EMS AND WASTE MANAGEMENT OPPORTUNITIES & OPTIONS

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ABSTRACT

There are a myriad of drivers and benefits to encourage public and private organizations to develop, implement and maintain an Environmental Management System (EMS). The EMS follows five basic principles described in the Code of Environmental Policy (CEMP) and these principles are accepted by ISO 14001. These five principles are: management commitment, compliance assurance/pollution prevention, enabling systems, performance/accountability, and measurement/improvements. These principles move beyond compliance with control and treat technologies to a holistic approach of using pollution prevention and sustainability options for compliance

The purpose of this paper is to identify the drivers and benefits for the development, implementation, and maintenance of an EMS. There are clear reasons for a manufacturing company who wants to be competitive in the global market to be ISO 14001 certified, and under Executive Order 13148, all Federal sector agencies must comply with "Greening the Government Through Leadership in Environmental Management." There are even requirements by some ISO 14001 certified companies that all companies who support these ISO 14001 certified companies must also have appropriate Environmental Management Systems. Private and public sector organizations use an EMS to improve overall environmental performance and compliance, establish a framework for pollution prevention opportunities, increase efficiency and economic vitality, and enhance the organization's public image to name a few overall improvements to the risk profile of an organization's facilities and operations. In light of current events, emergency preparedness has or should be expanded in many Environmental Management Systems to increase environmental security and facility vulnerability.

This paper will embrace EMS as an organized approach to managing wastes. It presents the authors' belief that establishment of an EMS is part of a management trend and challenge for managing solid and hazardous wastes in the private and public sectors. While it may be difficult to get started with the development and implementation of an EMS because of time, costs, and commitment, an Environmental Engineering Overview (not to be confused with a "gap analysis") can be offered that is in effect a "starter kit" for the preliminaries of an EMS. The Environmental Engineering Overview addresses environmental compliance assurance, pollution prevention opportunities and effective waste management operations at a site or facility. All data and information gathered during the Environmental Engineering Overview can be integrated into the development and implementation of an EMS should management decide to proceed. The Environmental Engineering Overview will provide management with a basic assessment of where the facility has opportunities for pollution prevention, options for better waste management operations, and potential issues involving environmental compliance.

This approach can be applied to industrial facilities, federal installations (as required under Executive Order (EO)13148 as described above), or even solid waste facilities and systems at large. Several municipalities have embarked on a program to achieve ISO certification for their MSW management system. ISO certification can be applied to landfills, transfer stations, and other operating solid waste facilities. To date, the authors' can speak to a few examples that have ISO certification status. One example is a municipality in California that has a city-owned sanitary landfill. Another example is a private landfill in Pennsylvania, and the third example is a regional municipality in Canada.

INTRODUCTION

Everyone wants cost-effective and efficient waste management, but not everyone follows the same approach. The best of all worlds may an approach that reflects a combination of innovative thinking and feasible engineering and management alternatives that include life cycle assessment/management and pollution prevention approaches in the performance of all environmental services including waste management. Environmental decision-making principles are needed to encourage companies to develop and implement an EMS to achieve environmental management efficiency.

Before we jump into bed with EMS it is important to understand the drivers and the costs as well as the benefits and opportunities. While organizations within the public and private sectors would like to cite "Internal Desire to Improve Environmental Performance and Compliance" as the driver, drivers more typically are requirements of outside parties, a desire to attain/maintain compliance, and/or an effort to improve bottom line performance.

Many manufacturers who are ISO 14001 certified are requiring their suppliers to be certified to ISO 14001. While waste management facilities have not been mandated by their clients to adopt ISO 14001, the trend and corporate pressure for many U.S. companies with overseas operations is to require ISO 14001 registration with all suppliers and services. Other pressures and drivers will come from banks and insurers encouraging certification. It is believed clients will equate ISO 14001 certification with environmental performance quality and business efficiency and view certification as an environmental compliance safeguard.

