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BEST PRACTICES FOR INTEGRATION OF ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEMS INTO SMALL TO MEDIUM SIZE BUSINESSES

THESIS

BY

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JANUARY, 2003

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF
THE DEGREE OF MASTER OF SCIENCE IN ENVIRONMENTAL, HEALTH AND
SAFETY MANAGEMENT.

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PERMISSIONS PAGE

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ABSTRACT

Small to Medium size Businesses (SMBs) are now confronted with a new challenge; “Would it be appropriate to implement and incorporate a strategic Environmental Management System (EMS) into their business?” SMBs have to live up to certain environmental responsibilities similar to large corporations. Major corporations are starting to favor suppliers that have a certified ISO 14001 environmental management system, so the question for many SMBs is, “Is it feasible to incorporate such a system?”

Industries currently face a certain degree of challenge when it comes to the environment, environmental performance, and demands by society for cleaner, more efficient processes. In SMBs there is always that question of feasibility, after all, to incorporate and change something it takes revenue. Limited SMBs budgets may present a problem, as may the limited environmental knowledge base of the staff. These problems are common when working with SMBs. This research explores this issue by reviewing literature sources and interviewing SMBs, and attempts to simplify a portion of the environmental management system process for SMBs by identifying successful practices employed by similar organizations to integrate a portion of strategic environmental management systems into their existing business systems.

Eight SMBs were interviewed as part of this work. Companies were selected on the basis of size, location, willingness to participate, and, most importantly, the presence of an operating environmental management system meeting the specifications of the International Organization for Standardization’s ISO 14001 environment system standard.

The findings of this research help evaluate the feasibility of implementing ISO 14001 in SMBs. The research also shows that ISO 14001 is becoming a trend in industries. This paper also argues that some SMBs are closer to ISO 14001 certification than they think because they have pre-existing systems in place that can drastically reduce the amount of time for the incorporation of ISO 14001. A Geographic Approach to Planning (GAP) analysis is used to determine what is lacking.

Key words and Acronyms

DEC – New York State Department of Environmental Conservation

EMS – Environmental Management System

EHSMS – Environmental Health and Safety Management System

EPA – Environmental Protection Agency

EIS – Environmental Impact Statement

ER – Environmental Researcher

EE – Environmental Interviewee

EP – Environmental Professional

GAP Analysis – Geographic Approach to Planning

H&S – Health and Safety

INEM – International Network for Environmental Management

ISO – International Organization for Standardization

ISO 9000 – Standard that defines, establishes and maintains an effective quality system for industries

ISO 14001 – A voluntary standard that specifies requirements for certification of an EMS

JSA – Job Safety Assessment

Large Business – Exceeding 250 employees

MSDS – Material Safety Data Sheet

OSHA – Occupational Safety Health Act

PDCA – Plan, Do, Check, Act

RCRA – Resource Conservation and Recovery Act

SMB – Small to Medium size Business (companies ranging from 10 – 250 employees)

VPP – Voluntary Protection Program

CHAPTER 1

INTRODUCTION

SECTION 1.1

Topic

The purpose of this study was to identify the best practices used by Small to Medium Size Businesses (SMB) to integrate ISO 14001-type environmental management systems into their existing businesses. ISO 14001 is the first in a series of standards that were developed by the International Organization for Standardization in response to the one of the recommendations coming out of the United Nations conference on Environment and Development (Earth summit, Rio de Janeiro, Brazil) 1992. It addresses environmental management and pollution prevention. Specifically, this standard sets forth the specification for certification of an environmental management system (EMS).

Significance of topic

- Identifying guidelines for implementation and integration models that work for SMBs.
- Determining the best method to implement an EMS in SMBs.

Reason for interest

This project provided an opportunity to discover how integrating, implementing and operations work for applying a new system in an SMB. Focusing on integrating ISO 14001 environmental management systems in SMBs provided an opportunity to explore how this may best be done and to develop a guideline to future implementation of any new program or system in a SMB.

Interest

ISO 14001 was mentioned and reviewed numerous times in undergraduate and graduate courses. As a student in the environmental field, the researcher can understand the need for an environmental, health and safety management system (EHSMS); it helps provide a framework that can be used to minimize an industry's impact on the environment. The EHSMS is an evolving trend in industry and developing efficient methods for its integration into older systems will help keep SMBs competitive. In addition, understanding what best methodologies to use when implementing the ISO 14001 system can help nations with developing industries to minimize and/or better regulate the impact of their industries on the environment.

Implementation and methods of training in order to integrate a system of any sort is a very important matter. The research aims to solve how to integrate a system into an operation by incorporating different SMBs strategies that work (best practices).

SECTION 1.2

Introduction

Examining the potential prospects for SMBs, there appears to be an emerging standard shift in environmental management. Previous environmental catastrophes have proven to be significant drivers for industries to develop voluntary environmental protection measures. These early voluntary systems gained popularity among industries across the spectrum creating a significant drive that was carried further by the development of the ISO 14000 Environmental Management Standards. The ISO 14001 standard, which specifies requirements for an environmental management system, is gaining popularity among major business as the preferred EMS in the global arena within different industries.¹ With worldwide popularity and growing numbers, the ISO 14001 EMS has become more globally accepted, causing more and more companies to require or encourage ISO 14001 certification among their suppliers.

This work, to determine the best practices for integrating a complete and functioning EMS in a SMB so that it may meet the criteria for certification of ISO 14001, is important because there is a lack of ISO 14001 certification, and indeed of strategic EMSs, among SMBs. This presents opportunities to further enlighten SMBs so that they are more competent on ISO 14001 and encourage them to implement and integrate the system into similar components that may already exist within their system and, perhaps, to expand on them to result in certification.

¹ "ISO 14000 is it time for you to become certified?" ISO 14000 Information center, Cappacio Environmental Engineering, Inc January 13, 2001, http://www.iso14000.com/implementation/iso14_cee_overview.htm

SECTION 1.3

The Problem

It is now evident that SMBs have to live up to some of the same environmental responsibilities as larger corporations. Yet, small and medium size businesses (SMBs) are challenged with a new dilemma of whether it is suitable to implement ISO 14001. Major industries are starting to prefer doing business with suppliers that have an ISO 14001 certification. If this is so, is it feasible to implement such a system? Businesses currently face a certain degree of confrontation dealing with government standards for environmental performance and the demands of the general public for uncontaminated, unpolluted and more efficient processes. Another aspect that must also be taken into consideration when trying to incorporate the system is cost. SMB discretionary budgets are small when compared to larger corporations and it is often found that SMB management often procrastinates when moving on to the next step in this regard. The growing interest in ISO 14001 is pushing many SMBs to examine and consider ISO 14001. With this in mind, the goal of this thesis is to help guide these SMBs with a synopsis of best practices used by SMBs that have already traveled the path.

