Corrective Action*		
4.5.1	Monitoring and Measurement		
4.5.2	Corrective and Preventive Action		
4.5.3	Records		
4.5.4	EMS Audit		
4.6	Management Review		
TOTAL			

Legend:

A = Acceptable: Interviews and other objective evidence indicate that the EMS meets all the requirements.

N = Not Acceptable: The auditor has made the judgment that, based on the number and type of nonconformances, the requirements of that the section of the standard are not being met.

X = Not Audited

Example EMS Audit Findings Form

Type of Finding (circle one):

Nonconformance: Major Minor Positive Practice Recommendation

Description (include where in the organization the finding was identified):

_____
_____
_____
_____
_____
_____
_____
_____

ISO 14001 Reference: _____	**Date:** _____	**Finding Number:** _____
Auditor: _____ _	**Auditee's Rep.:** _____	

Corrective Action Plan (including time frames):

_____
_____
_____
_____
_____
_____

Preventive Action Taken:

_____
_____
_____

Individual Responsible for Completion of the Corrective Action: _____	**Date Corrective Action Completed:** _____

Corrective Action Verified By:

_____**Date**:_____

Example EMS Audit Questions (by organizational function)

Function: Senior Management

4.2 Environmental Policy	
Senior Management	***Objective Evidence***
a. Describe your role in the development of the environmental policy.	
b. How do you know that your policy is appropriate for your activities?	
c. What is management's role in the review and revision of the policy?	
d. How does management ensure continued adherence to the policy?	
e. How does the policy help guide organizational decisions?	
f. How are employees made aware of the environmental policy?	
g. How is the environmental policy made available to the public?	

4.3.3 Objectives and targets	
Senior Management	***Objective Evidence***
a. What are the environmental objectives and targets for your organization?	
b. How are the environmental objectives linked to other organizational goals?	
c. Are objectives/targets consistent with the environmental policy and prevention of pollution and continual improvement?	
d. How were the objectives and targets communicated to management?	
e. How often are you informed of the status of the objectives and targets?	
f. On what basis are the objectives and targets reviewed and modified?	

4.4.1 Structure and responsibility	
Top Management	***Objective Evidence***
a. At what level within the organization is the designated EMS representative placed?	
b. What authority does the EMS representative have to carry out duties?	
c. How are environmental management resource needs assessed?	
d. What resources (financial, technical personnel) has management provided to develop or maintain the EMS?	
e. Are you informed on EMS performance? Do you receive routine reports?	
f. Are responsibilities for EMS documented? Is an integrated structure in place in which accountability and responsibility are defined, understood, carried out?	
g. How are these responsibilities communicated to all employees?	

4.4.3 Communication	
Top Management	***Objective Evidence***
a. How are you informed of the environmental issues within your organization? How often does this take place? Does this include compliance?	
b. How are you kept up to date with progress on environmental objectives and targets?	
d. How does the organization handle environmental inquiries?	

4.6 Management review	
Top Management	***Objective Evidence***
a. What is the management review process?	
b. How often are management reviews performed? How was this determined?	
c. Who is involved in the management review process? What are their roles?	
d. What changes have been made to the EMS as a result of the last review?	

Notes:

Task 14: Develop Procedures for Implementing Corrective and Preventive Actions

Input:

Procedures for Monitoring and Measurement and EMS Auditing (Task 12).

Tools:

EMS Tool 11: Preventive and Corrective Actions

	Completed?
Develop procedures for Implementing Corrective and Preventive Action. The procedures should: • Define responsibility for collecting the results of monitoring, measurement and auditing, and using them to determine what, if any, corrective and preventive actions need to be implemented. • Specify how corrective and preventive actions will be taken when a non-conformance is discovered by the monitoring or auditing procedures, such as a spill or accident. • Specify how corrective and preventive actions will be documented, so that changes to the EMS (i.e. continual improvement) can be demonstrated.	☐

Output:

Written procedures for corrective and preventive actions. (When those procedures are actually implemented, the outputs will be documentation of non-conformances and the resulting corrective and preventive actions).

Hint: Since ISO 14001 certification or self-declaration may be a possible goal, the registrars (or other verifying entity) will want to see evidence that the corrective and preventive action procedures have been utilized, which includes documentation of the non-conformances identified and the corrective and preventive actions taken in response. This documentation is typically generated following the internal EMS audit.

EMS Tool 11
Preventative and Corrective Actions

Develop procedures for Implementing Corrective and Preventive Action. The procedures should:

- Define responsibility for taking the results of monitoring and measurement and auditing and using them to determine what, if any, corrective and preventive actions need to be implemented;

- Specify how corrective and preventive actions will be taken when a non-conformance is discovered outside of the monitoring or auditing procedures, such as a spill or accident; and

- Specify how corrective and preventive actions will be documented, so that changes to the EMS (i.e. continual improvement) can be demonstrated.

The process can be demonstrated in a flow-diagram with decision points for choosing the correct action.

Example Corrective and Preventive Action Procedure

I. Purpose

The purpose of this procedure is to establish and outline the process for identifying, documenting, analyzing, and implementing preventive and corrective actions.

II. Scope

Preventive or corrective actions may be initiated for any environmental problem.

III. General

A. Corrective action is generally a reactive process used to address problems after they have occurred. Corrective action may be triggered by a variety of events, including internal audits and management reviews, neighbor complaints or results of monitoring and measurement.

B. Preventive action is generally a proactive process intended to prevent potential problems before they occur or become more severe. Preventive action focuses on identifying negative trends and addressing them before they become significant. Events that might require preventive action include monitoring and measurement, trends analysis, tracking of progress on achieving objectives and targets, response to emergencies and near misses, and customer or neighbor complaints.

C. The ISO Management Representative is responsible for reviewing issues affecting the EMS, the application and maintenance of this procedure, and any updates to EMS documents affected by the preventive and corrective actions.

E. The ISO Management Representative is responsible for logging the communications and recording solutions. The responsible parties are to verify the effectiveness of the solution. The ISO Management Representative is responsible for overall tracking and reporting on preventive and corrective actions.

F. Responsible personnel are to institute required corrective or preventive action, report completion of the required action to the ISO Management Representative, and assure sustained effectiveness.

IV. Procedure

A. Initiating Corrective or Preventive Action

1. Any employee may initiate corrective or preventive action. The employee is responsible for bringing the problem to the attention of the ISO Management Representative. The ISO Management Representative is responsible for determining whether action is required and records the appropriate information. Responsibility for resolving the problem is assigned to a specific individual.

2. The ISO Management Representative, working with the responsible person determines an appropriate due date for resolving the issue.

B. Determining and Implementing Corrective and Preventive Actions

1. The responsible person investigates and resolves the problem and. communicates the corrective or preventive action taken.
2. If the responsible person cannot resolve the problem by the specified due date, he / she is responsible for determining an acceptable alternate due date with the ISO Management Representative.

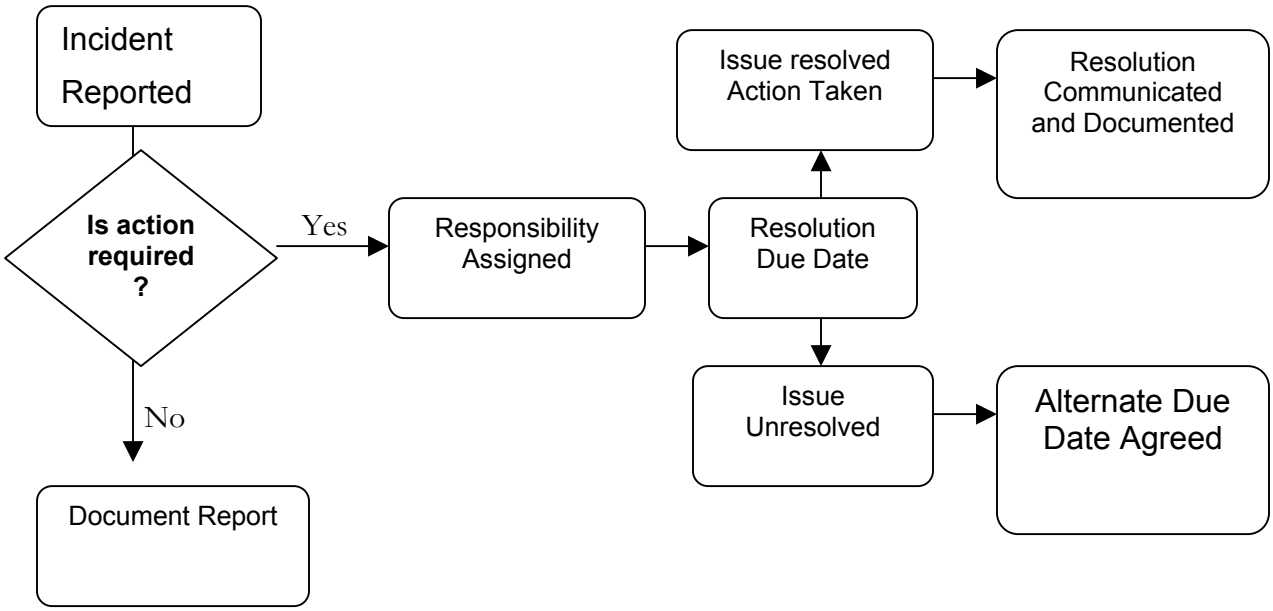
C. Tracking Corrective and Preventive Actions

1. The ISO Management Representative is responsible for issuing a weekly report to the Plant Manager and responsible personnel of any overdue actions.
2. Records of actions are maintained for at least two years after completion of the corrective or preventive action.

D. Tracking Effectiveness of Solutions

1. The responsible person is responsible for verifying the effectiveness of the solution. If the solution is deemed not effective, a new action will be issued to the original responsible person.

Procedure Flow Diagram



Example Corrective Action Tracking Log

Controlled Document **Document Control Number: _____**

Issue Number	Requested By	Issued To	Plan Due (Date)	Plan Completed (Date)	Corrective Action Completed (Date)	Effectiveness Verified (Date)	Closed (Date)

Task 15: Develop Emergency Preparedness and Response Procedures

Input:

Existing emergency preparedness and response procedures; significant aspects and impacts (Task 8).

Tools:

None

	Completed?
The emergency preparedness and response procedures should include: • A process for identifying potential accidents or emergency situations. The aspects and impacts analysis results can be used in this process, since they may help identify areas of risk. • For each identified potential emergency or accident, the measures to reduce the risk of occurrence as well as what actions would be taken if the emergency or accident were to take place. • How employees will be trained in these procedures and how drills will be conducted to test the procedures.	☐

Output:

Written emergency preparedness and response procedures.

Task 16: Development Management Review Procedure

Input:

Environmental Policy (Task 5), Objectives and Targets (Task 9), and EMS Auditing and Corrective/ Preventive Action procedures (Task 14).

Tools:

EMS Tool 12: Management Review Procedure

	Completed?
Develop Management Review Procedures. The purpose of the Management Review is to "close the loop" in the continual improvement process by ensuring that all components of the EMS and its effectiveness are reviewed periodically by the senior management for the municipality. Management should review the suitability, adequacy and effectiveness of the EMS because it represents the framework used by municipality to control risks that could potentially prevent the accomplishment of its energy and environmental related business objectives. The Management Review Procedure should include the following: • A description of the scope of the review, which must include consideration of any necessary changes to policy, objectives and targets and programs and procedures. • A description of who is going to conduct the review, how often it will be conducted, what inputs will be reviewed, and how the results of the review will be acted upon. • A listing of inputs into the review including results of any performance against objectives and targets, EMS audits, compliance audits, reports on the status of corrective and preventive actions and concerns raised by relevant interested parties. • A specific description of how the results of EMS auditing will be incorporated. A written report (minutes which includes the results of the management review should be completed).	☐

Output:

Written procedures for management review.

EMS Tool 12
Management Review Procedure

I. Purpose

The purpose of this procedure is to document the process and primary agenda of issues to be included in the Management Review meetings for evaluating the status of the EMS.

II. Scope

This procedure applies to all Management Review meetings conducted by the organization.

III. General

The Management Review process is intended to provide a forum for discussion and improvement of the EMS and to provide management with a vehicle for making any changes to the EMS necessary to achieve the organization's goals.

IV. Procedure

A. The ISO Management Representative is responsible for conducting an annual Management Review meeting. The meeting must coincide with the annual business strategy and financial review meetings. The ISO Management Representative must present a summary of proposed programs for the next year for budget planning purposes based on the results of the EMS implementation findings. The ISO Management Representative is also responsible for ensuring that the necessary information is collected prior to the meeting.

B. At a minimum, each Management Review meeting will consider the following:

- Suitability, adequacy and effectiveness of the environmental policy;
- Suitability, adequacy and effectiveness of the environmental objectives;
- Overall suitability, adequacy and effectiveness of the EMS;
- Status of objectives, targets, corrective and preventive actions;
- Results of any EMS audits conducted since the last Management Review meeting;
- Suitability, adequacy and effectiveness of training efforts; and,
- Results of any action items from the previous Management Review meeting.

C. Minutes of the Management Reviews will be documented and include, at a minimum the list of attendees, a summary of key issues and any actions items arising from the meeting.

D. A copy of the meeting minutes will be distributed to attendees and any individuals assigned action items. A copy of the meeting minutes will also be retained on file.