GOVERNMENT AND INDUSTRY CLIENTS

The clients as well as the service providers for waste management are government and industry. It is therefore significant for the service provider to understand its client's desire to be compliant with ISO 14001. The motivation for the federal government is that the federal government itself must meet Executive Order 13148. Executive Order 13148 of April 21, 2000 is entitled "Greening the Government Through Leadership in Environmental Management". This executive order requires the head of each Federal agency to ensure environmental accountability for day-to-day decision-making and long term planning processes, across all agency missions, activities, and functions.[2] In fact, "Greening of Government Executive Orders" means not only E.O. 13148, but includes the series of orders on greening the government including E.O. 13101 of September 14, 1998, E.O. 13123 of June 2, 1999, E.O 13134 of August 12, 1999, and other future orders as appropriate. "The DOD environment program's number one priority under the Bush administration is to establish environmental management systems throughout the Defense Department, including on its training lands, to aid in achieving the military's mission," says John Paul Woodley Jr., the DOD Assistant Deputy Under Secretary for the Environment. The goal of implementing EMS at DOD facilities would facilitate an initiative begun under the Clinton administration. The Pentagon's environment office is focused on environmental management system (EMS) implementation as its first priority "because we believe that is a proven managerial technique and policy," Woodley said, noting that the department's largest industrial partners are using it. "And so when all our industrial partners are moving in the same direction, the president wants us to move in that direction," he said. As has happened with industry, DOD believes adopting EMSs will minimize waste, and improve performance and productivity, according to Woodley.[3]

DOD recognizes that EMSs include ISO 14001, an international voluntary standard that concentrates on management activities rather than environmental actions. While DOD may be the largest agency affected by E.O. 13148, all Federal agencies are responsible for meeting E.O. 13148. By December 31, 2005, each agency shall implement an EMS at all appropriate agency facilities based on facility size, complexity, and the environmental aspects of facility operations.[2]

Private industry supports federal, state and municipal government clients in a wide variety of technical areas and understands the importance of providing full service support to Federal agencies in complying with E.O. 13148. This executive order is the primary driver for the federal government, and as a result, it may become the primary driver for a service provider seeking contracts to support federal facilities with waste management.

Industrial clients are finding that implementation of an EMS is contributing to quantifiable advantages, such as cost savings and reduced environmental risks. With the need to be competitive and keep all potential markets open for trade, small and medium-sized businesses will join with the larger industrial organizations in developing and implementing environmental management systems for the appropriate parts of their organizations. It seems reasonable for consulting firms that provide engineering services and support to follow suit. Consulting firms may better appreciate their clients' positions and their efforts to drive continual environmental improvement if they implement and maintain an EMS of their own. This has been the experience of SCS Engineers.

In the view of the authors, the primary drivers for waste management providers to join industry and government with an EMS are: 1. Being responsive to their clients environmental management philosophy; and 2. Being more competitive in the marketplace. These result in the waste management provider voluntarily accepting the same decision-making principles that their clients are using to meet their client's mission. This results in a waste management provider increasing its value to its client.

Implementing and maintaining an EMS is a substantive activity for any organization. Consequently, it is important for government and industry clients to place a value on service providers that have an EMS and reward that value when selecting firms under competitive bids.

DEVELOPING THE EMS

One approach to developing an EMS in the private and public sector is to take it slow and deliberate, particularly if time, costs and commitment seem to present issues to getting started. An Environmental Engineering Overview addresses environmental compliance assurance, pollution prevention opportunities and effective waste management operations at a site or facility. All data and information gathered during the Environmental Engineering Overview can be integrated into the development and implementation of an EMS should management decide to proceed. The Environmental Engineering Overview will provide management with a basic assessment of where the facility has opportunities for pollution prevention, options for better waste management operations, and potential issues involving environmental compliance. In effect the Environmental Engineering Overview is a "starter kit" for the preliminaries of developing an EMS. The Environmental Engineering Overview can provide a substantial portion of a gap analysis evaluation that compares an organization's current environmental management system against ISO 14001.