CHAPTER 2

REVIEW OF THE LITERATURE AND BACKGROUND

SECTION 2.1

Review of the literature

The need for this work is evident in the literature and is most appropriately stated as follows:

“The literature published on EMSs is substantial and includes the ISO 14001 standard and . . . [numerous] papers, journals, and books covering EMS development, evaluation and review. However, these literature sources provide little insight into how to initiate an EMS”.²

Historical overview of the theory and research literature

Incorporating an EMS into an SMB operates with the principle of ISO 14001 being made to suit organizations of all sizes. The fact remains that there are very few SMBs to date that have ISO 14001 certification. The ISO 14001 EMS is flexible and should be compatible with SMBs, but the research has yielded little to no information regarding the incorporation of such a system. The existing research literature focuses on larger companies and groups however; the material found is very broad and vague. There is yet to be a best practices manual that specializes in the implementation and integration of ISO 14001 into SMBs. The literature review did not reveal the number of SMBs registered to the ISO 14001 standard and there is very little specific literary information available to suggest that there are many SMBs pursuing ISO 14001. The research literature was based on journal entries and websites that are currently updated to provide the author with the best information available. Publications that provided in-depth details

² Turkow, David, “A Guide for Initiating an Environmental Management System in Academia,” RIT thesis proposal, May 8, 2001.

were also reviewed along with interviews that had been conducted of SMBs that have already implemented ISO 14001 or are in the process of incorporating the system.

The theory and research literature specific to the topic

Various information exists that can be said to contain similarities to the theory of incorporating EMSs into any organization, including SMBs. This information is often non-specific and sometimes misleading. The background literature that was reviewed yielded very little to no helpful information regarding EMSs in SMBs, and no publications were found in the research conducted of EMSs and SMBs. The majority of the documents found regarding SMBs and their involvement are notes from websites and various articles describing “the problem”, the very issue the author is discussing. An example is the International Network for Environmental Management (INEM) stating that problems for SMBs fall in three areas “Company-internal obstacles to implementation, Company-external obstacles to implementation and the lack of user-friendliness of the standard itself”³ In the section under lack of user friendliness INEM states that “Because of lack of user-friendliness, SMEs think that it will be impossible for them to use the standard before everyone else does it”. The website that seems to be involved in informing the world of the shortage of EMSs in SMBs is the TC 207 web site.⁴ TC 207 is the Technical Committee that was formed in 1993 by ISO; it is the umbrella committee under which the ISO 14000 series of environmental management standards are being developed.⁵ It predominantly listed concerns and was helpful solely in providing statistical information and some case studies about which companies

³ INEM web site; February 2, 1999 <http://www.inem.org/htdocs/iso/jensen-sme.html>.

⁴ ISO/TC 207 web site; November 1, 2001 <http://www.tc207.org/articles/index.html>.

⁵ ISO/TC 207 web site; November 1, 2001 <http://www.tc207.org/articles/index.html>.

incorporated ISO 14001. The website failed to consider how or what processes were used to implement ISO 14001.

Throughout the years the Environmental Protection Agency (EPA) has been an advocate of helping SMBs and has developed a small business ombudsman.⁶ Their priority is on SMBs and the fact that they are capable of incorporating many of the systems that their larger counterparts have. In addition, they have sought to aid SMBs with numerous publications. The agency has noble motives, however, its purpose is defeated because the publication simply repeats the information aimed at larger organizations.

An article by INEM on “Identifying Obstacles to ISO 14001 Implementation” was excellent but only focused on obstacles and failed to address the entire implementation spectrum of EMSs in SMBs therefore lacking on the “what to do” aspect.⁷

As previously mentioned, the majority of books contained too much literature which based their information on larger organizations. These textbooks were insightful but not very helpful on the subject of the incorporation of an EMS into an SMB. The background literature itself may be available but it would take a lot of patience and it would be necessary to go through it with a fine-tooth comb to filter out the essential information. In short, to date there are no best practices manuals on incorporating EMSs into SMBs; this is concluded by the author’s research.

⁶ EPA policies assist small businesses with environmental compliance; Small business ombudsman web site; February 10, 2001 <http://www.epa.gov/sbo>.

⁷ Environmental Management Experts identify Obstacles to ISO 14001 Implementation in SMEs and suggest Ways to overcome them, web site; May 1, 1999 <http://www.environmental-expert.com/articles/article106/article106.htm>.

The current issue is that there exists a gap between SMBs and larger corporations.⁸ The gap is based on the fact that the majority of organizations registered with ISO 14001 are predominantly in larger industries.⁹ This reflects the gap in the literature where the majority of works are based on larger corporations and tailored to how larger corporations ought to incorporate an EMS.

A trend has developed in which the literature published about and for larger, well-known corporations, plays a role in encouraging more large organizations to develop and implement environmental management systems.¹⁰ This in turn provides more opportunities for case studies and results in even more works devoted to EMSs in large corporations. The market is thus saturated with publications intended for larger corporations, and little or none devoted to SMBs.

SECTION 2.2

The International Business Food Chain

Unlike their European counterparts, most small and medium size companies in Monroe County (the targeted audience) do not consider themselves to be part of the international business “food chain” and consequently see little reason to invest in the costly and labor intensive development and implementation of internationally recognized strategic environmental management systems (EMS) like the one specified under the International Organization for Standardization’s ISO 14001 EMS Standard. However, there is a rapidly increasing number of multinational firms, and large domestic firms

⁸ Environmental Management Experts identify Obstacles to ISO 14001 Implementation in SMEs and suggest Ways to overcome them, web site; May 1, 1999 <http://www.environmental-expert.com/articles/article106/article106.htm>

⁹ The ISO survey of ISO 9000 and ISO 14000 certificates-Ninth cycle, ISO/TC207 website, November 1, 2001 <http://www.tc207.org/articles/file4.pdf>

¹⁰ The ISO 14001 implementation guide: creating an integrated management system, Jackson, Suzan L., New York: Wiley, 1997

involved in international business, that are requiring their supply chains to do just that. Daimler-Chrysler recently joined Ford and GM and announced that any company intending to provide goods and services to the automotive giant would soon have to have an ISO 14001 EMS in place. The Xerox Corporation requires this of the top 5% of its suppliers. Eastman Kodak gives preference to suppliers with ISO 14001 EMSs. The list is growing.¹¹

Governmental Recognition and Incentives

On another front, governmental agencies have started providing benefits to companies that have ISO 14000-style EMSs. For example, Connecticut Governor John Rowland has signed into law “An Act Concerning Exemplary Environmental Management Systems” promising expedited permit reviews, reduced fees, less frequent regulatory reporting, a facility-wide permit for all approvals, and public recognition for companies that implement acceptable environmental management systems.¹² EPA requires companies to have EMSs in place as a prerequisite to participation in any of its voluntary programs.¹³ EPA also has a policy of waiving punitive fines for companies with environmental management systems that, in the process of conducting an environmental self-audit, discover they are in violation of environmental law.¹⁴ New York State has a similar policy for small NYS businesses.¹⁵

Efficiency and Economics

Finally, the positive correlation between implementing an EMS and reducing pollution, increasing production efficiency, and avoiding unnecessary regulatory fines,

¹¹ Morelli, John, “Monroe County Strategic Environmental Management Initiative.” MCSEMI proposal, June 2001.

¹² Morelli, John, “Monroe County Strategic Environmental Management Initiative.” MCSEMI proposal, June 2001.

¹³ Morelli, John, “Monroe County Strategic Environmental Management Initiative.” MCSEMI proposal, June 2001.