Task 17: Assemble Existing Documentation

Input:

Written documentation assembled during Tasks 1 through 16.

Tools:

None

	Completed?
Note: The documentation discussed in this Task and Tasks 17, 18, and 19 may be electronic and/or in hard copy. In either case there must to be procedures to ensure appropriate access and control over the documentation. Assemble existing documentation regarding the following activities/processes: Energy and Environmental Policy (Task 5) Register(s) of Key Stakeholders and Requirements (Task 7) Aspects and Impacts Requirements (Task 8) Objectives and Targets (Task 9) Environmental Management Programs (Task 10) Procedures and Instructions (Task 11) Monitoring and Measurement Procedures (Task 12) EMS Auditing Procedure (Task 13) Corrective and Preventive Action Procedures (Task 14) Emergency Preparedness and Response Procedure (Task 15) Management Review Procedure (Task 16)	☐

Output:

Compilation of written documentation regarding the EMS.

Task 18: Develop Any Necessary Additional Documentation

Input:

Documentation compiled in Task 17.

Tools:

EMS Tool 13: Document Control

EMS Tool 14: Roles and Responsibilities

EMS Tool 15: Communications Plan

	Completed?
Develop documentation (if it does not already exist) regarding the flow of responsibility for implementing and maintaining the EMS and its procedures. Be sure to identify Document owners.	☐
Based on guidance regarding documentation requirements for an EMS and the requirements for document control determine the need to revise or supplement the existing documentation regarding each of the areas above.	☐

Output:

Additional documentation of EMS to meet ISO 14001 documentation requirements.

EMS Tool 13
Document Control

Instructions:

Note: The documentation discussed in Tasks 17, 18, and 19 may be electronic and/or in hard copy. In any case there must be procedures to ensure appropriate access and control over the documentation.

Assemble existing documentation regarding the following activities/processes:

Environmental Policy

Register(s) of Legal and Other Requirements

Aspects and Impacts Requirements

Objectives and Targets

Environmental Management Programs

Procedures and Instructions

Monitoring and Measurement Procedures

EMS Auditing Procedure

Corrective and Preventive Action Procedures

Emergency Preparedness and Response Procedure

Management Review Procedure

Develop documentation (if it does not already exist) regarding the flow of responsibility for implementing and maintaining the EMS and its procedures.

Based on guidance regarding documentation requirements for an EMS and the requirements for document control determine the need to revise or supplement the existing documentation regarding each of the areas above.

Example Document Index

Document	Revision Number					
	1	2	3	4	5	6
Environmental Policy						
Environmental Manual						
Procedure 1: Environmental Aspects Identification						
Procedure 2: Access to Laws and Regulations						
Procedure 3: Setting Objectives & Targets						
Procedure 4: Environmental Training						
Procedure 5: External Communications						
Procedure 6: Internal Communications						
Procedure 7: Document Control						
Procedure 8: Emergency Preparedness						
Procedure 9: Corrective Action						
Procedure 10: Records Management						
Procedure 11: EMS Audits						
Procedure 12: Management Reviews						
Procedures 13-X (list individually)						
EMS Audit Checklist						
Other plans & docs related to procedures (list separately, e.g. SPCC Plan, Emergency Response Plan, etc.)						
Other forms and checklists (list)						

Example Master Document List

ID	Title	Date	Location	Authorized By
Policy				
	Environmental Policy			
Manuals & Plans				
	EMS Manual			
	Integrated Spill Plan			
Procedures				
EP-001	Formatting Environmental Procedures and Work Practices			
EP-002	Environmental Aspects, Objectives and Targets, and Management Programs			
EP-003	Environmental Management System and Regulatory Compliance Audits			
EP-004	Non-Conformance, Corrective and Preventive Action			
EP-005	Environmental Management System Management Review			
EP-006	Emergency Preparedness and Response			
EP-007	Environmental Regulations and Other Requirements			
EP-008	Environmental Review of Projects			
EP-009	Agency Approvals			
EP-010	Environmental Communication			
EP-011	Contractor Control			
EP-012	Environmental Document Control			
EP-013	Environmental Records			
EP-014	Environmental Training and Awareness			
EP-015	Monitoring and Measurement			

Work Practices				
EWP-020.01	Servicing of Stationary Refrigeration Equipment			
EWP-023.01	Waste Drum Shipments			
EWP-024.01	Bulk Material Loading and Unloading			
Forms				
EF-002.01	Environmental Aspects			
EF-003.01	Audit Checklist			
EF-003.02	Corrective and Preventative Action Request (CAR)			
EF-003.03	Internal Environmental Audit Summary Report			
EF-003.04	Audit Schedule			
EF-005.01	Attendee Sheet			
EF-008.01	Project Environmental Checklist			
EF-010.01	External Communications Log			
EF-011.01	Environmental Briefing Packet and Contractor Template			
EF-012.01	Master Document List			
EF-013.01	Index of Environmental Records			
EF-014.01	Training Matrix			
EF-999.01	Management Review Meeting			
Audit Checklists				
ACEP-002	Audit Questions for EP-002			
ACEP-003	Audit Questions for EP-003			
ACEP-004	Audit Questions for EP-004			
ACEP-005	Audit Questions for EP-005			
Records (see Appendix J - Master Records List)				
References				
ISO 14001:1996	EMS - Specification with Guidance for Use	9/96		

Document Management

Establish and maintain procedures for the identification, maintenance and disposition of environmental records.

Issues to consider:

- Include training records and the results of audits and reviews;
- Ensured that environmental records are legible, identifiable and traceable to the activity, product or service involved;
- Ensured that environmental records are stored and maintained such that they are readily retrievable and protected against damage, deterioration or loss; and
- Ensured that the retention times of these environmental records have been established and recorded.

Example Records Management Table

Number	Record Type	Person Responsible	Location	File Method	Retention minimum
1.	**ADMINISTRATION**				
1.01	Purchases	Office Manager	Admin. Office	Supplier Name	3 years
1.02	Waste Disposal	Office Manager	Admin. Office	Date order	Life
1.03	Insurance Fees	Office Manager	Admin. Office	Date order	Life
1.04	Auditing	Office Manager	Admin. Office	Date order	5 years
1.05	Shipping	Office Manager	Admin. Office	Date order	3 years
2.	**ENVIRONMENTAL**				
2.01	Incident Reports	EMS Manager	Admin. Office	Date order	3 years
2.02	Complaint Reports	EMS Manager	Admin. Office	Date order	3 years
2.03	EMS meeting minutes with external parties	EMS Manager	Admin. Office	Issue	3 years
2.04	Decision regarding significant aspects	EMS Manager	Admin. Office	Date order	5 years
2.05	Major source determinations	EMS Manager	Admin. Office	Date order	Life of Co.
2.06	Correspondence on Air Notices	EMS Manager	Admin. Office	Date order	5 years
2.07	Odor Control System Permit	EMS Manager	Admin. Office	Date order	5 years or per Permit
2.08	Air Emission Reports	EMS Manager	Admin. Office	Date order	5 years
2.09	Records on waste disposal sites used	EMS Manager	Admin. Office	Site name	Life
2.10	EMS Monitoring Inspection reports	EMS Manager	Admin. Office	Date order	5 years

EMS Tool 14
Roles & Responsibilities Matrix

	Plant Manager	EHS Manager	HR Manager	Maintenance	Purchasing / Materials	Engineering	Production Supervisor(s)	Finance	EMS Mgmt Rep.	Employees
Communicate importance of environmental management	L	S					S			
Coordinate auditing efforts		L		S			S			
Track / analyze new regulations		L								
Obtain permits and compliance plans		L				S				
Prepare reports required by regulations		L								
Communications with interested parties			L							
Train employees		S					L			
Integrate EMS into recruiting practices			L							
Integrate EMS into performance appraisal process			L							
Communicate with contractors on environmental expectations					L					
Comply with regulatory requirements	L	L	S	S	S	S	S	S	S	S
Conform with EMS requirements	L	L	S	S	S	S	S	S	S	S
Maintain equipment / tools to control environmental impact				L						
Monitor key processes		S					L			
Coordinate emergency response efforts	L	S								
Identify environmental aspects of products, activities, or services	S	L	S	S	S	S	S	S	S	
Establish env. objectives and targets	L	S					S			
Develop budget for EMS		S						L		
Maintain EMS records (training, etc.)		L								
Coordinate EMS document controls					S				L	

Legend: L = Lead Role; S = Supporting Role

EMS Tool 15
Communications

Example Communications Program

1.0 Purpose/Scope

This procedure defines the process for:

a) Internal environmental communication/awareness;

b) External environmental communication with interested parties, such as regulatory authorities and the public/local community groups.

2.0 Activities Affected

All areas and departments

3.0 Forms Used

External Communication Log

4.0 References

4.1 Environmental Policy

4.2 Environmental Aspects, Objectives and Targets and Programs

4.5 Environmental Regulations and Other Requirements

4.9 Environmental Document Control

5.0 Definitions

External Communications: written or electronic correspondence, telephone conversations and oral discussions or meetings with external parties.

6.0 Procedure

6.1 Internal Communications/Awareness

6.1.1 Internal environmental communications shall ensure those personnel at each relevant level and function are aware of:

The environmental management system;

The importance of conformance with the environmental policy, procedures and system;

Individual roles and responsibilities in achieving conformance with procedures, including emergency preparedness and response; and

The significant environmental aspects associated with work activities and the environmental benefits of improved personal performance.

Internal environmental communications may be accomplished by the use of notice boards, awareness training of facility personnel, as appropriate in line with job function, environmental training of relevant job functions, as appropriate, newsletters, electronic notes, meetings and management reviews

6.2 External Communications

6.2.1 External communications concerning the environmental aspects of the facility should be directed to the EMS Manager.

6.2.2 Where community concerns relate to an environmental emergency, EP-004 shall be implemented.

6.2.3 The Environmental Management Representative or designee is responsible for determining the need for and preparation of any notification to regulatory agencies on an as needed basis.

7.0 General Rules

7.1 Department Managers shall keep own internal communication records.

7.2 The Environmental Management Representative shall maintain records of external environmental communication with interested parties and the media.

7.3 The Environmental Coordinator shall maintain records of external environmental communications with regulatory agencies.

8.0 Records

Records shall be retained consistent with EP-013.

Task 19: Assemble EMS Manual

Input:

Documentation assembled in Task 17, with additional documentation from Task 18.

Tools:

EMS Tool 16: EMS Manual Format

Sample EMS Manual

	Completed?
Assemble the documentation into a manual. It is usually not a good idea to attempt to include every EMS related document in the EMS Manual. The manual should be considered a tool to identify and locate documentation. Consider the manual the "hub" of the EMS wheel with links (spokes) or references to all the related documentation that forms the written part of the EMS.	☐
Ensure user-friendliness of the manual by separating information with section tabs, and by referencing other documentation. Use of Intranet site or internal network as the location for the EMS manual is an efficient mechanism for document control and access.	☐

Output:

EMS Manual.

EMS Tool 16
EMS Manual Format

Contents

1) Index / Revision History / Distribution List
2) Environmental Policy
3) Description of How EMS Addresses Each of the EMS Elements (and linkages among elements)
    - How We Identify Significant Environmental Aspects
    - How We Access and Analyze Legal and Other Requirements
    - How We Establish and Maintain Objectives and Targets
    - How the Organizational Structure Supports EMS (organization charts, key responsibilities)
    - How We Train our Employees and Ensure Competence
    - How We Communicate (internally and externally)
    - How We Control EMS Documents
    - How We Identify Key Processes and Develop Controls for them
    - How We Prepare for and Respond to Emergencies
    - How We Monitor Key Characteristics of Operations and Activities
    - How We Identify, Investigate and Correct Nonconformance
4) Environmental Management Program Description
5) Annual Objectives and Targets
6) Action Plans (to achieve objectives and targets)
7) Tracking and Measuring Progress
8) EMS Procedures
9) Index / Revision History / Distribution List

10) Organization-wide Procedures (some EMS elements may have more than one procedure)

- Environmental Aspects Identification
- Access to Legal and Other Requirements
- Training, Awareness and Competence
- Internal Communication
- External Communication
- Document Control
- Change Management Process(es)
- Management of Suppliers / Vendors
- Emergency Preparedness and Response
- Monitoring and Measurement
- Calibration and Maintenance of Monitoring Equipment
- Compliance Evaluation
- Corrective and Preventive Action
- Records Management
- EMS Auditing
- Management Review

11) Procedures / Work Instructions for Specific Operations or Activities (examples only)

- Waste Management
- Wastewater Treatment
- Operation of the Paint Line

12) Other EMS Documentation

(Emergency Response Plans, etc.)

Task 20: Develop Training Modules

Input:

Listing of significant aspects and impacts (Task 8), work procedures (Task 11). In Addition, training requirements for all other sources, including legal requirements and emergency response.