ASSESSING WHAT YOU HAVE

Probably the most difficult part of developing the EMS is the assessment of internal requirements and operations. An EMS provides a systematic way to review and improve operations for better environmental performance and compliance. An operation may have established procedures and systems in place that can be incorporated and/or integrated into an EMS. Many parts of an existing quality assurance program can be integrated into an EMS. Pollution prevention programs, regulatory compliance programs, and management operations will be of assistance with the initial assessment. SCS Engineers encourages the use of an Environmental Engineering Overview for this assessment phase. This approach will help in understanding what you should have and reviewing what you do have before determining resource needs.

INTEGRATION OF QMS AND EMS (ISO 9001 & ISO 14001)

Quality Management Systems (QMS) and Environmental Management Systems (EMS) share many common elements and can be successfully integrated to realize significant benefits such as streamlined operations and decision-making, simplified employee training, more efficient use of resources, and reduction in audit costs. The second edition of "Environmental Management Systems: *An Implementation Guide for Small and Medium-Sized Organizations*" published by NSF in 2001 and available via www.nsf-isr.org includes the key elements of an EMS and categorizes the elements of the QMS and EMS as either 1. essentially the same, 2. similar, or 3. unique.

Elements in the categories of essentially the same and similar can often be addresses by a common procedure although some customization

may be required. Unique elements are typically addressed in separate procedures. ISO 9000 was one of the source documents used by the drafters of ISO 14001and, consequently, there are components common to both standards. Organizations that have a QMS in place have a head start when implementing an EMS for several reasons. There are several reasons for this. Foremost is the requirement of ISO 9000 to have a documented control system in place. This one result of installing an ISO 9000 system greatly simplifies and reduces the effort of installing an ISO 14000 system. In addition, other important reasons for the value of having an ISO 9000 system in place are: employees are already familiar with management system concepts; some procedures may already be in place; and top management has committed to the use of management systems to meet established goals. Appendix E in the aforementioned NSF publication lists the relationship of EMS to QMS elements as follows:

Elements that are Essentially the Same

- Training, Awareness & Competence
- Document Control
- Nonconformance, Corrective & Preventive Action
- Calibration (part of Monitoring & Measurement)
- Records

Elements that are Similar

- Environmental Policy
- Structure and Responsibility
- EMS Documentation
- Operational Control
- Monitoring & Measurement
- EMS Audit
- Management Review

Elements that are Unique

- Environmental Aspects
- Legal and Other Requirements
- Objectives & Targets
- Environmental Management Programs
- Emergency Preparedness & Response

It is noted that an Environmental Engineering Overview primarily addresses the elements that are unique for environmental compliance assurance (legal requirements & environmental aspects), pollution prevention opportunities (environmental aspects and objectives & targets), and effective waste management operations (environmental management programs and emergency preparedness) at a site or facility. Of course, the Environmental Engineering Overview can be customized to address those issues of greater significance to the client or additional environmental issues of concern.

EMS PRINCIPAL ELEMENTS[1]

The principal elements of an Environmental Management System are:

1. Environmental Policy
2. Environmental Aspects
3. Legal and Other Requirements
4. Environmental Objectives and Targets
5. Environmental Management Programs
6. Organizational Structure and Responsibility
7. Training, Awareness and Competence
8. Communication
9. Document Control
10. Operational Control
11. Emergency Preparedness and Response
12. Monitoring and Measurement
13. Nonconformance and Corrective and Preventive Action
14. Records
15. Environmental Management System Audit
16. Management Review

1. Environmental Policy

The top manager must endorse the Environmental Policy. The policy covers basically describes the environmental philosophy of an organization and addresses the major environmental activities within the organization. The Policy should include a commitment to continual improvement and pollution prevention, as well as a commitment to meet or exceed relevant environmental legislation, regulations and other requirements. The Policy will be reviewed annually by top management, communicated to all employees and made available to the public in accordance with the Environmental Communication procedure.