¹⁴ Morelli, John, “Monroe County Strategic Environmental Management Initiative.” MCSEMI proposal, June 2001.

¹⁵ Morelli, John, “Monroe County Strategic Environmental Management Initiative.” MCSEMI proposal, June 2001.

fees and assessments is illustrated well in the professional literature.¹⁶ Progressive companies have embraced the concept of pro-active pollution prevention, sometimes called "source reduction," to reduce pollution by addressing the problem over the life cycle of the product or service.¹⁷ The continual improvement element of the ISO 14001 EMS fosters such improvements at all stages of the life cycle.¹⁸ An effective EMS helps an organization identify the causes of environmental problems and eliminate them and saves money by reducing waste, increasing efficiency, and reducing the costs associated with environmental compliance and liability. "An EMS offers the potential to improve an organization's overall environmental performance, especially through pollution prevention and improved compliance."¹⁹

The Monroe County Strategic Environmental Management Initiative Mission

The Monroe County Strategic Environmental Management Initiative (MCSEMI) provides education and training to further improve EMSs at SMBs. Most small and medium size businesses that do recognize the benefits associated with strategic environmental management, are still daunted by the complexity of the implementation process and the cost of bringing in the expertise necessary to assist in developing it. The intent of the MCSEMI program is to assist small and medium size businesses in Monroe County, NY by providing appropriate training and guiding them through the design, development, and implementation of strategic environmental management systems.²⁰

¹⁶ Morelli, John, "Monroe County Strategic Environmental Management Initiative." MCSEMI proposal, June 2001.

¹⁷ Morelli, John, "Monroe County Strategic Environmental Management Initiative." MCSEMI proposal, June 2001.

¹⁸ Goodman, Sally L., "Is ISO 14001 an Important Element in BUSINESS SURVIVAL?" The Quality Magazine of Australia, June 1988.

¹⁹ Memo from Deputy Administrator Fred Hansen regarding responsibility of EMS development, December 16, 1997.

²⁰ Morelli, John, "Monroe County Strategic Environmental Management Initiative." MCSEMI proposal, June 2001.

Motivations

The motivations for implementing an EMS range from “planning for the future” to “we are being pressured by some clients to become ISO-certified.”

Some domestic companies in Monroe County plan to enter the international markets within the next five years and believe that having a certified ISO14001 EMS will lend credibility that they would not otherwise have being unknown entities in the international marketplace. In addition, a handful of companies are aware that effective environmental management systems can reduce waste generation pollution and their associated costs, however they have yet to discover what is involved and how to implement it.²¹

SECTION 2.3

ISO 14001

The ISO 14000 series of management system standard (ISO 14000) is a relatively new voluntary Environmental Management System (EMS). ISO 14000 was preconceived at the United Nations Conference on Human Environment in Stockholm in 1972.²² The conference determined that a global action plan on the environment was a requirement at the worlds’ request. Following the conference, the Brutland commission published a report on the environment entitled, “Our common future.” The report identified the need for global dedication to sustainable progressions and effective environmental management. ISO formed an advisory group in 1991 to research EMSs and to make suggestions to ISO on an environmental management standard. Subsequent to the 1992 Earth Summit Conference in Rio De Janeiro ISO formed a technical

²¹ Morelli, John, “Monroe County Strategic Environmental Management Initiative.” MCSEMI proposal, June 2001.

²² Cascio, Joseph, *The ISO 14000 Handbook*, CEEM Information Services, ASQC Quality Press, 1996

committee (TC207) in 1993. The committee's task was to develop the standard. ISO officially implemented the ISO 14000 series of EMS standard for standardization in 1996. The endeavor to expand and embrace the standard consisted of a consortium that involved over 40 countries and attempted to include potential stakeholders worldwide. ISO 14000 standards had been developed with the following fundamentals in mind:²³

- Enhanced environmental management.
- Universal adaptability for implementation capabilities in all nations.
- Promotion of extensive interests of the public and the users of the standards.
- The need for it to be cost effective, non-invasive, and accommodating, thereby allowing them to meet the different needs of organizations of any size worldwide.
- Suitable for internal or external verification.
- Must encompass practicality, usefulness and usability.

²³ ISO/TC207 web site; November 1, 2001 <http://www.tc207.org/articles/index.html>

The ISO 14000 series is comprised of two categories of standards-Process/Organization standards and Product oriented standards (Figure 2.1).



Figure 2.1

The ISO 14001 EMS standard is a system that is intended to advance performance beyond government regulation and in due course contributes to sustainable development. The system is based on the Plan-Do-Check-Act (PDCA) cycle.²⁴ It is by means of this sequence that the EMS will result in continual improvement in environmental performance. ISO 14001 standards consist of 5 main categories containing 17 separate elements (Table 2.1).²⁵

²⁴ Cascio, Joseph, The ISO 14000 Handbook, CEEM Information Services, ASQC Quality Press, 1996

²⁵ Cascio, Joseph, The ISO 14000 Handbook, CEEM Information Services, ASQC Quality Press, 1996

ISO 14001 REQUIREMENTS
4.0 Environmental management system requirements
4.1 General Requirements
4.1 Environmental Policy
4.3 Planning
4.3.1 Environmental aspects
4.3.2 Legal and other requirements
4.3.3 Objectives and targets
4.3.4 Environmental management programs
4.4 Implementation and operation
4.4.1 Structure and responsibility
4.4.2 Training and awareness
4.4.3 Communication
4.4.4 Environmental management system documentation
4.4.5 Document control
4.4.6 Operational control
4.4.7 Emergency preparedness and response
4.5 Checking and corrective action
4.5.1 Monitoring and measurement
4.5.2 Nonconformance and corrective action
4.5.3 Records retention
4.5.4 Environmental management system audit
4.6 Management review

Table 2.1

The EMS follows the PDCA cycle for improvement in environmental performance (Figure 2.2²⁶). Section 4.0 of the ISO 14001 standard sets the requirement for a facility EMS. It necessitates that the organization be committed to environmental performance improvement, and the objectives and principals of environmental

²⁶ Carey, Ruth E., Elements, The ISO 14001 EMS Element Cycle, website, March 2000
<http://www.successfuliso14000.com/Element.htm>

performance are recognized for the participating facility. This section of ISO 14001 provides direction for the EMS while affording a facility the freedom to create its own performance standards. Performance standards must include a system to maintain compliance with applicable regulations or other applicable standards.