Tools:

EMS Tool 17: Training Instructions and Log

	Completed?
There are two basic levels of training as part of ISO 14001 EMS implementation: 1) awareness training for employees; and 2) competency training for those whose jobs affect the organization's ability to meet its objectives and targets. Assemble a list of all energy, environmental and EMS training requirements. All employees will require basic awareness training. Other (competency) training will be provided as needed. Include both initial training requirements and ongoing or refresher training requirements. To determine what competency training is needed: • Assemble a list of all staff that will play a role in EMS implementation. The listing of significant aspects and impacts can help suggest what roles in the organization are involved in interactions with the environment, and the work procedures should identify staff categories with specific energy and environmental management functions. • Divide the list into categories based on the type and extent of responsibilities related to the EMS. • Determine the type of training needed for each staff category. It is important to recognize that senior management needs competency training (as well as awareness training), since they have an important role in the Management Review process. • Prepare a Training Matrix with Training needs along one-axis and employee groups to be trained along the other. • Develop training curricula for each category, based on their needs for information. It is likely that some portion of the training will be the same for each category of staff, but that the extent and nature of the additional information provided will vary from category-to-category. Training materials for employees often include a description of the EMS, why it is important to the organization, and the role of each employee. Use videos, staff meetings, new employee training modules, and PowerPoint presentations as mechanisms for this awareness training to occur. During Task 6, the EMS team may decide that the awareness-training portion may proceed earlier than Task 20. This may be encouraged because it would begin to build awareness	☐

as new employees are hired for the municipality.	

Output:

Training curricula for each type of training that will be implemented.

Hint: Training materials for employees often include a description of the EMS, why it is important to the organization, and the role of each employee. Use of videos, staff meetings, new employee training modules, and PowerPoint presentations are mechanisms for this awareness training to occur.

EMS tool 17
Training Instructions and Log

Instructions:

There are two basic levels of training as part of ISO 14001 EMS implementation:

1. Awareness training for employees; and
2. Competency training for those whose jobs affect the organization's ability to meet its objectives and targets.

Assemble a list of all environmental and EMS training requirements. Include both initial training requirements and ongoing or refresher training requirements. To determine what competency training is needed:

- Assemble a list of all staff that will play a role in EMS implementation. The listing of significant aspects and impacts can help suggest what roles in the organization are involved with interactions with the environment, and the work procedures should identify staff categories with specific environmental management functions.
- Divide the list into categories based on the type and extent of responsibilities related to the EMS.
- Determine the type of training needed for each staff category. It is important to recognize that senior management needs competency training (as well as awareness training), since they have an important role in the Management Review process.
- Prepare a Training Matrix with Training needs along one-axis and employee groups to be trained along the other.
- Develop training curricula for each category, based on their needs for information. It is likely that some portion of the training will be the same for each category of staff, but that the extent and nature of the additional information provided will vary from category-to-category.

Training materials for employees often include a description of the EMS, why it is important to the organization and the role of each employee. Use videos, staff meetings, new employee training modules, and PowerPoint presentations as mechanisms for this awareness training to occur.

Prepare a training schedule for initial and continuing training. Include provisions for employees transferred to different positions and new hires. Deliver training sessions to all staff involved in EMS. Maintain appropriate records regarding staff that received training, and the content of the training they received.

Example EMS Training Log

Training Topic	Attendees*	Frequency	Course Length	Course Method	Comments	Date Complete
EMS Awareness						
Supervisor EHS Training						
Hazardous Waste Management						
Hazardous Waste Operations						
Spill Prevention & Response						
Chemical Management						
Emergency Response						
Accident Investigation						
Hazardous Materials Transport						
Hazard Communication						
Personal Protective Equipment						
Fire Safety						
Electrical Safety						
Hearing Conservation						
Confined Space Entry						
Lock-out/Tag-out						
Job-Specific Training (list)						

***Attendees Code**

1: All Employees **2: Supervisors / Managers** **3: Operators**

4: Maintenance **5: Material Handlers** **6: Engineering**

Task 21: Deliver Training to Staff

Input:

Training curricula from Task 20.

Tools:

None

	Completed?
Deliver training sessions to all staff involved in the EMS.	☐
Prepare a training schedule for initial and continuing training. Include provisions for employees transferred to different positions and new hires.	☐
Maintain appropriate records regarding staff who received training, and the content of the training they received.	☐

Output:

Documentation of training.

Task 22: Implement EMS

Input:

EMS Manual (Task 19) and all supporting EMS documentation.

References:

None

	Completed?
Note: Often procedures may be utilized informally as they are developed. Establish a specific date on which the EMS is considered effective. Communicate this date to all employees. Ensure this date is included in all Awareness Training sessions.	☐
Publicize that the EMS is now in-place through available avenues of communication: newsletters, e-mail, bulletin boards, etc.	☐

Output:

Documentation regarding notification of EMS effective date.

Annex F – Phase 4 Initiate Continuous Improvement Checklists and Tools

Task 23: Perform a Self-Audit of the EMS

Input:

Audit Procedure (Task 13) and EMS Manual (Task 19).

Tools:

None

	Completed?
Perform a self-audit of the EMS according to the Self-Audit Procedure developed in Task 13.	☐
Log any findings of nonconformance in a corrective action log and include them in the annual plan for continual improvement of the EMS.	☐

Output:

A Self-Audit Report detailing the areas of the EMS inspected and the employees interviewed. In the case that the audit reveals any deficiencies in the EMS, the corrective action log will be modified to include those items.

Task 24: Perform First EMS Management Review Cycle

Input:

The EMS Manual (Task 19), Management Review Procedure (Task 16) and Results of the EMS Self-Audit (Task 23).

Tools:

None

	Completed?
Using the results of the self-audit of the EMS, draft an Annual Plan for improvement of the EMS over the next year, complete with objectives, targets, and management programs that will be implemented. Prepare a budget to accompany the plan that outlines the resources that will be required to maintain and improve the EMS.	☐
Prepare a presentation for top management on the results of the EMS implementation project, the results of the self-audit, and the draft annual plan. Use the results of the EMS Self Audit as a starting point for discussion on the following year's Annual Plan.	☐
Demonstrate the value of the EMS to top management, recommit the top management team to supporting the Energy and Environmental Policy, develop consensus on the resources needed to improve the EMS over the next year, and get a commitment!.	☐
Finalize an Annual Plan for the next year and distribute to the EMS Team.	☐

Output:

EMS Annual Plan for the following year.

Task 25: (Optional) Pursue Certification

Input:

If the organization decides to pursue certification, this step outlines activities to achieve certification.

Tools:

None

	Completed?
Choose a registrar. There are a number of registrars in the U.S. that have been accredited by the American National Standards Institute (ANSI) and/or the Registrar Accreditation Board (RAB). Many facilities find it efficient to use the same registrar for ISO 14001 registration as was used for ISO 9001 registration.	☐
Once a registrar is chosen, there will be a series of meetings and reviews conducted by the registrar before a certification decision is made. During the interviewing process or early in the interactions with the selected registrar, solicit the registrar's views on critical considerations in the EMS, such as boundary conditions, the role of regulatory compliance in ISO 14001 registration, and other examples of issues that they think are critical. While there are efforts to make the registration process consistent across registrars, there may be slight differences in interpretation that may affect the ability of the site to become certified.	☐

Output:

ISO 14001 Certification.

Hint: The certification or registration process usually consists of (1) a registration audit to confirm that the EMS meets the ISO 14001 criteria, and can be considered "in place, effective & sufficient," and (2) ongoing surveillance audits of all or parts of the EMS to verify that it is being fully implemented and maintained. The surveillance audits often occur over a 3-year cycle, with a full registration audit being conducted every three years. Details may vary between registrars.

Annex G - EMS ISO 14001 Gap Analysis Protocol

GAP ANALYSIS PROTOCOL

Date: _____ Municipality Name: _____

Audit Team: _____ Municipality Location: _____

_____ _____

Lead Auditor: _____ Municipality Host: _____

Element	Average Performance Level
Environmental Policy	
Environmental Aspects	
Legal and Other Requirements	
Objectives and Targets	
Environmental Management Program(s)	
Structure and Responsibility	
Training, Awareness and Competence	
Communication	
Environmental Management System Documentation	
Document Control	
Operational Control	
Emergency Preparedness and Response	
Monitoring an Measurement	
Nonconformance and Corrective and Preventive Action	
Records	
Environmental Management System Audit	
Management Review	

Environmental Policy

Question 1	**Is there an organizational environmental policy that sets forth the organization's environmental principles and mission?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Is the environmental policy appropriate to the nature, scale and environmental impacts of the organization's activities, products or services?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Does the environmental policy include a commitment to continual improvement and prevention of pollution?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Policy

Question 4	**Does the environmental policy include a commitment to comply with relevant environmental legislation and regulations, and with other requirement to which the organization subscribes?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 5	**Does the environmental policy provide the framework for setting and reviewing environmental objectives and targets?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 6	**Is the environmental policy documented, implemented and maintained, and communicated to all employees?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Policy

Question 7	**Is the environmental policy made available to the public?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Aspects

Question 1	**Has the organization established and maintained (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, in order to determine those which have or can have significant impacts on the environment?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization ensured that the aspects related to these significant impacts are considered in setting its environmental objectives?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Aspects

Question 3	**Has the organization kept this information up-to-date?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Legal and Other Requirements

Question 1	**Has the organization established and maintained a procedure to identify and have access to legal and other requirements to which the organization subscribes, that are applicable to the environmental aspects of its activities, products or services?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Objectives and Targets

Question 1	**Has the organization established and maintained documented environmental objectives and targets, at each relevant function and level within the organization?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Objectives and Targets

Question 2	**Has the organization considered the legal and other requirements, when establishing and reviewing its objectives?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Has the organization considered its significant environmental impacts, when establishing and reviewing its objectives?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 4	**Has the organization considered its technological options, when establishing and reviewing its objectives?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Objectives and Targets

Question 5	**Has the organization considered its financial, operational and business requirements, when establishing and reviewing its objectives?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 6	**Has the organization considered the views of interested parties, when establishing and reviewing its objectives?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 7	**Are the objectives and targets consistent with the energy and environmental policy, including the commitment to prevention of pollution?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Management Program(s)

Question 1	**Has the organization established and maintained (a) program(s) for achieving its objectives and targets?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Does this program include the designation of responsibility for achieving objectives and targets at each relevant function and level of the organization?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Does this program include the means and time-frame by which they are to be achieved?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Management Program(s)

Question 4	**Has the organization amended program(s) where relevant to ensure that environmental management applies to such a project where there are new developments and new or modified activities, products or services?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Structure and Responsibility

Question 1	**Has the organization defined, documented and communicated roles, responsibilities and authorities in order to facilitate effective environmental management?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization's management provided the human resources and specialized skills essential to the implementation and control of the environmental management system?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Structure and Responsibility

Question 3	**Has the organization's management provided the technology and financial resources essential to the implementation and control of the environmental management system?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 4	**Has the organization's top management appointed (a) specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for ensuring that environmental management system requirements are established, implemented and maintained in accordance with this International Standard?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Structure and Responsibility

Question 5	**Has the organization's top management appointed (a) specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for reporting on the performance of the environmental management system to top management for review and as a basis for improvement of the environmental management system?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Training Awareness and Competence

Question 1	**Has the organization identified training needs that require that all personnel, whose work may create a significant impact upon the environment, have received appropriate training?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Training Awareness and Competence

Question 2	**Has the organization established and maintained procedures to make its employees or members at each relevant function and level aware of the importance of conformance with the environmental policy and procedures and with the requirements of the environmental management system?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Has the organization established and maintained procedures to make its employees or members at each relevant function and level aware of the significant environmental impacts, actual potential, of their work activities and the environmental benefits of improved personal performance?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Training Awareness and Competence

Question 4	**Has the organization established and maintained procedures to make its employees or members at each relevant function and level aware of their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system, including emergency preparedness and response requirements?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 5	**Has the organization established and maintained procedures to make its employees or members at each relevant function and level aware of the potential consequences of departure from specified operating procedures?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Training Awareness and Competence

Question 6	**Are personnel, who are performing the tasks that can cause significant environmental impacts, competent on the basis of appropriate education, training and/or experience?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Communication

Question 1	**With regard to energy and environmental aspects and the environmental management system, has the organization established and maintained procedures for internal communication between the various levels and functions of the organization?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Communication

Question 2	**With regard to energy and environmental aspects and environmental management system, has the organization established and maintained procedures for receiving, documenting and responding to relevant communication from external interested parties?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Has the organization considered processes for external communication on its significant environmental aspects and has it recorded its decision?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Management System Documentation

Question 1	**Has the organization established and maintained information, in paper or electronic form, to describe the core elements of the management system and their interaction?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization established and maintained information, in paper or electronic form, to provide direction to related documentation?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Document Control

Question 1	**Has the organization established and maintained procedures for controlling all documents required by this International Standard to ensure that they can be located?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization established and maintained procedures for controlling all documents required by this International Standard to ensure that they are periodically reviewed, revised as necessary and approved for adequacy by authorized personnel?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Document Control

Question 3	**Has the organization established and maintained procedures for controlling all documents required by this International Standard to ensure that 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?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 4	**Has the organization established and maintained procedures for controlling all documents required by this International Standard to ensure that obsolete documents are promptly removed from all points of issue and points of use, or otherwise assured against unintended use?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Document Control

Question 5	**Has the organization established and maintained procedures for controlling all documents required by this International Standard to ensure that any obsolete documents retained for legal and/or knowledge preservation purposes are suitably identified?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 6	**Has the organization ensured that documentation is legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner and retained for a specified period?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 7	**Has the organization established and maintained procedures and responsibilities concerning the creation and modification of the various types of document?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Operational Control

Question 1	**Has the organization identified those operations and activities that are associated with the identified significant environmental aspects in line with its policy, objectives and targets?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization planned these activities, including maintenance, in order to ensure that they are carried out under specified conditions by establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Operational Control