2. Environmental Aspects

A Cross Functional Team (CFT), sometimes referred to as the "Implementation Team," identifies the environmental aspects that the organization controls and over which it may be expected to have an influence, and determines which of those aspects are considered significant. Discussions regarding significance are recorded in CFT meeting minutes. These aspects are reviewed at least semi-annually by the CFT or

when there is a new or changed process or activity. The Environmental Management Representative maintains CFT minutes and other records. A list of all aspects by area and department is included in the Aspects, Objectives & Targets section of the organization's EMS Manual.

Reference Material
ISO 14001 Standard (4.3.1)

Applicable Procedures
Environmental Aspects, Objectives and Targets, and Management Programs

Environmental Review of Projects

3. Legal and Other Requirements

The organization shall establish an environmental procedure for the purpose of identifying, accessing and communicating applicable legal and other requirements. Additional information can also be available through legal publications. Local regulations are identified, accessed and communicated by the Environmental Coordinator. At least annually, the Environmental Coordinator will review the most current national, regional, provincial, state and local legal and other applicable requirements.

Reference Materials
Legal and Other Requirements
ISO 14001 Standard (4.3.2)

Applicable Procedures
Environmental Regulations and Other Requirements

4. Environmental Objectives and Targets

The Cross Functional Team develops objectives and targets for each significant environmental aspect. These objectives and targets define:

- performance objectives (Investigate/Study, Control/Maintain, or Improve) for each significant environmental aspect;
- specific, quantified targets which define those performance objectives; and
- planned deadlines for the achievement of those targets.

Objectives and targets are developed considering significant environmental aspects, technological options and financial, operational and business plans, and the views of interested parties.

Reference Material
ISO 14001 Standard (4.3.3)

Applicable Procedures
Environmental Aspects, Objectives and Targets, and Management Programs
EP-008 Environmental Review of Projects

5. Environmental Management Programs

The CFT establishes environmental management programs (EMPs) as a means for achieving objectives and targets. These programs define the principal actions to be taken, those responsible for undertaking those actions and the scheduled times for their implementation. The EMPs are developed by the CFT and approved by the Management Team (refer to Section 5.0 Environmental Aspects).

Reference Material:
ISO 14001 Standard (4.3.4)

Applicable Procedures
Environmental Aspects, Objectives and Targets, and Management Programs

Environmental Review of Projects

6. Organizational Structure and Responsibility

Environmental management system roles, responsibilities and authorities are defined at relevant functions and levels within the organization. The Management Team jointly provides the resources essential to the implementation and control of the environmental management system. These include training, human resources, specialty services, financial resources, technical and informational services. The Environmental Management Representative (EMR) has primary responsibility for establishing, operating and maintaining the EMS. A Cross Functional Team provides routine EMS support and reports directly to the EMR.

Reference Material
ISO 14001 Standard (4.4.1)

7. Training, Awareness and Competence

The EMR identifies, plans, monitors and records training needs for personnel whose work may create a significant impact upon the environment. The organization should have an environmental procedure to train employees at each relevant function and level so they are aware of the environmental policy, significant environmental aspects, their roles and responsibilities in achieving conformance with the policy and procedures, and with the requirements of the environmental management system. The training coordinator is responsible for maintaining the employee training records. Appropriate records are monitored and reviewed on a scheduled basis. Competency is determined by the employee's supervisor and is specified in an environmental training plan.

Reference Material
ISO 14001 Standard (4.4.2)

Applicable Procedures
Environmental Training and Awareness

8. Communication

The organization shall establish and will maintain a procedure for internal and external communications regarding environmental aspects and the EMS.

Reference Material
ISO 14001 Standard (4.4.3)

Applicable Procedures
Environmental Communication

9. Document Control

The organization shall establish an environmental procedure for controlling all documents related to the environmental system. This procedure describes where documents can be located and how and when they are reviewed. The procedure ensures that current versions are available and that obsolete documents are promptly removed from use or are suitably identified. Controlled documents are obtainable from the Environmental Management Representative or designee.