The 14001 EMS Element Cycle

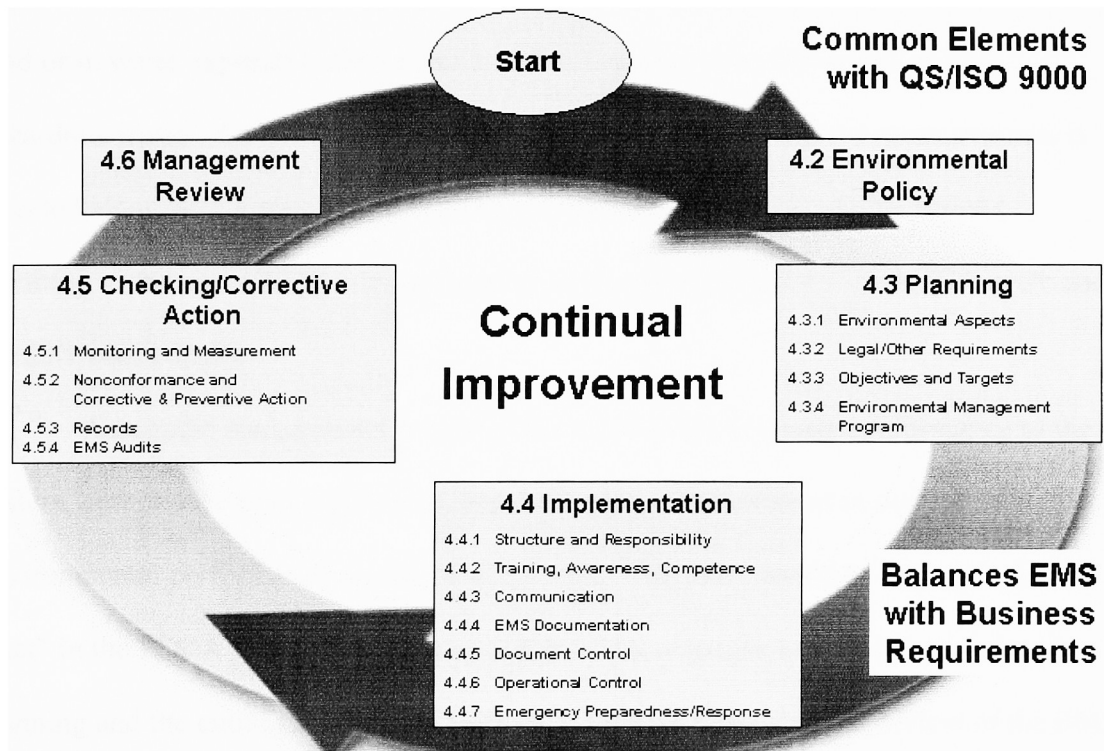


Figure 2.2

Section 4.3 “Planning” is one of the most significant aspects of the ISO 14001 standard. All aspects of environmental impact of the operation and regulatory compliance assessment have to be measured and identified. These can be very time consuming, technically demanding, and expensive. Once the assessments are complete, section 4.3 requires expansion of environmental policies as well as the extent of performance criteria, objectives and goals.

Section 4.4 deals with the “Do” portion of the PDCA cycle. In section 4.4 resources and accountability are assigned. Development of the tools and training required to meet the necessities of the EMS are part of the “Do” procedure. The method includes the documentation process, procedures, operational controls and emergency preparation plans.

Checking is achieved through the observation of emissions, discharged wastes on land or in water exposed to the environment or disposed of as hazardous or non-hazardous waste. An EMS information system that tracks all of these measurements is directed along with a structure to follow-up on any corrective preventive actions. Auditing of the entire EMS is a requirement of the checking part of the PDCA cycle and the ISO 14001 EMS.

A periodic management review of the entire EMS to insure conformance to the system, compliance with regulations, and continuous improvement in overall environmental performance should be conducted. The latter would be the equivalent of “Act” in the PDCA cycle. This assessment provides response to the persons doing the planning and the entire process continues. It is through this executive review of the EMS that the management insures the companies’ objectives are accomplished and that sufficient resources are devoted to meet these objectives.

The ISO 14001 EMS is expected to meet the intentions of the original ISO advisory group and develop an EMS that could be globally directed to enhance environmental performance. This would be based on the PDCA. The significance of the ISO 14001 EMS is that it is versatile that it can be implemented by any organization worldwide of various ranges (small-large).

SECTION 2.4

Implementation status of ISO 14001

Initially the ISO TC 207 vision encompassed a benchmark that would achieve global recognition in all industry sectors and businesses of all sizes.²⁷ Various articles from 1996 - 2001 propose that the ISO 14001 EMS will spread and be implemented in the same manner as the ISO 9001 standards. The ISO 9001 series has over 340,000 companies registered in 150 countries worldwide as of the end of 1999. The acknowledgment of ISO 14001 in 1996 proved to raise the number of registered companies. Figure 2.3²⁸ below shows the top ten countries and the number of companies registered in each country for June 1998.

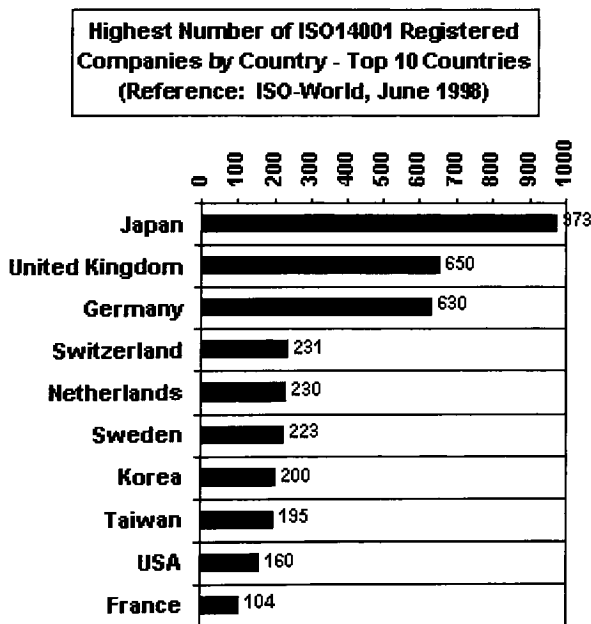


Figure 2.3

²⁷ Cascio, Joseph, The ISO 14000 Handbook, CEEM Information Services, ASQC Quality Press, 1996

²⁸ Murray, Paula C., Inching toward environmental regulatory reform-ISO 14000: Much ado about nothing or a reinvention tool?, American Business Law Journal, Austin, Fall 1999.

Figure 2.4²⁹ illustrates the ISO 14001 registrations since 1995. Registrations worldwide have increased at an average rate of 75% per year after 1997. As indicated by the data, the US is lingering behind other countries in incorporating ISO 14001 with only 5.6% of the registrations worldwide as of the end of 2001.³⁰