Question 3	**Has the organization planned these activities, including maintenance, in order to ensure that they are carried out under specified conditions by stipulating operating criteria in the procedures?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 4	**Has the organization planned these activities, including maintenance, in order to ensure that they are carried out under specified conditions by 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?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Emergency Preparedness and Response

Question 1	**Has the organization established and maintained procedures to identify potential for and responses to accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization reviewed and revised, where necessary, its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Has the organization periodically tested these procedures, where practicable?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Monitoring and Measurement

Question 1	**Has the organization established and maintained documented procedures to monitor and measure, on a regular basis, the key characteristics of its operation and activities that can have a significant impact on the environment (including the recording of information to track performance, relevant operational controls and conformance with the organization's environmental objectives and targets)?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization calibrated and maintained monitoring equipment, and retained the records of this process according to the organization's procedures?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Monitoring and Measurement

Question 3	**Has the organization established and maintained a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Nonconformance and Corrective and Preventative Action

Question 1	**Has the organization established and maintained procedures for defining the responsibility and authority for handling and investigating nonconformance, taking action to mitigate any impacts caused and for initiating and completing corrective and preventive action?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Nonconformance and Corrective and Preventative Action

Question 2	**Has the organization ensured that 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?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Has the organization implemented and recorded any changes in the documented procedures resulting from corrective and preventive action?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Records

Question 1	**Has the organization established and maintained procedures for the identification, maintenance and disposition of environmental records?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Do these records include training records and the results of audits and reviews?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Has the organization ensured that environmental records are legible, identifiable and traceable to the activity, product or service involved?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Records

Question 4	**Has the organization ensured that environmental records are stored and maintained such that they are readily retrievable and protected against damage, deterioration or loss?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 5	**Has the organization ensured that the retention times of these environmental records have been established and recorded?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 6	**Has the organization ensured that these environmental records have been maintained, as appropriate to the system and to the organization, to demonstrate conformance to the requirements of this International Standard?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Management System Audit

Question 1	**Has the organization established and maintained (a) program(s) and procedures for periodic environmental management system audits to be carried out, in order to determine whether or not the environmental management system conforms to planned arrangements for environmental management including the requirement of this International Standard?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 2	**Has the organization established and maintained (a) program(s) and procedures for periodic environmental management system audits to be carried out, in order to determine whether or not the environmental management system has been properly implemented and maintained?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Management System Audit

Question 3	**Has the organization established and maintained (a) programme(s) and procedures for periodic environmental management system audits to be carried out, in order to provide information on the results of audits to management?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 4	**Is the organization's audit program, including any schedule, based on the environmental importance of the activity concerned and the results of previous audits?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 5	**Do the audit procedures cover the audit scope?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Environmental Management System Audit

Question 6	**Do the audit procedures cover the frequency and methodologies?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 7	**Do the audit procedures cover the responsibilities and requirements for conducting audits and reporting results?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Management Review

Question 1	**Has the organization's top management reviewed (at determined intervals) the environmental management system to ensure it continuing suitability, adequacy and effectiveness?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Management Review

Question 2	**Does the management review process ensure that the necessary information is collected to allow management to carry out this evaluation?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 3	**Is the management review documented?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Question 4	**Does the management review process 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?**	Level	✓
Comments:		None	
		Partial	
		Complete	
		Opportunity	

Annex H - Sample EMS Manual

Environmental Management System Model Manual Specific to Pennsylvania Municipal Operations

Prepared for:

Pennsylvania Department of Environmental Protection

Prepared by:

Five Winds International

www.fivewinds.com

Table of Contents

Purpose

The municipality of Name has implemented an environmental management system (EMS) based on the ISO 14001 standard as a way of demonstrating environmental leadership, commitment to continual improvement and environmental responsibility to all stakeholders (identified in *Appendix 1. Stakeholder Registry*, p.15).

To ensure the development and maintenance of a complete and effective EMS, this manual has been prepared in compliance with the requirements of the ISO 14001 international standard. This EMS manual is the central document for identifying and controlling all EMS-related information and material, and provides reference to all supporting documents.

The ISO 14001 EMS model is built on the "Plan, Do, Check, Review" model introduced by Stewart and Deming (Figure 1). The basic structure of an EMS, as defined by the ISO 14001 standard, includes a commitment to continual improvement. Within this structure, there are five primary components:

1) Commitment and Environmental Policy;
2) Planning;
3) Implementation & Operation;
4) Checking and Corrective Action, and
5) Management Review.

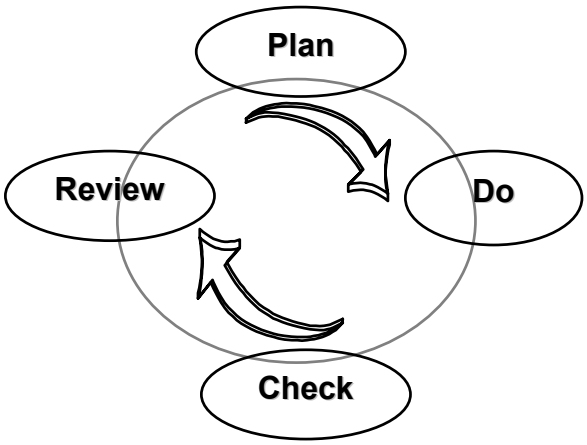


Figure 1. The EMS Model

These components are all interrelated to produce a framework for managing and continually improving environmental performance. The five components of EMS are further subdivided into the following 17 elements:

- Environmental Policy;
- Legal and Other Requirements;
- Environmental Aspects and Impacts;
- Environmental Objectives and Targets;
- Operational Control;
- Environmental Management Programs;
- Organizational Structure and Responsibility;
- Training, Awareness and Competence;
- Communication;
- Documentation;
- Document Control;
- Emergency Preparedness and Response;
- Monitoring and Measurement;

- Nonconformance and Corrective and Preventive Action;
- Records and Record Keeping;
- Environmental Management System Auditing;
- Management Review.

The interdependency of these elements is depicted in Figure 2.

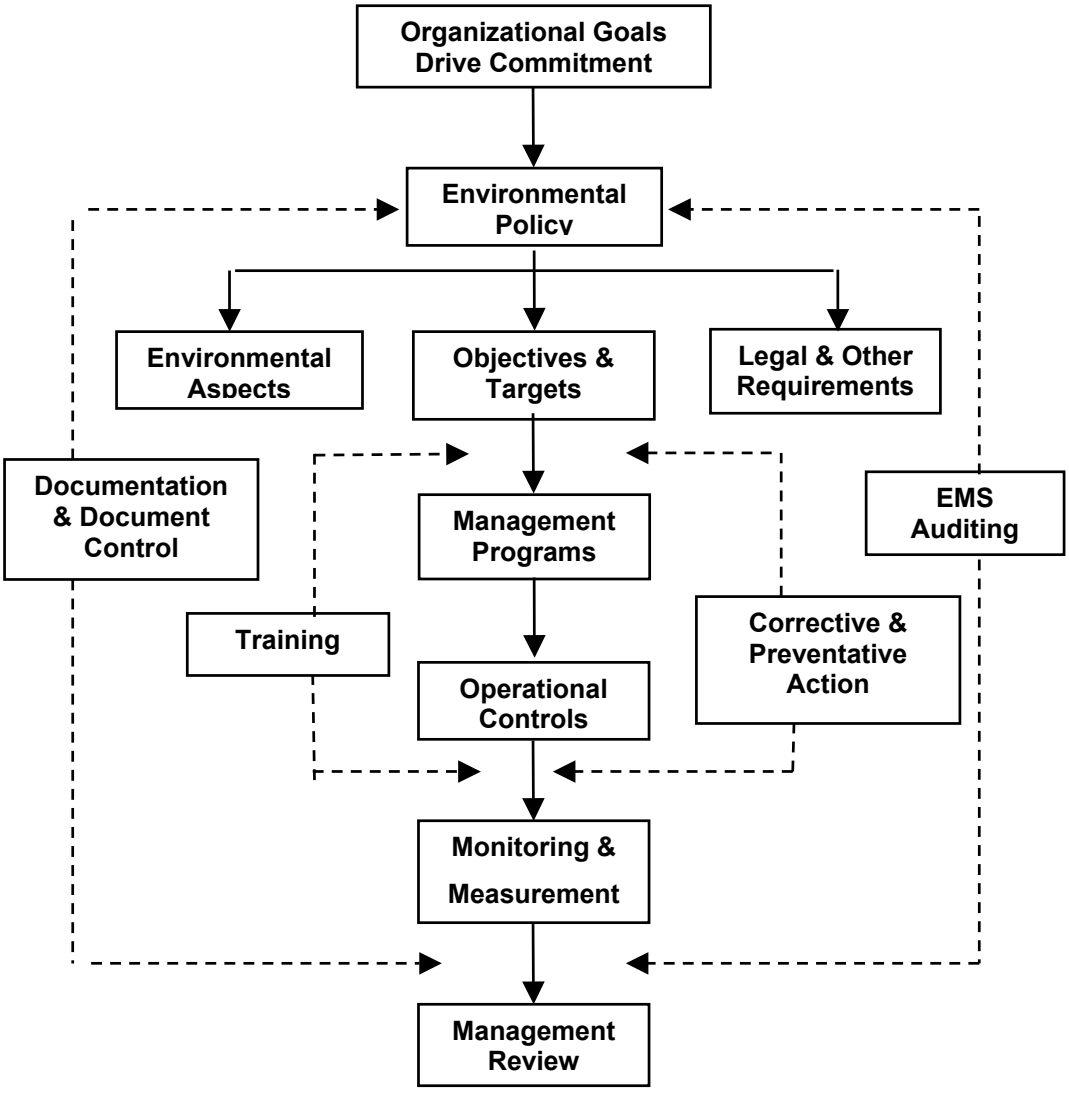


Figure 2. Interdependence of EMS Elements

Scope of the EMS

The municipality of Name has developed and implemented its EMS to cover all activities occurring within a defined section of the municipal operations known as the EMS boundary. These operations are listed in *Appendix 2. List of Operations within the EMS Boundary* p. 16. The EMS addresses all environmental aspects that may have a significant impact on the environment arising from activities within the EMS boundary. The EMS covers only those aspects for which the municipality of Name is responsible or over which it can reasonably expect to have control or influence.

Environmental Policy

The municipality of Name has a publicly available Environmental Policy that has been endorsed by senior management (person or group). The policy sets forth the environmental commitments of the municipality, which cover all activities within the defined EMS boundary. As required by the ISO 14001 standard, the policy includes the following key components:

- a commitment to continual improvement;
- a commitment to the prevention of pollution; and,
- a commitment to meet or exceed relevant environmental legislation, regulations and other internal or external requirements.

Appendix 3. Environmental Policy (p. 17) is a copy of the Environmental Policy for the municipality of Name. The policy is reviewed annually by senior management (title of person or name of group) as part of the management review (covered in the section on Management Review, below), communicated to all personnel and made available to the public as required in operational control procedure *EMS/5.001 EMS Communications Procedure* (p. 46).

The management review considers whether or not the policy is appropriate to the nature, scale and environmental impacts of the activities within the EMS boundary.

Environmental Aspects and Impacts

The EMS Team (See definition) identifies the environmental aspects of all activities within the EMS boundary that the municipality controls or over which it can be expected to have influence. The EMS Team then determines which of the aspects may have a significant impact on the environment. This is done using operational control procedure *EMS/1.001 Procedure for the Identification of Environmental Aspects, Determination of Significant Impacts, and Development of Objectives and Targets* (p. 26). A list of all aspects and the significant impacts is included in *Appendix 4. List of Environmental Aspects and Significant Impacts, Objectives and Targets* (p. 18).

Aspects determined to have significant impacts are reviewed at least semi-annually by the EMS Team as well as anytime there are new or changed activities to consider. Meeting discussions and procedures used to determine significant impacts are recorded in EMS Team meeting minutes. The EMS responsible person (title of the person) maintains the EMS Team meeting minutes and other records, as required.

Legal and Other Requirements

As part of the Environmental Policy's commitment to regulatory compliance, the municipality of Name has established a procedure (*EMS/2.001 Procedure for Identifying Legal and Other Environmental Requirements* p. 39) for ensuring compliance with environmental regulations and other requirements. This procedure involves identifying, accessing and communicating legal and other environmental requirements that are applicable to the activities within the EMS boundary.

Information necessary to ensure compliance is acquired through legal publications and other sources identified by the EMS responsible person (title of the person). The relevant requirements are identified, accessed and communicated to all personnel, as necessary. At least once a year, the EMS responsible person (title of the person) reviews the current national, state and local legal requirements and other requirements to ensure ongoing compliance. *Appendix 5. List of Legal and Other Environmental Requirements* (p. 19), lists the requirements.

Environmental Objectives and Targets

The EMS Team establishes environmental objectives and targets to set performance improvement goals for the aspects that may lead to significant impacts. These are integrated into programs developed to stimulate action within individual units, departments or across all operations within the EMS boundary. Objectives and targets are developed for aspects considering significant environmental impacts, legal and other requirements, technical and financial feasibility, commitments in the environmental policy and operational requirements. The EMS Team develops objectives and targets to define:

1. the performance objectives (e.g., monitor, study, control or improve) for each aspect with a significant environmental impact;
2. the specific, quantified targets which define those performance objectives; and,
3. the planned schedule for achieving targets.