The organization's Manual identifies all documents relevant to the EMS. A copy of EMS documents, other than visual aids and records, can be obtained from the Environmental Management Representative or designee.

The control of the Manual is to be in accordance with the environmental procedure.

The EMR or his designee, following approval by the top manager will issue any amendments to the EMS Manual.

Reference Material:
ISO 14001 Standard (4.4.4)

Reference Material
ISO 14001 Standard (4.4.5)

Applicable Procedures
Formatting Environmental Procedures, Work Practices & Forms

Environmental Document Control

10. Operational Control

The CFT is responsible for identifying operations and activities associated with significant environmental aspects that require operational controls in procedures, work practices or environmental management programs.

These documents define the mechanisms for the establishment, implementation and maintenance of the EMS and ensure that the system is maintained in accordance with the environmental policy and objectives and targets and is communicated to suppliers and contractors.

- System Procedures: Cover the management and control of both the EMS and the principal environmental aspects, which the system manages. These procedures are organization wide in their application.

- Work Practices: Cover the environmental control of specific operational activities and are usually activity-specific in their application.

Reference Material
ISO 14001 Standard (4.4.6)

11. Emergency Preparedness and Response

The organization should have an environmental procedure to identify potential for and respond to

accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them. Emergency methods are reviewed by the CFT on an annual basis and after the occurrence of accidents or emergency situations. Emergency preparedness includes environmental security and facility awareness relating to any potential terrorist activities.

Reference Material
ISO 14001 Standard (4.4.7)

Applicable Procedures
Emergency Preparedness and Response

12. Monitoring and Measurement

The organization should establish an environmental procedure to monitor and measure the key characteristics of its operations and activities that can have a significant impact on the environment. This procedure includes calibration and maintenance requirements and ensures that records will be retained.

The organization should establish an Environmental Regulatory Compliance Program with a Procedure to outline the requirements of the program and to periodically review regulatory compliance and report results to management on a yearly basis

Reference Material
ISO 14001 Standard (4.5.1)

Applicable Procedures
Environmental Management System and Regulatory Compliance Audits

Monitoring and Measurement

13. Non-conformance and Corrective and Preventive Action

The organization should have an environmental procedure for defining responsibility and authority for handling and investigating non-conformances, for taking action to mitigate impacts, and for initiating and completing corrective and preventive action. Any changes in procedures resulting from corrective and preventive actions are implemented and recorded. The Audit Program Leader maintains these records.

Reference Material
ISO 14001 Standard (4.5.2)

Applicable Procedures
Non-Conformance and Corrective and Preventive Action

14. Records

The organization should have an environmental procedure for the identification, maintenance and disposal of environmental records. These records include training records and the results of audits and reviews. They are readily retrievable and protected against damage, deterioration and loss. The Areas and Departments maintain their own environmental records. Record and document retention is also specified in the procedure.

Reference Material
ISO 14001 Standard (4.5.3)

Applicable Procedures
Environmental Records

15. Environmental Management System Audit

Periodic system audits are conducted to ensure that the environmental management system has been properly implemented and maintained. The results of these audits are provided to management. Audits are performed according to a schedule, which is based on the environmental importance of an activity, the results of previous audits and the audit schedule. All auditors are trained and audit records are kept with the Audit Program Leader.

Reference Material
ISO 14001 Standard (4.5.4)

Applicable Procedures
Environmental Management System and Regulatory Compliance Audits

16. Management Review

The Management Team reviews all elements of the EMS annually to ensure its continuing suitability, adequacy and effectiveness. Meeting minutes record these reviews and are kept by the EMR or designee.

These 16 EMS elements are common to most EMS models. It is recognized that each organization is unique and the key EMS elements will have different relationships with each unique organization. The potential costs both internally with staff and management time and externally with outside training and consulting assistance can be substantial, but the benefits of enhanced compliance, new customer/markets, increased efficiency/reduced costs, enhanced morale/public image, improved environmental performance/pollution prevention and employee awareness will far outweigh the costs. An EMS is introspective and management must be willing to find out more about their organization than they previously felt was possible. This commitment to the objectives and goals of the EMS begins a continual cycle of planning, reviewing and improving the processes and actions that are required by an organization to meet its environmental obligations.