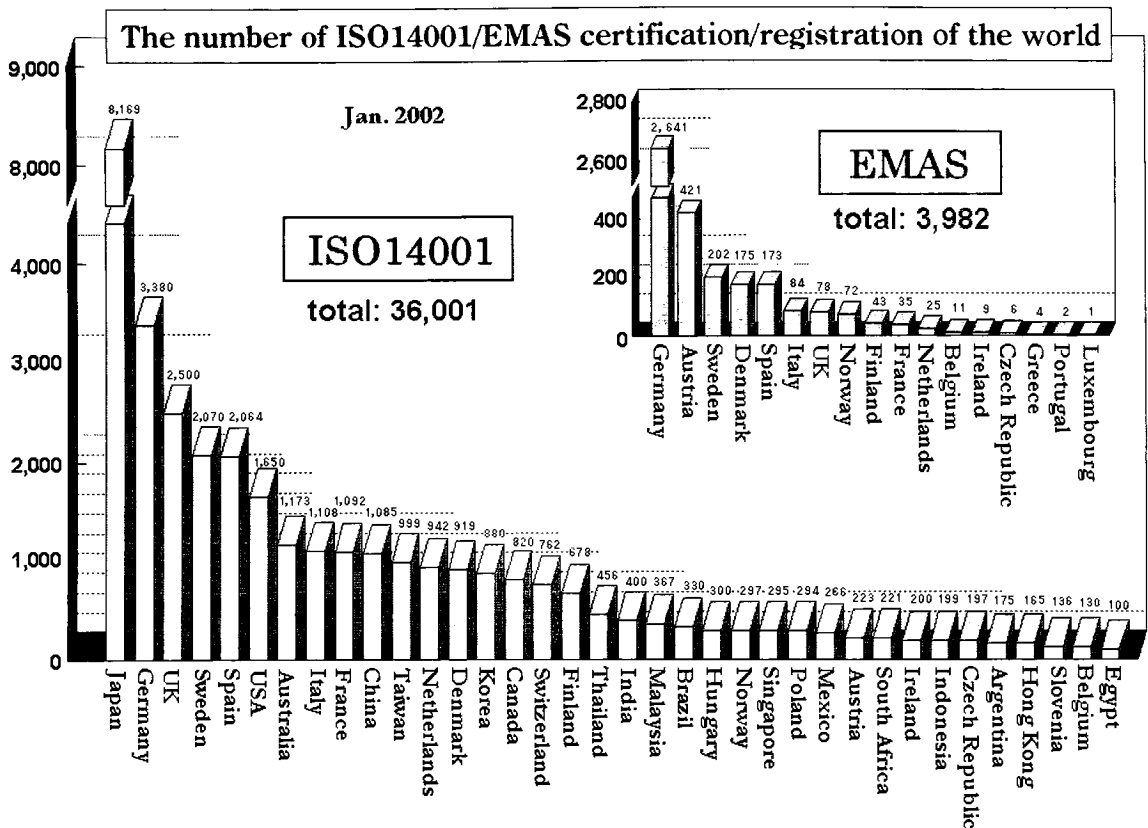


Figure 2.4

The ISO 14001 EMS can be incorporated in an industry and self certified for conformance purposes, or it can go through third party certification and registration. There is also no record on the quantity of SMBs registered to the ISO 14001 EMS. However information found on the ISO TC 207 web site identified the need that support is required for SMBs to incorporate ISO 14001. There is insufficient detail available but

²⁹ Should you be ready for ISO 14001?, ISO 14000 Information Center, Capaccio Environmental Engineering, Inc, 2001 http://www.iso14000.com/implementation/iso14_consider_cee.htm

³⁰ The number of ISO 14001/EMAS certification/registration of the world, ISO World website, Tsujii, K. Director, January 2002 <http://www.ecology.or.jp/isoworld/english/analy14k.htm>

the author suspects the reason for this is that SMBs have encountered very low numbers of official recognition to date.³¹

³¹ The ISO survey of ISO 9000 and ISO 14000 certificates-Ninth cycle, ISO/TC207 website, November 1, 2001
<http://www.tc207.org/articles/file4.pdf>

CHAPTER 3

METHODOLOGY

SECTION 3.1

The objective was to evaluate the methods by which small and medium size businesses involved in designing, developing, and incorporating strategic environmental, health, and safety management systems, implement those systems. Because of the small number of SMBs that have implemented EMSs, survey-based research was deemed inappropriate for this work. Qualitative research methodology was the best suited in this investigation, namely, the in-depth, semi-structured interview which produced the best results as it allowed the interviewer to explore more areas where the interviewee had a greater depth of knowledge. This proved to be helpful, reliable, and especially useful when seeking to verify, validate or solicit comments on data acquired from other sources.

Limitations

- The “facts” collected represented only part of the picture. As a result of this development being new and sensitive to feedback, the extent to which the author “believed” that what the interviewee did was the right thing to do at this time influenced its chance of success.
- Second, the perceptions of each individual are shaped by a different set of factors. The interviews provided the opportunity for the interviewer not only to identify these influences but in certain instances to make some assessment regarding their relative strengths.

*Note: The basic research methodology was adopted and adapted from previous similar work conducted by Dr. John Morelli in “ISO 14000: A catalyst for reinventing the EPA”, 1997.

Sampling Strategy

An effective sampling strategy in this situation was to begin with identifiable and accessible key individuals (identified through a review of the literature) and every interview included reconnaissance questions (e.g., is there anyone else that you think I should talk to about this? Would you introduce me to this person?). This sampling strategy is known as snowball sampling and its strengths lie in its effectiveness at identifying individuals and organizations central to the research as well as in identifying social networks associated with the investigated topic.³² Through this method, the sample interviewee list grew (snowballed) over time providing more and improved information sources. When additional significant resources were no longer being identified, it provided a useful indication that the field research needs were fulfilled.

Organizations investigated included small and medium businesses (SMBs) which had been ISO14001 certified or are in the process of obtaining certification; large organizations involved in assisting SMB; and SMBs interested and/or in the process of developing an EHS management system. Individuals that had been interviewed within these organizations included corporate-level officers, managers, auditors, environmental directors, and other participants in the design, development, and implementation of an EHS management system. Relevant individuals involved in ISO leadership were also interviewed.

³² Lindlof, Thomas R., "Qualitative Communication Research Methods", pg. 127-128, SAGE, 1995.

Protocol and Logistics

Study subjects were approached in the following manner.

The researcher (ER):

- Prepared for the interview by researching information connecting the interviewee (EE) with the research topic.
- Called the EE and briefly explained the ER's status as an M.S. candidate in RIT's Environmental, Health, and Safety Management program.
- Stated the ER's interest in interviewing the EE and explained the interview process.
- Sent an introductory letter to the EE with an attached questionnaire of the interview.
- Followed-up with a second call to establish the time and date of the interview.
- Traveled to the location of the EE's whenever possible.
- Offered to provide EE with summary information on the finding of this work.
- A letter of thanks was sent.

Human Subject Protection

The ER did the following:

- In advance of the interview, the ER provided each EE with a written statement introducing and providing the rationale for the research project, and describing the semi-structured interview procedure to be used by the ER.
- In advance of the interview, the ER provided each EE with background information on the ER.

- Before beginning the interview, the ER requested permission to record the interview on audiotape for the sole purpose of enhancing the ER's note-taking ability.
- Explained that the EE may request that any part of the EE's response be kept confidential or off the record.
- Explained that the EE may turn off the tape recorder at any time during the interview, or not use it at all.
- Showed the EE how to shut off the tape recorder and place the recorder within the EE's reach.
- Kept the audiotapes secure and inaccessible to others outside of this study.
- Erased the audiotapes after the ER was through transcribing and analyzing their contents.