Appendix 4. List of Aspects, Significant Impacts, Objectives and Targets (p. 18) lists all of the EMS environmental objectives and targets that have been established. The objectives and targets are developed using environmental control procedure *EMS/1.001 Procedure for Identifying Environmental Aspects, Determining Significant Impacts, and Developing Objectives and Targets* (p. 26).

Environmental Management Programs

Objectives and targets are developed to stimulate action using environmental management programs. This element of the EMS translates objectives and targets into programs that direct the municipality towards achieving results.

The EMS Team establishes environmental management programs (EMPs) for all objectives and targets. EMPs are reviewed and approved by senior management (title of the person or name of the group) prior to implementation. The EMPs define the principal actions to be taken, the individuals responsible and the scheduled times for implementation that will achieve the desired results. EMPs are included in *Appendix 6. Environmental Management Programs* (p. 20) and are developed using operational control procedure *EMS/3.001 Procedure for Establishing Environmental Management Programs* (p. 41).

Organizational Structure and Responsibility

The environmental management programs identify roles, responsibilities and authorities for all personnel. The EMS Team ensures that the resources (e.g., budget and personnel time) required for implementing and controlling the EMS are provided. Environmental management programs require resources for training, human resources, specialty services, financial resources, technical and informational services.

A key element of responsibility is the identification of an EMS responsible person (title of the person) with primary responsibility for establishing, operating and maintaining the EMS in accordance with the ISO 14001 standard. The EMS Team provides routine EMS support and reports directly to the EMS responsible person (title of the person). A list of roles and responsibilities is available in *Appendix 7. List of Environmental Responsibilities* (p. 21).

Training, Awareness and Competence

EMS implementation includes training for personnel on both general awareness and competency. Awareness training ensures that all personnel are familiar with the environmental policy and the relevance of the EMS, including the potential significant environmental impacts of their work activities. Additional competency training addresses environmental procedures that are specific to personnel work activities. All personnel receive appropriate training based on a delivery procedure that matches training requirements with personnel job descriptions and work activities.

The municipality of Name identifies, plans, monitors and records awareness and competency training needs and delivery for all personnel. The municipality of Name has a procedure to ensure effective and timely training for employees at all levels to ensure awareness of:

- the importance of conformance with the environmental policy;
- the implementation of environmental management procedures and the EMS;
- the actual and potential significant environmental impacts of their work activities;
- the environmental benefits of improved personal performance;

- their own roles and responsibilities for achieving conformance with the policy and procedures, and with the requirements of the EMS; and,
- the potential consequences of departure from specified operating procedures.

The responsible person (title of the person) for the organization and delivery of training is also responsible for training records. Records are to be monitored and reviewed on a scheduled basis. Supervisors determine competency as outlined in environmental control procedure *EMS/4.001 Procedure for Environmental Awareness and Competency Training* (p. 44).

Appendix 8. Training Matrix (p. 22) lists environmental training needs and delivery programs.

Communication

EMS communication includes programs addressing internal and external parties. The purpose of internal communication is to ensure that environmental information is disseminated to all personnel and that all personnel feel they are able to participate in the EMS through available communication channels. Communication with individuals, groups, government, local businesses and others outside of the municipal EMS provides insight into how the environmental performance of operations within the municipal EMS boundary is perceived externally.

The municipality of Name has established and is maintaining a procedure for internal and external communication relating to the EMS as described by operational control procedure *EMS/5.001 EMS Communications Procedure* (p. 46).

Documentation

The municipality of Name has established and is maintaining information to describe the core elements of the EMS. All EMS-related documents are referenced in the EMS manual, and copies of EMS documents can be obtained from the EMS responsible person (title of the person) or designee, upon request.

Document Control

The EMS requires extensive documentation of procedures, tools and other elements. Document control procedures are implemented to ensure that all personnel have access to appropriate EMS documentation and that out-dated documents are replaced and only current versions are used.

The municipality of Name has established an operational control procedure *EMS/6.001 EMS Document Control Procedure* (p. 47) for controlling all documents relevant to the EMS. This procedure describes where documents are located and how and when they are reviewed. The procedure ensures that current document versions are available and that obsolete versions are removed from use or are suitably identified. Controlled documents are maintained in an orderly manner and are obtained from the EMS responsible person (title of the person) or designee. A list of controlled documents is provided in *Appendix 9. Master Document List* (p.21).

This manual is a controlled document in accordance with the operational control procedure *EMS/6.001 EMS Document Control Procedure* (p. 47). The EMS responsible person (title of the person) or designee, following approval by senior management (title of person or name of group), issues amendments to the EMS manual. All copies of this EMS manual or other EMS documentation that are not marked 'CONTROLLED DOCUMENT' are uncontrolled and are to be used for reference purposes only.

Operational Control

The EMS Team follows a process to identify aspects that may lead to significant impacts and uses these to establish objectives and targets, which are addressed in the environmental management programs. Environmental management programs are then used to develop specific operational control procedures.

Operational control procedures direct personnel work activities. Operational control procedures stipulate operating criteria to ensure operations and activities are carried out appropriately. *Appendix 11. Operational Control Procedure Registry* (p. 25) lists all operational control procedures for the management of the EMS and operations with potential for significant environmental impact. The list of operational controls is developed using environmental control procedure *EMS/7.001 Procedure for Developing Operational Controls* (p. 49).

Emergency Preparedness and Response

Emergency preparedness and response plans identify the potential for and response to environmental accidents and emergency situations. These plans also address the prevention and mitigation of the environmental impacts of accidents that do occur.

The EMS includes emergency preparedness and response plans developed using environmental control procedure *EMS/8.001 Procedure for Establishing Emergency Preparedness and Response Plans* (p. 50). The EMS Team reviews emergency plans annually and following any accidents or emergency situations that do occur.

Monitoring and Measurement

The EMS Team establishes environmental performance objectives and targets that require monitoring and measurement to assess performance. The EMS Team establishes and maintains operational control procedures to monitor and measure the key characteristics of activities within the EMS boundary that have aspects that may lead to significant environmental impacts. This procedure, *EMS/9.001 Procedure for Environmental Monitoring and Measuring* (p. 51), outlines requirements for recording information needed to track performance, relevant operational control procedures and specified environmental objectives and targets. The procedure includes requirements for equipment calibration and maintenance and ensures that records are retained.

A key element of monitoring is the EMS audit program, which outlines a procedure for scheduling audits used to monitor the overall effectiveness of the EMS and particularly regulatory compliance. The municipality of Name has established an environmental regulatory compliance program to monitor regulatory requirements. Environmental control procedure *EMS/12.001 Procedure for EMS and Regulatory Compliance Audits* (p. 56) outlines the requirements of the program and the need to periodically review regulatory compliance and report results to management on a yearly basis.

Nonconformance, Corrective & Preventive Action

The operational control procedure, *EMS/10.001 Procedure for Non-Conformance and Corrective and Preventive Action* (p. 52), defines responsibility and authority for handling and investigating occurrences of non-conformance with the requirements of the EMS. This includes taking action to mitigate significant environmental impacts, and initiating and completing corrective and preventive action. Any changes in procedures resulting from corrective and preventive actions are implemented and recorded. The EMS responsible person (title of the person) maintains these records.

Environmental Records

The operational control procedure, *EMS/11.001 Environmental Records Procedure* (p. 55), ensures that environmental records are correctly identified, maintained and disposed of. Environmental records relevant to the EMS include training records and the results of audits and reviews. Records are legible, identifiable, traceable, readily retrievable and protected against damage, deterioration and loss. Record and document retention is also specified in the procedure. Individual departments maintain environmental records using the EMS procedure. A list of relevant records is provided in *Appendix 10. Master EMS Records List* (p.24).

EMS Audit

The municipality of Name conducts internal EMS audits to ensure that the EMS has been properly implemented and is being maintained. Audits include a review of documentation and records, personnel interviews, and a review of the results from monitoring and measurement.

The results of these audits are communicated to senior management (title of person or name of group) for inclusion in the management review process described below. Audits are performed according to a regular schedule based on the management review cycle. The audit procedure is described in operational control procedure *EMS/12.001 Procedure for EMS and Regulatory Compliance Audits* (p. 56). The audit procedure covers the audit scope, frequency, methodologies applied and the responsibilities and requirements for conducting audits and reporting results. All auditors are properly trained, and the audit records are provided to the EMS responsible person (title of person) for use in the management review process.

Management Review

The EMS review process includes a senior management (title of person or name of group) review of all elements of the EMS. Management reviews are conducted annually to ensure suitability, adequacy and effectiveness of the EMS, as defined in operational control procedure *EMS/13.001 EMS Management Review Procedure* (p. 60). All management review meeting minutes are recorded and kept by the EMS responsible person (title of person).

Appendices

Appendix 1. Stakeholder Registry

This is an example of a completed Stakeholder Registry.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Name of Stakeholder Group	Description of Stakeholder Group	Description of Environmental Expectation	Is it a Regulatory or Other Requirement?
Local residents	Residents in the community including individual taxpayers, groups, etc.	Provision of services in a way that causes the minimum of environmental degradation	NO
Local environmental groups	Citizens and interest groups promoting environmental protection	Continual improvement in environmental performance towards a leadership position	NO
Users of municipal facilities	Residents and visitors using municipal parks and other public areas	Maintenance of municipal facilities to minimize environmental and health risk	NO
Employees	All permanent and temporary employees of the municipality	A work environment and work activities that respect and preserve the environment	Yes (Union agreement)
Suppliers and service providers	Companies from which the municipality purchases products or services	Access to environmental information and freedom to compete to provide products and services in a fair process	Yes (Fair competition for service providers)
State DEP	State regulators and compliance officers focusing on environmental regulations	Maintenance of required environmental permits and compliance with regulations	Yes
OSHA	Health and safety regulatory compliance enforcement	Compliance with health and safety regulations	Yes
US DOE	Promoters of energy efficiency and renewable energy resources	Continual improvement in energy usage	No
US EPA	Regulators and promoters of environmental performance	Compliance with Federal regulations and participation in environmental programs	Yes

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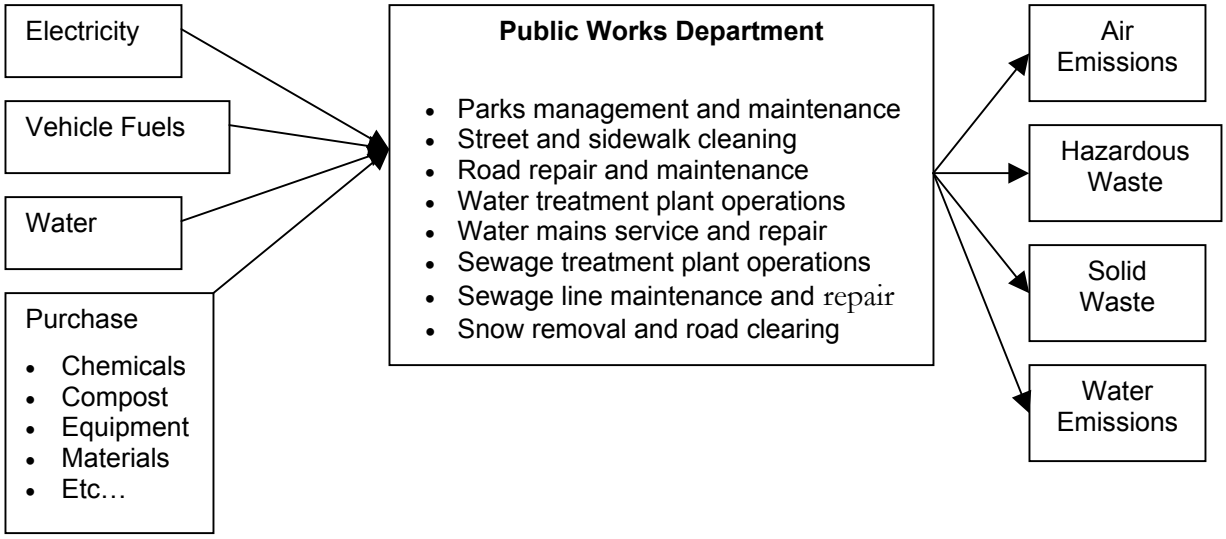
Appendix 2. List of Operations within the EMS Boundary

This is an example of a comprehensive list of operations within the EMS boundary.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

EMS Boundary: Graphic Representation



List of Activities within the EMS Boundary

	Activity	Description
1.	Park maintenance	Lawn cutting, tree and hedge trimming, field and diamond grooming, fence repair, pond and stream clearing
2.	Street cleaning	Operation of propane-powered street-cleaning equipment for sidewalks and inner-city streets, manual collection of garbage from street and from sidewalk garbage cans
3.	Road repair	Filling holes in street asphalt each spring and repair of sidewalk and curb concrete
4.	Water treatment plant	Operation of water plant, water screening, water purification, fluorine additive, water testing
10.	Etc…	

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Appendix 3. Environmental Policy

This is an example of an Environmental Policy.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Name of Municipality Environmental Policy

The municipality of Blain County (provide an opening paragraph that briefly describes the activities, products and/or services at the facility).