IMPLEMENTING THE EMS

Once the EMS Manual is in place, the implementation and maintenance begins. There has been a great deal of interest and internal investment to develop the EMS and while it may be satisfying to see this effort completed, the real benefits and satisfaction come with the implementation. There are many challenges in the Implementation Phase.

The first challenge is keeping up the interest after the completion of the EMS system. There tends to be a letdown after completing one effort and beginning a new effort in a project oriented organization. Once again the issue of conducting a project, now an ongoing project, becomes difficult without an established budget. The cost perspective of an EMS implementation is a concern because of the potential negative impact of the company's profit margin or expenses within a government organization. This is more of a concern in more difficult economic times. The costs for EMS implementation should focus on minimizing the organization's current environmental costs, and should consider the manager's benefits of assessing the procedures and operations for additional savings. It is also important to keep up with competitors or stay ahead of other organizations that have an advantage by being ISO 14001 certified. While being environmentally friendly may do little for the organization and its location in the local community, the organization can announce to the government and industry clients and potential clients that the organization cares about the environment and their clients' environment.

Another challenge will be to include all employees at all levels of the organization in the EMS implementation. The importance of employee buy-in will be evident in the amount of success achieved. Organizations get caught-up in the day-to-day activities that all organizations experience and thoughts may drift to outputs, profits and losses rather than EMS and pollution prevention.

Continual improvement will bolster continuing commitment. The first benefit may come from using the records resulting from EMS, or having the legal requirements coordinated, or having a clear organized emergency preparedness and response procedure, or winning a bid because of an EMS. These benefits will fuel the enthusiasm for maintaining the EMS

ISO 14001 WASTE MANAGEMENT EXPERIENCES

The management and staff of Keystone Sanitary Landfill, Inc., the City of San Diego, and the Regional Municipality of Hamilton-Wentworth have experienced the development and implementation of an EMS. All three organizations embraced the structured process for achieving environmental compliance, pollution prevention and continual improvement. One striking commonality is the commitment by top management and employees to see this journey through the long process to certification. Their experiences are not unique in the development and implementation of an EMS and should serve as examples that solid waste disposal and management services like any good or service can be managed appropriately to meet environmental obligations. A capsule of each example is provided as follows:

1. Keystone Sanitary Landfill

The Keystone Sanitary Landfill, Inc. is located in Dunmore, PA. This facility became certified under ISO 14001 in June 2001. The EMS includes the key elements listed above in this paper and serves as the framework for Keystone Sanitary Landfill, Inc. to continually improve its operations, while meeting regulatory compliance and pollution prevention standards. The Pennsylvania Department of Environmental Protection has recognized Keystone Sanitary Landfill, Inc. as a benchmark for landfill

operations. Keystone Sanitary Landfill, Inc. hired Gannett Fleming to implement new policies and train employees. Employees were very active in the EMS development and accepted ownership of the implementation. Keystone management advises others that the process can be very tedious and it is ongoing. The internal and external costs of implementation may range between $50,000 to $90,000 therefore Sanitary Landfill owners should be prepared for this commitment. Fortunately, approximately 80 to 90 percent of the "cost" typically is internal and is almost all related to time that staff dedicates to building its EMS. The Keystone management believes the benefits far outweigh the costs, and after completing over a year of certification, the employees are using the tools and structure that are in place to move forward for continual improvements.[4]

2. City of San Diego

In March of 2002, the Refuse Disposal Division (RDD) of San Diego's Environmental Services Department, along with thirteen other governmental entities, concluded participation in a twenty-four month-long U.S. EPA sponsored "Initiative for Government Entities" pilot project. This project was designed to allow each participant to develop an Environmental management System (EMS) and to be in a position for certification to the ISO 14001 Standard at the program's conclusion. On July 31, 2002, the RDD received official notification that the RDD's Miramar Landfill had become the first municipality owned and operated landfill in the United States to successfully complete the rigorous certification process and be registered to the ISO 14001 Standard. This will enable the Department to reach the goals of continual improvement, prevention of pollution and regulatory compliance. The Miramar Landfill handles approximately 1.4 million tons of refuse annually and processes over 400,000 customer fee transactions per year. The EMS website provides a link with their EMS Manual and other EMS links. The web address is www.sannet.gov/environmental-services/miramar.