Coding & Analysis

Coding is central to a developing analysis.³³ It is a process of identifying data elements in terms of where and why they relate to the topic under investigation. It provided a means of tagging data elements so that they could be pulled back together providing us with a theoretical building block to substantiate a theory, to refute one, etc. There were two basic steps in the coding:

1. Tagging the data element with one or more appropriate codes.
2. Placing the coded data element into a corresponding file where other like-coded elements existed.³⁴

³³ Lofland, John and Lyn H. Lofland, *"Analyzing Social Settings"*, pg. 186, SAGE, 1995

³⁴ Lofland, John and Lyn H. Lofland, *"Analyzing Social Settings"*, pg. 187-188, SAGE, 1995

Each of these steps involved analytical elements. Determining an appropriate code for a data element required we develop some understanding of what the datum was and what it represented. Filing it resulted in a fine-tuning of the category description. Obvious categories for coding an interview text would include an individual's title or position, the category or organization he or she represented, identification of the question being asked (see appendix). Codes, which categorized responses to interview questions and text extracted from archival sources, were developed during analysis. Initially, interview data was segregated by question and arranged and coded across the range of responses in each area. Archival text was coded to indicate support or dissention with respect to the responses.

The Constant Comparative Method (CCM) of data analysis was conducted concurrently with coding efforts. Following the process developed by Glaser and Strauss,³⁵ data categories were developed and defined as discussed above. As category definitions are fine-tuned and strengthened, relationships among them were discerned and used as building blocks for theory. When additional data elements have little to add, major themes were documented. CCM was used to organize text and to develop an initial hypothesis, which was then developed further and strengthened using the more rigorous Negative Case Analysis methodology (NCA). The CCM/NCA analysis was supplemented and supported by triangulation using multiple-use interview and multiple-source data texts. Member checks were performed for the verification of specific explanations or clarification of interpretations. Additional discussion on these analytical methods is included in the sections on Reliability and Validity below. Coding to ensure

³⁵ Glaser, Barney G. and Anselm L. Strauss, "*The Discovery of Grounded Theory: Strategies for Qualitative Research*", pg. 105-115, Aldine, 1967.

good housekeeping of data coincides with the activities described under Reliability below.

Reliability & Validity

The reliability of the research effort was a measure of the consistency of the results when the research instrument was used repeatedly in the same way to evaluate the same event. Inconsistencies in the application of research methodologies pose the greatest threat to reliability in qualitative research.³⁶ In *Interpreting Qualitative Data*, David Silverman addresses reliability in qualitative research observations, texts, interviews and transcripts.³⁷ With respect to observational studies he recommends, amongst other things, that notes be systematized to avoid inconsistencies and that expanded notes be made as soon as possible after each field session in order to avoid or minimize errors that could arise from the later misinterpretation of notes. This is clearly evident when trying to make distinctions among verbatim quotes, paraphrases and contextual interpretations. Concerning the analysis of existing texts (i.e., prepared bodies of data), he alerts the reader that a lack of 'inter-rater' consistency among analysts of the texts will lead to inconsistencies and consequently produce unreliable results. He identifies interview reliability as a central issue in qualitative research and highlights the importance of consistent interview schedules (i.e., sets of interview questions, prompts, etc.) and consistent understanding of the questions by the interviewees. To achieve interview reliability, he again recommends 'inter-rater' reliability checks as well as interview schedule testing, interviewer training, and maximum use of fixed-choice answers. Finally, Silverman identifies transcripts of audio recordings of interview

³⁶ Lindlof, Thomas R., "*Qualitative Communication Research Methods*", pg. 237, SAGE, 1995.

³⁷ Silverman, David, "*Interpreting Qualitative Data*", pg. 145-149, SAGE, 1994.

sessions as satisfactory for ensuring transcript reliability and documenting data collection procedures. Each of these recommendations are presented and discussed below with respect to their application to this research.

- Systematize note-taking conventions.

In order to eliminate or minimize contextual misinterpretations, all interviews conducted for this research were audio taped. Correspondingly, field notes were taken to identify body language and gestures that may impart additional meaning or understanding to the text or to highlight topics that needed to be revisited either during the interview or in connection with other sources that corroborate or challenge the text. Simple abbreviations were used, when needed, to describe gestures or facial expressions associated with specific topics that appear to convey. Verbatim transcripts of audiotapes were prepared using systematic conventions to delineate contextual variations.

- Expand notes as soon as possible.

When interviewing, we reread field notes as soon as possible after each interview and elaborated upon areas needing additional detail. Strategies that worked well or that did not work were identified. We transcribed audiotapes and annotated transcriptions with field notes, comments and references to other corresponding text within 48 hours or less when possible. If transcription was not possible within one week of an interview, we replayed the tapes and took additional notes elaborating on any areas that might become confusing with time.

- Perform ‘Inter-rater’ reliability checks.

The single most significant factor in minimizing inconsistencies in the application of research methodologies in this work is, the involvement of only one individual. Eliminating the interpretative filters of multiple interviewers, transcribers and analysts will amplify and enhance each of the strategies described above. For the purpose of the actual research we used a team of four individuals who contributed to different interpretations of the research. This caused too much inconvenience due to the segregation of ISO 14001 and how it pertained to each individual. These steps were followed.

- Maximum use of fixed-choice answers.
- Developed and implemented a consistent interview guide.
(See appendix)
- Strived for consistent understanding of the questions by the interviewees.

To the extent possible and without significantly impeding the natural flow of information, we followed the prescribed interview schedule. However, while a standardized open-ended interview format including previously prepared questions is advisable for interviewees with limited available time,³⁸ the interviewer considered how each individual would interpret the questions being asked. Understanding of a question varied from one person to the next depending upon how the person “saw” the world and perceived the motives of the interviewer for asking the question. This would have created

³⁸ Patton, M.Q., *“Depth Interviewing,”* How to Use Qualitative Methods in Evaluation, pg. 113, SAGE, 1987.

a dilemma for us who were interested both in a consistent understanding of the question and in the interpretative differences among the interview subjects. In preparing for each interview, we assessed the implications of the interviewee's position (e.g., director of corporate environmental affairs, commissioner of environmental protection, etc.) We considered this information in preparing for each interview, with the emphasis remaining on providing interviewees with a consistent understanding of the questions. In cases where such consistency was inappropriate (e.g., because it would force the interviewee to respond in a manner inconsistent with his or her own vision or understanding), or impossible (e.g., because the interviewee will not respond to the question as asked), we would attempt to determine the basis for this aversion, although this scenario almost never occurred.

Establishing rapport, imparting a sense of trustworthiness, and creating a context for expressing feelings, opinions and communicating knowledge and opinions early on in the interview is helpful in engaging the interviewee.³⁹ Toward this end, we initiated each interview with a casual, candid and value-neutral description of the purpose for and nature of the research, and with a fairly general, non-controversial first question prefaced by a narrative describing a relevant and historical event and establishing a context for the response.

When additional areas of inquiry or area-specific issues were uncovered, we decided to add to the interview schedule for subsequent interviews, these additions were, to the extent possible and reasonable, positioned in the question sequence so as to minimize the disruption of the information flow in the set of questions and probes.

³⁹ Patton, M.Q., *"Depth Interviewing,"* How to Use Qualitative Methods in Evaluation, pg. 120, SAGE, 19

- Document data collection procedures.

Taken together, the research guide, audiotapes and field notes adequately documented data collection procedures.

Validity

The validity of the research effort was the measure of the extent to which the findings and conclusions of the work accurately explained the activity under investigation. Also, it asked whether the right thing was being measured. Carefully and incisively identifying and evaluating competing interpretations of the data established validity of qualitative research data. Lindlof provides four proven methodologies involving this strategy: Triangulation, Negative Case Analysis, Member Checks and Quitting the Field.⁴⁰ Each is presented below and discussed with respect to their application in this research.