Our Environmental Policy is to be a responsible corporate citizen in protecting the environment. We are committed to complying with accepted environmental practices, including the commitment to meet or exceed applicable legal and other requirements, to strive for continual improvement in our environmental management system, to use energy efficiently and to minimize the creation of wastes and pollution. We will therefore manage our processes, our materials and our people in order to reduce the environmental impacts associated with our work.

The Public Works Department pledges to implement and operate the ISO 14001 Environmental Management System to further enhance environmental performance. Our main objectives are to:

- investigate the reduction of hazardous and toxic chemicals;
- reduce, reuse and recycle waste and packaging;
- improve the efficiency of energy usage.

This policy will be communicated to all parties interested in the performance of our environmental management system.

Signed: *Signature of Senior Manager* Date: *Date*

Manager, Public Works Department

Appendix 4: List of Aspects, Significant Impacts, Objectives and Targets

This is an example of a list linking activities within the EMS boundary to environmental aspects, significant impacts, and performance improvement objectives and targets.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Activity	Aspect	Significant Impact	Objective	Target
Park maintenance: Lawn mowing	Diesel tractor emissions	Reduced air quality	Reduce emissions from mowing vehicles	Reduce CO_2 emissions by 25% by end of year
Park maintenance: Hedge trimming	Collection of trimmings and yard waste	Organic material sent to landfill as solid waste	Divert yard waste from landfill	Implement a composting system to capture 100% of yard waste by the end of the year
Street cleaning: Emptying of sidewalk refuse containers	Collection of waste deposited in sidewalk refuse containers	Mixed waste (including recyclables) sent to landfill	Divert recyclables from landfill	Supplement curbside refuse containers with curbside recycling containers in a program to divert 20% of curbside refuse from landfill
Etc…				

Appendix 5: List of Legal and Other Requirements

This is an example of a list of legal and other environmental requirements.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Legal Environmental Requirements

Environmental Aspect	Legal Requirement	Reference
Solid waste	Implementation of a recycling program to capture and divert metal and glass containers and fine paper	#
Waste water treatment facility	Permits required for operation of facility	#
Etc…		

Other Environmental Requirements

Environmental Aspect	Other Requirement	Reference
Use of toxic materials	Internal policy to minimize employee exposure to toxic materials whenever possible	#
Air pollution	Environmental Policy commitment to pollution prevention	#

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Appendix 6: Environmental Management Programs Registry

This is an example of a registry of environmental management programs addressing environmental targets.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Activity	Environmental Aspect	Significant Impact	Objective	Target	Environmental Management Program Document No.	Operational Control Procedures
Park maintenance: Lawn mowing	Diesel tractor emissions	Reduced air quality	Reduce emissions from mowing vehicles	Reduce CO_2 emissions by 25% by end of year	#	#
Park maintenance: Hedge trimming	Collection of trimmings and yard waste	Organic material sent to landfill as solid waste	Divert yard waste from landfill	Implement a composting system to capture 100% of yard waste by the end of the year	#	#
Street cleaning: Emptying of sidewalk refuse containers	Collection of waste deposited in sidewalk refuse containers	Mixed waste (including recyclables) sent to landfill	Divert recyclables from landfill	Supplement curbside refuse containers with curbside recycling containers in a program to divert 20% of curbside refuse from landfill	#	#

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Appendix 7: List of EMS Responsibilities

This is an example of a matrix outlining all EMS roles and responsibilities.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

	Plant Manager	EHS Manager	HR Manager	Maintenance	Purchasing / Materials	Engineering	Production Supervisor(s)	Finance	EMS Mgmt. Rep.	Employees
EMS audit		X								
Regulatory compliance	X	X	X							
Obtain and maintain permits	X									
Coordination of EMS training requirements		X	X							
Contractor environmental performance	X			X		X				
Comply with regulatory requirements	X	X								
Maintain the EMS Manual		X								
Maintain maintenance and calibration program	X			X						
Coordinate emergency response planning	X	X							X	
Identify environmental aspects of operations	X	X		X	X	X				
Establish objectives and targets	X	X						X	X	
Maintain EMS records	X	X	X	X			X			
Coordinate document maintenance and control		X								

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Appendix 8: EMS Training Matrix

Example of a matrix for awareness and technical training needs and delivery.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Training Required	Description	Mandatory Attendance	Frequency	Date Complete
EMS Awareness	Introduction to the EMS and the Environmental Policy	All	6 monthly	
Supervisor EHS Training	Responsibility for employee health and safety	Supervisors	Yearly	
Toxics Management	Procedure for managing and using toxic materials	Operational personnel	Monthly	
Spill Response	Procedure for responding to liquid spills	Production supervisor	Yearly	
Emergency Response				
Etc…				

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Appendix 9: Master EMS Document Index

This is an example of a master list of all EMS documents.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

Document Control Number	Document Name	Date of Current version	Location
Document			
#	Environmental Policy		
#	List of Operations within the EMS Boundary		
#	List of Aspects, Significant Impacts, Objectives and Targets		
#	List of Legal and Other Environmental Requirements		
#	Table of Environmental Management Programs		
#	Master Document List		
#	Registry of Operational Control Procedures		
#	Etc…		
Procedure			
#	Procedure for Aspects, Significant Impacts, Objectives, Targets		
#	Procedure for Legal and Other Environmental Requirements		
#	Procedure for Environmental Management Programs		
#	Procedure for Awareness and Competency Training		
#	EMS Communications Procedures		
#	Document Control Procedures		
#	Etc…		
Form			
#	Environmental Aspects, Impacts, Objectives and Targets		
#	Audit Checklist		
#	Corrective and Preventative Action Request		
#	Etc…		

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Appendix 10: Master EMS Records List

This is an example of a master list of EMS records.

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*Document control number*
Date:	*Revision date*

No.	Record Type	Person Responsible	Location	File Method	Retention minimum
1.	**ADMINISTRATIVE**				
1.01	Purchasing				
1.02	Waste Management				
1.03	Insurance				
1.04	Auditing				
1.05	Shipping/receiving				
2.	**ENVIRONMENTAL**				
2.01	Incident Reports				
2.02	Complaint Reports				
2.03	EMS meeting minutes				
2.04	Significant Impacts				
2.05	Major source determinations				

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Appendix 11: Operational Control Procedure Registry

EMS Operational Control Procedures	Document Control Number
Procedure for Aspects, Significant Impacts, Objectives, Targets	**EMS/1.001**
Form for Listing Activities within the EMS Boundary	EMS/1.001 F1
Form for Preparing a Stakeholder Registry	EMS/1.001 F2
Form for Listing all Aspects for a Specific Activity	EMS/1.001 F3
Form for Determining Significance of Environmental Impacts	EMS/1.001 F4
Form for Establishing Objectives and Targets for Significant Impacts	EMS/1.001 F5
Procedure for Legal and Other Environmental Requirements	**EMS/2.001**
Form for Preparing a List of Legal and Other Environmental Requirements	EMS/2.001 F1
Procedure for Environmental Management Programs	**EMS/3.001**
Form for Preparing and Environmental Management Program	EMS/3.001 F1
Form for Preparing a List of Environmental Management Programs	EMS/3.001 F2
Procedure for Awareness and Competency Training	**EMS/4.001**
Form for Preparing a Training Delivery Log	EMS/4.001 F1
EMS Communications Procedures	**EMS/5.001**
Document Control Procedures	**EMS/6.001**
Form for Preparing a List of Controlled Documents	EMS/6.001 F1
Procedure for Operational Controls	**EMS/7.001**
Emergency Preparedness and Response Procedures	**EMS/8.001**
Procedure for Environmental Monitoring and Measurement	**EMS/9.001**
Non-conformance, Corrective, Preventive Actions Procedure	**EMS/10.001**
Form for Preparing a Corrective and Preventative Actions Tracking Log	EMS/10.001 F1
Procedure for Environmental Records Maintenance	**EMS/11.001**
Procedure for EMS and Regulatory Compliance Audits	**EMS/12.001**
Form for Developing an EMS Audit Plan	EMS/12.001 F1
Form for Summarizing Audit Findings	EMS/12.001 F2
Form for Developing an Audit Finding Response Plan	EMS/12.001 F3
EMS Management Review Procedure	**EMS/13.001**

Procedure for Identifying Environmental Aspects, Determining Significant Impacts, and Developing Objectives and Targets

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/1.001*
Date:	*Revision date*

Description:

This procedure covers all elements from listing the activities within the EMS boundary to developing environmental performance improvement targets. Part 1. describes how to classify activities within the EMS boundary. Part 2. describes the procedure for identifying stakeholder expectations regarding environmental performance. Part 3. involves listing the environmental aspects of activities. Part 4. is the procedure for assigning environmental impacts to the list of aspects. Part 5. describes the procedure for assessing environmental impacts and determining which of them are to be classified as significant environmental impacts. Part 6. is the procedure for establishing environmental objectives and targets.

Procedure:

Part 1. Identifying Operations within the EMS Boundary

This procedure is used to describe the operations within the defined EMS boundary. Operations include all activities, products, and services.

1. Identify a boundary for the EMS (the boundary should correspond to activities over which t the organization has control over or can influence).
2. It can be helpful to divide operations into categories. Use a method for categorizing operations that suits the municipal operation. Some examples of categorization are:
   - flowchart following materials or activities through processes;
   - dividing operations along departmental lines;
   - any other categories that capture all operations in the EMS boundary.
3. Identify and list all activities, products, and services within the EMS boundary:
   - review the EMS boundary when deciding which operations to include;
   - create separate lists of activities, products and services, as needed;
   - start with as comprehensive a list as possible grouped into categories and consider anything that may have been missed by these categories.
4. Record the operations and activities, along with a short description, in the table in form EMSF/1.002. Consider creating a separate table for each category of operation.

Form for Listing Operations in the EMS Boundary

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/1.001 F1*
Date:	*Revision date*

	Activity	Description
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Note: *List operations using the categories you have defined. Be sure to capture all operations within the EMS Boundary. Consider creating a separate table of activities for each category of operation.*

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Part 2. Preparing a Stakeholder Registry

Engage your entire EMS Team: in this process to ensure you capture all possible stakeholder groups.

1. Use form EMS/1.001 F2 to list all stakeholders with an interest in the environmental performance of the operations within the EMS boundary;
2. Describe the nature and structure of the stakeholder group;
3. Identify the environmental expectations for each stakeholder group;
4. Identify if the environmental expectation includes a regulatory or other requirement:

   Note: You can answer Yes, No or Unknown but if the answer is 'unknown' make an action point to find out and report back.

Stakeholders: those organizations or individuals with an interest in the environmental performance of the operations within the EMS boundary.

Regulatory and Other Requirements: anything regulated as well as requirements outlined in legal contractual agreements or as part of internal policy.

Form for Preparing a Register of Stakeholder Environmental Expectations

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/1.001 F2*
Date:	*Revision date*

Name of Stakeholder Group	Description of Stakeholder Group	Description of Environmental Expectations	Is it a Regulatory or Other Requirement?

Pg. ___ of ___

Part 3. Identifying Environmental Aspects

This procedure is used to identify the environmental aspects for each operation identified in form EMS/1.001 F1 Operations in the EMS Boundary.

1. For each operation (i.e., activity, product and service) identified, list all environmental aspects associated with its activities, products or services.
2. For each activity, product or service, there may be more than one aspect. In defining aspects, consider interactions that create releases into the environment, involving:
   - air emissions;
   - releases to water;
   - solid waste management;
   - contamination of land;

   and/or interactions that use materials, resources (e.g., water), energy, such as:
   - raw materials and natural resources.
3. For each activity, product or service, list the associated environmental aspects using form EMSF/1.003. Use a separate form (aspects list) for each activity, product or service.

From ISO 14001:

Environmental Aspect: "An element of an organization's activities, products or services that can interact with the environment."

Form for Preparing a List of Environmental Aspects for One Activity

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/1.001 F3*
Date:	*Revision date*

Activity from Form EMS/1.001 F1: _____

Inputs: What are the interactions occurring or done that use:
Electricity:
Materials:
Water:
Fuels:
Other:
Emissions: What are the interactions occurring or done that create releases to:
Air:
Water:
Land:
Other: (e.g. noise/odor):

Note: Complete a separate Form EMS/1.001 F3 for each Activity on Form EMS/1.001 F1.

Part 4. Assigning Impacts to Aspects

1. Identify a specific environmental impact caused by each aspect.

   Note: If more than one impact exists for a specific aspect, you must redefine the aspect so that there is only one impact (this makes the evaluation of significance much easier).

2. In determining the environmental impact associated with each aspect note the impact category into which it falls. Impacts will fall into one of four categories:
   - resources: consumption of natural resources; i.e. water, energy, materials, land;
   - air: potential degradation of air quality;
   - water: potential degradation of water quality;
   - land: potential land contamination.
3. Use the table headings in form EMSF/1.004 to list the impact of each aspect for the given activity. Use a separate form for each activity, product or service.

ISO 14001 definition of Impact:

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

Note: There is considerable flexibility within ISO 14001 regarding the evaluation of significance. The criteria selected should reflect the organizations judgment regarding what is important. Therefore ensure criteria result in identifying as significant those aspects and impacts which are important to your organization. After applying the evaluation criteria to several activities, review the results to see if adjustments are needed.

Part 5. Determining Significant Environmental Impacts

For each environmental impact apply the evaluation criteria to determine significance. Use the questioning methodology outlined below and presented as a flow diagram in figure 3:

Is it regulated?