3. Hamilton-Wentworth, Canada

In March 1997, the Regional Environmental Department of Regional Municipality of Hamilton-Wentworth initiated a project to develop an EMS and seek registration to the ISO 14001 Standard. The Management and Disposal of Solid Waste was one of the five core business areas of the Department that was identified for incorporation within the EMS. A Gap Analysis was conducted in the summer of 1997 and it was determined the Department had in place about 65% of the requirements of the standard. The major gaps were: 1. Well -maintained records to provide evidence of standard procedures being followed and environmental issues being addressed. 2. A structured management plan to show how environmental issues are considered in setting work plans and budgets. 3. A lack of systematic auditing or review of management systems. The Regional Environmental Department's services for the management and disposal of solid waste includes:

- Operation of the Solid Waste Disposal Systems Incinerator, 3 Transfer Stations, & the Regional Landfill
- Operation of the Waste reduction Programs (residential recycling, leaf & yard, white goods, & household hazardous waste)
- Maintenance of 10 Closed Landfills
- Incinerator Emissions & Landfill Migration Monitoring
- Maintenance of the Solid Waste Bylaw, Special Projects, & Long Range Planning.

In January of 1999 the Implementation Team completed the final phase of establishing the systems for completing the cycle of continuous improvement. The development of the EMS is seen as something that must be done in-house. In January of 2001, the Mayor and Committee of the Whole endorsed the phased development of a corporate-wide EMS, which identifies activities that allows the organization to maintain awareness of and control over its interactions with the environment. An EMS Community Advisory Group was to be formed to work directly with the Environmental Management Team charged with the development and administration of the EMS and reporting to the City Manager. ISO

14001 registration will be sought for the City's EMS.[5]

CONCLUSIONS

Benefits from improved internal management and communication, environmental compliance, cost savings, pollution prevention, and improved client relationships will result from organizations taking the step toward ISO 14001 certification.

The development and implementation of an EMS can consume many person-hours. Contractor support to an in-house project can provide the necessary additional experienced manpower required to improve efficiency in implementing the EMS.

There is nothing magical about developing an EMS Manual and Program, but there are well-defined frameworks that must be followed to be considered for registration and certification.

SCS Engineers recommends an Environmental Engineering Overview to get your organization started in the right direction for developing an Environmental Management System that will provide cost-effective waste management sustainability options and environmental compliance.

Finally, the trend for organizations that provide goods and services is ISO 14001 certification. This is true for organizations that work with local and global clients. An EMS can assist an organization enhance community well-being, sustainability, economic vitality, pollution prevention, and environmental compliance.

REFERENCES

1. Ford Supplier ISO 14001 Awareness Workshop, EMS Workbook, Ford Motor Company, Revision #2, December 2, 1999.

2. Executive Order 13148, Greening the Government Through Leadership in Environmental Management, April 21, 2000.

3. Woodley Jr., J. P., Implementing Environmental Management Systems is Top Priority, *Defense Environmental Alert*, Issue December 18, 2001.

4. Padgett, C.B., LANDFILLS: Setting a New Standard, *Waste Age*, October 1, 2002.

5. Bekkering, M., Regional Municipality of Hamilton-Wentworth and McCallum, D., M&A Consultants, Developing an EMS to the ISO 14001 Standard for Municipal Government – The Experiences of Hamilton-Wentworth, Canada.
www.mgmt14k.com/articles/awma99.htm