- Triangulation

This method compared multiple sources of information about an object of inquiry. Data was derived from multiple use of a single method (e.g., in-depth interviews), single (or multiple) use of multiple methods (e.g., interviews and examination of archival texts), and the use of multiple investigators. Triangulation provided both a credible means of verifying data and developing concepts. The use of multiple methods was the most common approach to triangulating research text. In the most common approach (i.e., multiple methods) explanations were derived from one method, from among those employed, they were enriched or qualified by text generated using complementary

⁴⁰ Lindlof, Thomas R., "*Qualitative Communication Research Methods*", pg. 238-242, SAGE, 1995

methods. Although multiple-investigator methodology introduced additional variables to the study, it was used to take advantage of the strengths and to compensate for the weaknesses of individual analysts.

Silverman argues that attempts to develop and validate explanations by aggregating data taken in different contexts ignore both the ‘skillful character of social interaction’ (i.e., does not recognize the fact that different methodologies can elicit different responses to what essentially may be the same question), and the differences in boundaries imposed by each methodology.⁴¹ He suggests that this concern can be addressed by triangulating methods and data only to the extent that they focus on the understanding of why an event is occurring rather than how.

Multiple-use of in-depth interview methodology and use of multiple-methods (i.e., in-depth interviewing and examination of archival text) were applied in this investigation as the principal strategies for validating this work. Alternating between these methodologies provided us with opportunities to identify essential information sources, refine investigative strategies and verify data. The analysis of areas of convergence was directed toward understanding why, rather than how events were occurring.

- Negative Case Analysis (or Analytic Induction)

The Negative case analysis was an iterative process in which the hypothesis was formulated, then tested by applying it to a case or to data generated during the research, modified as necessary to accommodate the data, tested against new data, modified again, tested again, and so on until a universal relationship was developed. Silverman suggests

⁴¹ Silverman, David, “*Interpreting Qualitative Data*”, pg. 156-188, SAGE, 1994.

that in qualitative research, analytic induction replaced the quantitative function of statistical testing; since hypothesis development continued until all the data fit, random error variance is eliminated and statistical analysis becomes unnecessary.⁴²

Both Lindlof and Silverman identify Glaser and Strauss' Constant Comparative Method (CCM) as appropriate for developing the initial hypothesis for use in Negative Case Analysis (NCA). Glaser and Strauss differentiate between the two methods by making the distinction that CCM is used to develop, but not prove, a plausible hypothesis about a general problems, and NCA is concerned with developing and proving a universally applicable theory about a specific behavior.⁴³

In this research, both methods were used, as suggested by Lindlof and Silverman, for initial development of a plausible hypothesis, and NCA for further refinement and verification. Since the outset, development of the methodology has involved an evolutionary process resulting in several significant adjustments both to the lead research questions and to the conceptual area of inquiry itself. Much of this is attributable to the need to narrow the conceptual area of inquiry to a manageable topic.

Application of the constant comparative method provided an evaluative framework for focusing on the substance, or aspect, of the topic. At each stage of this evolution, data coding categories were created in which elements of each observation were placed (the first step in CCM), revealing areas of depth and potential significance and beginning to provide the dimensions and theoretical properties of these areas. This sometimes resulted in a shift away from the original area of inquiry and toward new areas

⁴² Silverman, David, *"Interpreting Qualitative Data"*, pg. 161, SAGE, 1994

⁴³ Glaser, Barney G. and Anselm L. Strauss, *"The Discovery of Grounded Theory: Strategies for Social Research"*, pg. 104, Aldine, 1967.

identified through this process. When the dimensions were revealed as too large for this undertaking, the unit or aspect being examined was narrowed.

In our initial observations of this study we revealed a perceived need for a decision-making model for US manufacturing industries to use in determining an appropriate level of voluntary environmental performance. Exploring this need revealed the possibility that development of voluntary international environmental management standards in the private-sector (i.e., ISO14000) could create competitive disadvantages for domestic US companies. Investigating this possibility revealed the importance of identifying the benefits that voluntary environmental performance could provide for domestic companies. Recognizing the excessive breadth of such an undertaking, the range of related potential benefits were narrowed to those associated with relief from regulatory requirements. Delving into this area of inquiry highlighted the need to understand the relationship between voluntary private-sector environmental performance and regulatory programs. Pursuing this need revealed the newness and complexity of some of the issues being brought to light because of these voluntary actions and disclosed the inadequacies of current governmental environmental protection strategies and infrastructure in the US. Examining the nature of the inadequacies led to the recognition that an increasingly global economy is driving the US industry toward more or elevated levels of voluntary environmental performance, calling additional attention to the problem and creating a situation in which environmental regulatory reform will be an unavoidable outcome.

- Member Checks

While warning that no one member of a culture is fully informed about his or her culture, Lindlof suggests that member checks can be a useful way to test or validate hypotheses, explanations or interpretations presenting them to members of the culture.

Member checks were used in this work to test a particular interpretation or explanation or simultaneously as a prompt to determine a response to a proposed hypothesis.

- Quitting the Field

When the new data was consistent with the hypothesis or explanation, it required no modification and provided no new surprises, the study had reached a point of theoretical saturation. It was time to review what had been done and end the project.

This work ended when a point of diminishing returns was reached to the extent that new information duplicated what already was known and no significant modification to the hypothesis or explanation was required.

- Interview Guide

Integration and implementation of EHSMS interview guide

1. How different was the integration of EMS than any other system integrated into the management system?
 - ☐ Why is it different?
2. Are E and HS systems in the organization integrated?
 - ☐ If so, could you explain the system as to what portions are integrated?
 - ☐ How was it decided?
3. How did you integrate your EMS and OHSMS and the EMS/OHSMS into your organization?
 - ☐ Who needs to be involved?
 - ☐ How are their roles incorporated?
 - ☐ How is the progress reported?
 - ☐ How often is it done?
 - ☐ What occurred as far as operations went?
 - ☐ With having done implementation and integration what procedures should be avoided and what should be done differently?
4. In implementing and integrating EMS/OHSMS into operation what obstacles/opportunities were faced?
 - ☐ How were they overcome?
 - ☐ If you were to do it again what would be changed?
5. What resources are usually stressed upon when implementing a management system?

Where they the following? How would you rate the importance of each factor on a scale of 1-3
Where:

- 1- Very important
- 2- Important
- 3- Can do without it

People	1	2	3
Money			
Equipment			
Any other (specify)			

6. What materials were used as a guideline for implementing the management system?

Where they the following? How would you rate the importance of each factor on a scale of 1-3
Where:

- 1- Very Helpful
- 2- Helpful
- 3- Minimal Help acquired

Case studies of similar industries	1	2	3
Related case studies			
Report (specify kind)			
Any other (specify)			

CHAPTER 4

RESULTS AND ANALYSIS

NOTE: The results and analysis section contains data obtained from interviews conducted based on the interview questionnaire. The names of the companies and full names of individuals interviewed will be kept confidential. The position of the individuals will be given as well as the positions of the industries that were interviewed.