Yes: if it is regulated at the federal, state or municipal level
No: if it is not regulated
Future: if there is knowledge of pending regulations based on the stakeholder analysis

Does the aspect pose a potential environmental impact?

Yes: if the aspect is known to create environmental impacts or is likely to create impacts; severe consequences to environment
No: if the aspect is not known to create environmental impacts or has negligible consequence to environment
Unknown: if there is insufficient knowledge about the potential for the aspects to create environmental impacts

Is there significant stakeholder interest?

Yes: high potential for concern documented and expressed by several stakeholders
No: no or little concern
Unknown: if there is insufficient knowledge about the level of stakeholder concern

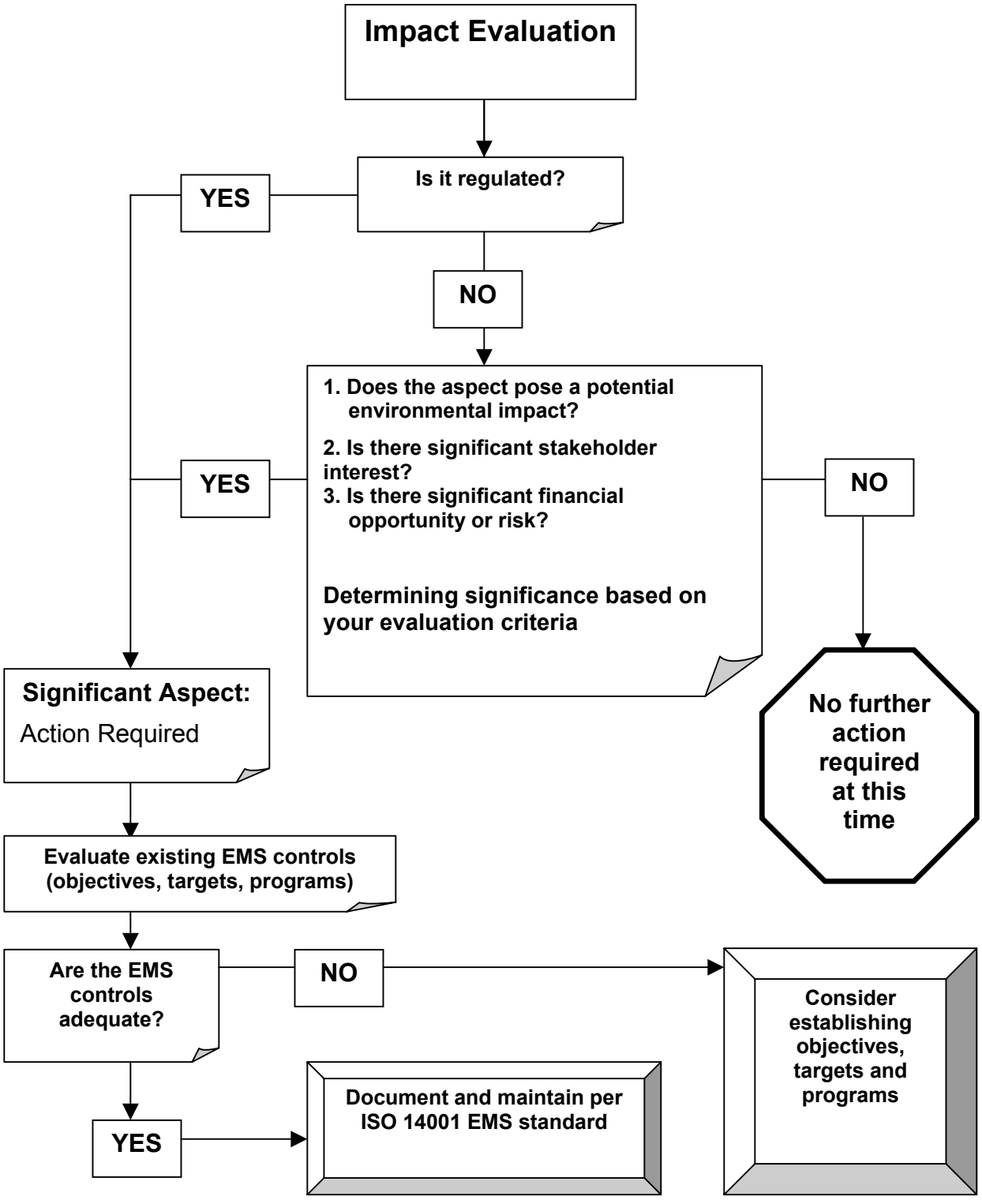
Is there significant financial opportunity or risk?

Yes: costs to currently manage the aspect is significant or potential to create significant cost savings exists
No: currently little or no cost to manage the aspect; little to no potential for cost savings or revenue generation
Unknown: potential for cost savings or revenue generation or costs to manage the aspect is unknown

In situations where most or all of the answers are Unknown (or Future), additional information gathering may be necessary.

Complete form EMS/1.001 F4 by adding the results of this analysis to the appropriate headings in the table.

Figure 3. Flow Diagram of Impact Significance Evaluation



Form for Assigning Impacts to Aspects and Determining Significance

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/1.001 F4*
Date:	*Revision date*

Activity from form EMS/1.001 F1: _____

Aspect	**Impacts**				**Questions for Significance**				**Is it a significant aspect? Yes/No**
	Air	Water	Land	Resource	Is it regulated	Does the aspect pose a potential environmental impact	Is there significant stakeholder interest	Is there significant financial risk or opportunity	

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Part 6. Setting Environmental Objectives and Targets

This procedure is used to evaluate each aspect with a significant impact to assess whether or not an environmental objective and target should be established. Assess each activity with the following questions as outlined in figure 4.

1. Evaluate each aspect with a significant impact using the flowchart criteria:
    - Does your organization have control or influence over the aspect?
    - Do technically feasible options exist to control the aspect?
    - Are the technically feasible options financially feasible?

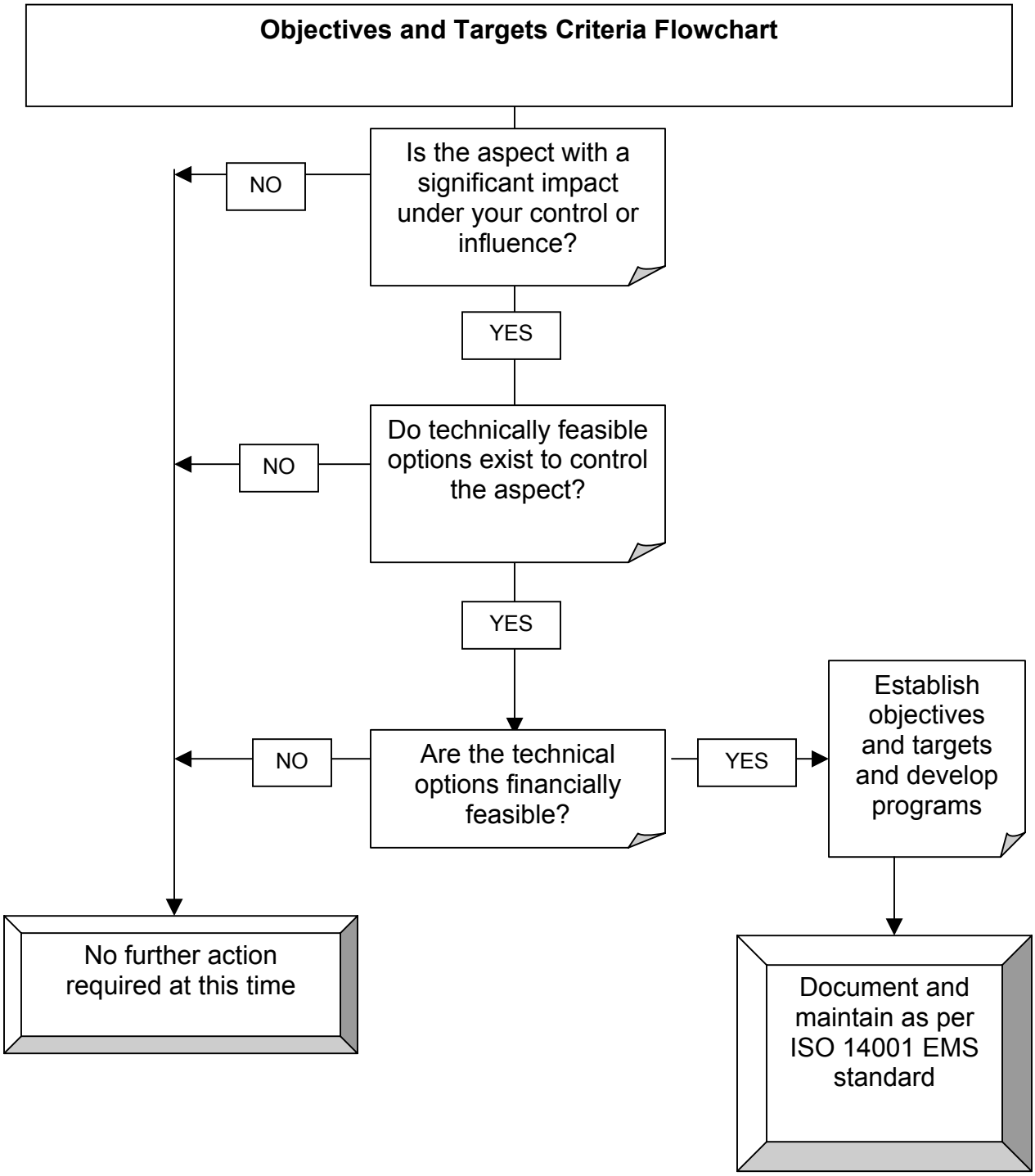
2. Once the aspect has been assessed against these criteria, determine whether an objective and target should be established using the decision logic from the flowchart criteria.

3. Use form EMS/1.001 F5 to record the results of your evaluation.

Note: Once it is determined that an Objective and Target should be established for a specific Significant Aspect, each municipality will have to evaluate options.

Objectives and targets should be set so that they represent a valuable but achievable goal to base the Environmental Management Programs around.

Figure 4. Flow Diagram for Establishing Objectives and Targets



Form for Setting Objectives and Targets

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/1.001 F5*
Date:	*Revision date*

Activity	Aspect	Significant Impact	Objective	Target

Pg ____ of ____

Procedure for Identifying Legal and Other Requirements

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/2.001*
Date:	*Revision date*

Description:

This procedure is used to identify all legal/regulatory and other environmental requirements to which the municipality must conform and the status of compliance.

Procedure:

The EMS responsible person with support from the EMS Team completes the Form EMS/2.001 F1 in its entirety. The EMS Team completes the form to the greatest degree possible using all available sources of information for identifying applicable legal and other environmental requirements.

After completing form EMS/2.001 F1 the EMS responsible person integrates the list of compliance issues into the form EMS/1.001 F4 declaring all impacts with an applicable regulatory requirement as significant.

The EMS responsible person or designee stays informed of changing environmental regulations:

- obtaining a regulatory guidance manual and subscription to ensure access to amendments;
- reviewing regulatory updates and the compliance calendar and attending compliance workshops offered by state and local regulatory agencies;
- using a consultant specializing in compliance issues;
- accessing documentation and websites with compliance assistance content;

The EMS responsible person or designee reviews the List of Legal and Other Requirements on a regular basis as part of the EMS Audit preparation.

Form for Preparing a List of Legal and Other Environmental Requirements

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/2.001 F1*
Date:	*Revision date*

Legal Environmental Requirements

Environmental Aspect	Legal Requirement	Reference

Other Environmental Requirements

Environmental Aspect	Other Requirement	Reference

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Procedure for Establishing Environmental Management Programs

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/3.001*
Date:	*Revision date*

Description:

This procedure is used to develop and document all Environmental Management Programs required for managing environmental aspects that have significant impacts and to meet the objectives and targets that have been developed.

The description of the Environmental Management Programs include:

- designation of responsibility
- resources available (budget, staff and technology)
- time frame for execution

A continual improvement process shall be in place to amend Environmental Management Programs when necessary.

4. For each environmental aspect with a significant impact identified in form EMS/1.001 F4 for which an objective and target has been developed, complete form EMS/3.001 F1.

   Note: If there are 5 environmental improvement targets, there will be 5 environmental management programs, each described on a separate form EMS/3.001 F1.

5. Assign each completed EMS/3.001 F1 a distinct document control number.
6. Use form EMS/3.001 F2 to prepare a list of environmental management programs.

This planning process is completed annually or within the normal budgeting period of your organization.

Form for Preparing an Environmental Management Program

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/3.001 F1*
Date:	*Revision date*

Subject:		**Document No:** **Page: of:**
Facility:	**Responsible Person:**	**Start Date:**
Goal Statement: (Describe how this program meets commitments of the Environmental Policy)		
Objective:	**Target and Completion Date:**	
Strategy:		
Tasks for Achieving Objective and Target:		
Metrics and Measurement:		
Importance relative to Other Environmental Programs:		
Comments / Process Towards Completion:		

Form for Preparing a Register of Environmental Management Programs

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/3.001 F2*
Date:	*Revision date*

Activity	Environmental Aspect	Significant Impact	Objective	Target	Environmental Management Program Document No.

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Procedure for EMS Awareness and Competency Training

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/4.001*
Date:	*Revision date*

Description:

There are two basic types of environmental training required in the ISO 14001 standard for environmental management systems:

1. awareness training for all employees; and
2. competency training for those whose jobs affect the organization's ability to meet its objectives and targets.

Procedure:

- Develop a standard environmental awareness training program for all employees;
- Assemble a list of all technical training requirements for the operational control procedures (include initial training and ongoing or refresher training requirements);
- Assemble a list of all staff that will play a role in EMS implementation. The list of environmental aspects and significant impacts can be used to complete this task;
- Determine the type of training needed for each personnel category and job function. It is important to recognize that senior management also need competency training (as well as awareness training), since they are involved in the Management Review process.
- Prepare a Training Matrix with training needs along one-axis and employee groups to be trained along the other using form EMS/4.001 F1;
- Develop technical training curricula for each category of staff. It is likely that some portion of the training will be the same for each category of staff, but that the extent and nature of the additional information provided will vary;
- Prepare a training schedule for initial and continuing training;
- Include provisions for employees transferred to different positions and new hires;
- Deliver awareness training to all staff and technical training as required;
- Maintain appropriate records regarding staff that received training, and the content of the training they received.

Training materials should include a description of the EMS and the Environmental Policy, and describe why it is important to the company, and the role of each employee in its implementation.

Form for Preparing an Environmental Training Requirements and Delivery Log

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/4.001 F1*
Date:	*Revision date*

Training Required	Description	Mandatory Attendance	Frequency	Date Complete

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EMS Communication Procedure

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/5.001*
Date:	*Revision date*

Description:

This procedure describes the process for:

- internal environmental communication/awareness;
- external environmental communication with interested parties.

External communication includes all written or electronic correspondence, telephone conversations and oral discussions or meetings with external parties. According to the ISO 14001 standard, the organization shall consider processes for communicating externally on its significant environmental aspects and record its decision.

Procedure:

- Internal environmental communications shall ensure that those personnel at each relevant level and function are aware of:
  - the EMS and the environmental policy;
  - the importance of conformance with the environmental policy;
  - all operational control procedures;
  - individual responsibilities for achieving environmental objectives and targets;
- External environmental communications ensure that:
  - external communication concerning the environmental aspects within the EMS boundary is directed to the EMS Responsible person;
  - the ISO Management Representative or designee is responsible for determining the need for, and preparation of, any notification to regulatory agencies.
- General guidelines:
  - Department Managers keep records of their own internal communication;
  - The ISO Management Representative maintains records of external environmental communication with interested parties and the media;
  - The Environmental Coordinator maintains environmental records.

EMS Document Control Procedure

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/6.001*
Date:	*Revision date*

Description:

EMS documentation may be maintained in electronic and/or hard copy form. In either case this procedure is to be applied to ensure appropriate access to and control over all EMS documentation.

Procedure:

1. The EMS Responsible person assembles existing environmental documentation.

2. Develop additional environmental documentation required by the ISO 14001 standard. This may include EMS responsibility, training and other elements.

3. Use ISO 14001 standard requirements for EMS documentation to determine the need to revise or supplement the existing documents.

4. Use Form EMS/6.001 F1 to maintain an index of EMS documents and revisions.

Form for Preparing an EMS Document List

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/6.001 F1*
Date:	*Revision date*

Document Control Number	Document Name	Date of current version	Location

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Procedure for Establishing Operational Controls

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/7.001*
Date:	*Revision date*

Description:

For each Environmental Management Program, operational control procedures need to be developed describing how each program will be implemented, and who has responsibility for implementation. These requirements must be detailed in written operational control procedures.

Procedure:

- Operational control procedures must explicitly describe how environmental management activities will be implemented;

- Operational Control Procedures must link operations to significant environmental aspects, significant impacts, the environmental policy, objectives and targets.

Operational control procedures primarily describe work practices and cover the environmental control of specific operational activities. These are activity-specific in their application.

Operational control procedures also include management operations. These procedures cover the management and control of both the EMS and the principal environmental aspects, which the system manages.

Procedure for Emergency Preparedness and Response Plans

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/8.001*
Date:	*Revision date*

Description:

This procedure is used to establish plans to prepare for and respond to emergency events with the potential for significant environmental impacts.

Procedure:

The environmental responsible person supported by the EMS Team is responsible for identifying and quantifying environmental risk and implementing plans to avoid the occurrence of emergency events and to mitigate the environmental impacts associated with emergency events that do occur.

The environmental responsible person supports operational managers in the development and upkeep of Emergency Preparedness and Response Plans addressing risks as required by local, state and federal regulations.

The environmental responsible person ensures the preparation and delivery of training for all personnel as required by the training matrix.

For each emergency incident that does occur, the environmental responsible person and other relevant personnel use the procedure to evaluate the required response, and take actions to minimize the likelihood of its recurrence.

Procedure for Environmental Monitoring and Measuring

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/9.001*
Date:	*Revision date*

Description:

The EMS requires the establishment and maintenance of documented procedures to monitor and measure, on a regular basis, the key characteristics of operations and activities that can have a significant impact on the environment (including the recording of information to track performance, relevant operational controls and conformance with environmental objectives and targets). Monitoring and measuring equipment must be calibrated and maintained, records of this process must be maintained according to the procedures.

Procedure:

Develop required procedures for all areas in which monitoring and measurement is necessary for compliance with environmental operational control procedures. The procedures should:

- ensure that monitoring and measuring occurs in order to assess whether or not objectives and targets are met;
- respond to stakeholder demands, to the extent these are not reflected in the objectives and targets (e.g., tracking number of complaints regarding noise in response to a stakeholder request to reduce noise impacts);
- meet regulatory and legal requirements regarding performance tracking and reporting requirements; and,
- address the needs for operational control of equipment and processes.

The procedures should specify:

- the means by which the appropriate data will be gathered;
- how that data will be transferred to the other processes in which it will be used;
- develop and include calibration procedures for all measuring equipment.

Ensure that monitoring and measuring requirements are included in the Operational control Procedure for the relevant activity.

Procedure for Non-conformance Corrective and Preventive Actions

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/10.001*
Date:	*Revision date*

Description:

This procedure is used for implementing corrective and preventive action. The procedure should:

- define responsibility for taking the results of monitoring and measurement and auditing and using them to determine what, if any, corrective and preventive actions need to be implemented;
- specify what corrective and preventive actions will be taken when a non-conformance is discovered outside of the monitoring or auditing procedures—such as when a spill or accident occurs;
- specify how corrective and preventive actions will be documented, so that changes to the EMS (i.e., continual improvement) can be demonstrated.

Procedure:

Corrective action is generally a reactive process used to address problems after they have occurred. Corrective action may be triggered by a variety of events, including internal audits and management reviews, neighbor complaints or results of monitoring and measurement.

Preventive action is generally a proactive process intended to prevent potential problems before they occur or become more severe. Preventive action focuses on identifying negative trends and addressing them before they become significant. Events that might require preventive action include monitoring and measurement, trends analysis, tracking of progress on achieving objectives and targets, response to emergencies and near misses, and customer or neighbor complaints.

The environmental responsible person is responsible for reviewing issues affecting the EMS, the application and maintenance of this procedure, and any updates to EMS documents affected by the preventive and corrective actions.

The ISO Management Representative is responsible for logging the communications and recording solutions. The responsible parties are to verify the effectiveness of the solution. The ISO

Management Representative is responsible for overall tracking and reporting on preventive and corrective actions.

Responsible personnel are to institute required corrective or preventive action, report completion of the required action to the ISO Management Representative, and assure sustained effectiveness.

Initiating Corrective or Preventive Action:

1. Any employee may initiate corrective or preventive action. The employee is responsible for bringing the problem to the attention of the ISO Management Representative. The ISO Management Representative is responsible for determining whether action is required and records the appropriate information. Responsibility for resolving the problem is assigned to a specific individual.
2. The ISO Management Representative, working with the responsible person determines an appropriate due date for resolving the issue.

Determining and Implementing Corrective and Preventive Actions:

1. The relevant personnel investigates and resolves the problem and communicates the corrective or preventive action taken to the environmental responsible person.
2. If the relevant personnel cannot resolve the problem by the specified due date, he / she is responsible for determining an acceptable alternate due date with the environmental responsible person.

Tracking Corrective and Preventive Actions:

1. The environmental relevant person is responsible for issuing a weekly report to the responsible personnel detailing any overdue actions.
2. Records of actions are maintained for at least two years after completion of the corrective or preventive action.

Tracking Effectiveness of Solutions

1. The relevant personnel is responsible for verifying the effectiveness of the solution. If the solution is deemed not effective, a new action will be issued to the relevant personnel.

This information is recorded in form EMS/10.001 F1 and given a document control number.

Form for Preparing a Corrective and Preventive Action Tracking Log

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/10.001 F1*
Date:	*Revision date*

No.	Requested By	Issued To	Plan Completed (Date)	Corrective Action Completed (Date)	Effectiveness Verified (Date)	Closed (Date)

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Environmental Records Procedure

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/11.001*
Date:	*Revision date*

Description:

This procedure is followed to establish and maintain control procedures for identifying, maintaining and disposing of environmental records.

Procedure:

Environmental records are maintained in an archive so as to be retrievable as needed.

Records are preserved and archived for retrieval as needed based on the following criteria:

- include records of all data and information required in Environmental Management Programs such as training records and the results of audits and reviews, expired permits, inspection results;
- ensure that environmental records are legible, identifiable and traceable to the activity, product or service involved;
- ensure that environmental records are stored and maintained such that they are readily retrievable and protected against damage, deterioration or loss;
- ensure that the retention times of these environmental records have been established and recorded.

EMS and Regulatory Compliance Audit Procedure

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/12.001*
Date:	*Revision date*

Description:

The outputs from EMS audits feed into two separate processes: 1) Management Review, and 2) Corrective and Preventive Action.

EMS audit procedure must be developed and documented with goals that:

- ensure that the procedures incorporated into the EMS are being followed;
- determine if the EMS itself requires revision or restructuring.

Procedure:

Audit Team Selection: One or more auditors comprise an audit team. When the team consists of more than one auditor, a Lead Auditor is designated. The Lead Auditor is responsible for audit team orientation, coordinating the audit process, and preparing the report.

The Lead Auditor prepares a written plan for the audit using form EMS/12.001 F1.

A pre-audit conference is held with appropriate personnel to review the scope, plan and schedule for the audit.

The Lead Auditor prepares the audit report, which summarizes the audit scope, identifies the audit team, describes sources of evidence used, and summarizes the audit results using form EMS/12.001 F3 and communicates the results to the EMS responsible person and the operations manager. A post-audit conference is held to present audit findings, clarify any misunderstandings, and summarize the audit results.

The EMS responsible person communicates the audit results to responsible management personnel. Management personnel execute follow-up actions as needed. The EMS responsible person tracks the completion and effectiveness of corrective actions.

Form for Preparing an EMS Audit Plan

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/12.001 F1*
Date:	*Revision date*

Area or Department Audited	Function or Operation	Lead Auditor	Audit Team Members	Date	Special Instructions

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Form for Preparing an EMS Audit Summary Sheet

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/12.001 F2*
Date:	*Revision date*

Element Number and Description		Audit Results	
		Major/Minor Findings	Comment
TOTAL			

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Form for Responding to EMS Audit Finding

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/12.001 F3*
Date:	*Revision date*

Type of Nonconformance: (circle as appropriate)			
Major	**Minor**	**Positive Practice**	**Recommendation**
Description (include where in the organization the finding was identified):			
ISO 14001 Reference:		**Date:**	**Finding Number:**
Lead Auditor:		**Audit Team:**	
Corrective Action Plan (including time frames):			
Preventive Action Taken:			
Responsible Person:		**Completion Date:**	
Corrective Action Verified By:		**Date:**	

Management Review Procedure

EMS CONTROLLED DOCUMENT	
Municipality:	*Name*
Prepared By:	*Name and title*
Number:	*EMS/13.001*
Date:	*Revision date*

Description:

The purpose of this procedure is to document the process for conducting the Management Review and the primary agenda of issues to be included in reviewing the status of the EMS.

The Management Review process is intended to provide a forum for discussing the performance of the EMS and opportunities for improvement and for providing management with a vehicle for making changes to the EMS to achieve continual improvement.

Procedure:

The EMS responsible person coordinates the EMS Management Review meeting. The meeting coincides with the annual business planning and financial review meetings. The EMS responsible person presents a summary of proposed EMPs for the next year to be considered in the budget planning process. The EMS responsible person is also responsible for ensuring that the necessary information is collected prior to the meeting. At a minimum, each Management Review meeting considers the following:

- suitability, adequacy and effectiveness of the environmental policy;
- suitability, adequacy and effectiveness of the environmental objectives;
- overall suitability, adequacy and effectiveness of the EMS;
- status of objectives, targets, corrective and preventive actions;
- results of any EMS audits conducted since the last Management Review meeting;
- suitability, adequacy and effectiveness of training efforts; and,
- results of any action items from the previous Management Review meeting.
- suitability of resources, considering re-alignment of resources if required.
- extent to which changes in legislation, organizational activities, technology or stakeholder interests will require changes in the EMS.

Minutes of the Management Reviews are documented and include, at a minimum, the list of attendees, a summary of key issues and any actions items arising from the meeting. A copy of the meeting minutes are distributed to attendees and to any individuals assigned action items.

For more information, visit DEP's website at www.dep.state.pa.us,
Keyword: "DEP EMS."

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