The interviews were conducted with eight representatives from these industries: plastics industry, two electroplating industries, ink industry, beauty products industry, magnetic materials industry, turbine industry, and waste-to-energy facility.

SECTION 4.1

Case: How is integrating an Environmental Management System (EMS) into an organization different than integrating any other management system?

The relevance of differentiating between an EMS and any other system in place is, in part, to determine whether or not that industry has overlapping content prior to initiating ISO 14001. This would make integration less demanding on existing resources.

Integrating a management system: This can be defined as adding value to an existing environmental management system. It is the rallying up of predominant existing resources and placing them into one body linking them and formulating them into a lifeline that is tailored to the needs of that industry, helping it become more efficient.

Change is always difficult

Throughout the various interviews conducted, difference of integration was not as much of an issue as was the change in culture. This is due to integration overlapping in a lot of the same areas as opposed to culture which permeates the organization, and which needed to occur before integration could effectively take place. Addressing culture in a company is vital in any corporation since, in order for an EMS to be effective everyone has to be involved. Such involvement will be considered during any evaluation of the EMS, and ultimately may make the difference whether or not the company receives certification under the ISO 14001 EMS Standard. As stated by an environmental chemist interviewed at an electroplating industry “change is always hard”. He indicated that when implementing a new system, in order for that industry to be in conformance with its guidelines, the employees must know the guidelines and abide by them. Becoming aware of the environmental aspects associated with a company’s products, services, and activities will be a new area of attentiveness for many employees and they will have to become sensitized to the importance of this matter before they commit to it.

Developing this awareness would be a good place to begin integrating the ISO 14001 EMS into the organization. Integrating through this process could help offset the uncomfortable feeling for many employees who are locked into certain habits associated with their work routine or with other required standards such as OSHA.

To better help with cultivating this new culture, all the industries provided training for their employees on ISO 14001, emphasizing the importance of a good EMS and the company's commitment to it. For the majority of the industries, none of the trainers had to repeat themselves, the guidance of ISO 14001 was quite clear. In presenting what an EMS could do for the industry and how it could help in both the long-term and short-term, an Environmental Affairs manager for an industry that manufactured turbines stated, "I had a couple of people come up to me after the meeting and say they knew more efficient ways to cut down on waste, I even had people calling up their previous employers to see what methods they were using for a cleaning solvent that had less of an environmental impact".

The industries interviewed all claimed to have a certain introductory training session for the EMS in order to indoctrinate their employees. This reduced the apprehension of an oncoming management system that was unfamiliar to them and explained the basis for ISO 14001.

An effective technique for integrating an EMS would be to initially hold informal introductory EMS classes by the head of the industry's Environmental Team or a representative that has taught ISO 14001 lectures to better help the employees understand and know the EMS and how it can benefit the company. As stated by almost all of the environmental professionals, training sessions should take 2-4 hours. The workers should

receive training initially on the issues that include a short process on how to do things, the different aspects of recycling, learning about waste streams and not confusing them, and an awareness program about the ISO 14001 itself to make sure they know what regulatory issues may be involved in that area.⁴⁴

Initial integration difference

The environmental professionals interviewed explained that during the initial process of integration with the ISO 14001 Standard, difficulties would always arise and that the availability of adequate time is continuously an important concern, since a schedule always has to be met.⁴⁵ The smaller of the industries would not have as many problems due to the size, approximately 25-30 people.⁴⁶ With the exception of a waste-to-energy incinerator plant and an electroplating company, the majority of the industries interviewed had been ISO 9001 certified prior to implementing ISO 14001. The ISO 9000 is a Quality Management System that deals with organizing the company's methods of communication internally so to make matters more efficient. It focuses on documentation control as well as Quality Assurance; the ISO 9000 standard revolutionizes methods of doing business since many enterprises accept it when conducting business with a client. In Asia, Europe and now the United States it has spread to non-manufacturing companies as well, since the majority of firms value its document control.

The industries' previous certification of ISO 9001 had greatly helped them understand the ISO concept and what third party auditors would be looking for during an

⁴⁴ "Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

⁴⁵ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

⁴⁶ "Interview with magnetic materials industry" S. Brisson, Quality Assurance Manager, Western NY Summer 2001

⁴⁶ "Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

ISO audit.⁴⁷ This also helped build a better working relationship and understanding with the auditor. The ISO 9001 QS is likely to be already in place in a lot of industries but is not a prerequisite to the ISO 14001 EMS. Regardless of whether ISO 9001 QS or ISO 14001 EMS are initially in place, the system which is first put into operation would be the hardest system to implement due to Documentation Control which is included in each standard.

Regardless of which system is implemented first, it may seem as though the next system to be implemented would be less strenuous. It is true that initially any new system without a base is difficult to implement. For this purpose, the author has accumulated information on industries with ISO 9001 certification before ISO 14001 implementation. The exception to the interviewees are an electroplating industry that decided to implement both systems at the same time and a waste-to-energy facility that decided to integrate ISO 14001 without having any other ISO system in place. The Environmental professionals claim that it is much simpler to go through the 14001 EMS than the 9001 QS because of the way ISO has clarified it, informing them what the exact requirements are. The 9001 QS is unspecific, but details a step-by-step approach and requires a lot more work to implement. This is because there is more paper work involved and it is very large in comparison. The usual issue with ISO 14001 is that the industry already has their own environmental system in place and the EMS duplicates a lot of it. The good thing about having the ISO 9001 in place is that certain sections overlap so when the time comes to implement the EMS, documentation control would

⁴⁷ "Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

only need a little tweaking. The one electroplating industry that had decided apply for ISO 9002 and 14001 at the same time barely looked at the QS. The company had decided to split the two up. They only had intermittent dealings in order to save time. The company had integrated ISO 9002, which is an adaptation of the ISO 9001. It is no longer a step-by-step approach but is structured like the ISO 14001 EMS, which is helpful to future SMBs in incorporating ISO 9000 with less trouble. They would be extremely comfortable with the language if they were to implement ISO 14001.

Having the ISO 9000 in place would make the project less strenuous. It would be more helpful if the company has ISO 9002 in place because according to the majority, ISO 9001 was much harder to implement because of its unfriendly user protocol.

Strategy for progress

There can be three strategies for progress: 1. Implement ISO 9002 and once certified start implementing ISO 14001; 2. Implement ISO 9002 and ISO 14001 at the same time; and 3. Implement ISO 14001. (These strategies are recommended since the majority of companies interviewed besides two had already incorporated the ISO 9001 system and that the majority of industries world wide whether SMBs or large corporations have already adopted the ISO 9001 system. The author does not state that a company wanting to implement an EMS should consider a quality system. The company should have already implemented these strategies because the majority of competing companies already have a quality system. This may better help them to integrate and implement the ISO 14001 system. This is due to documentation control a part found in both ISO 9001 and ISO 14001. This task is usually the most strenuous but can be simplified.) The Ninth cycle published by the International Organization for

Standardization states that ISO 9000 is indeed more popular in numbers than ISO 14000. The United States is the second highest country in the world to have ISO 9000 certificates while ISO 14000 certificates trail as the sixth highest in the world. (See figure 4.1 and 4.2)⁴⁸

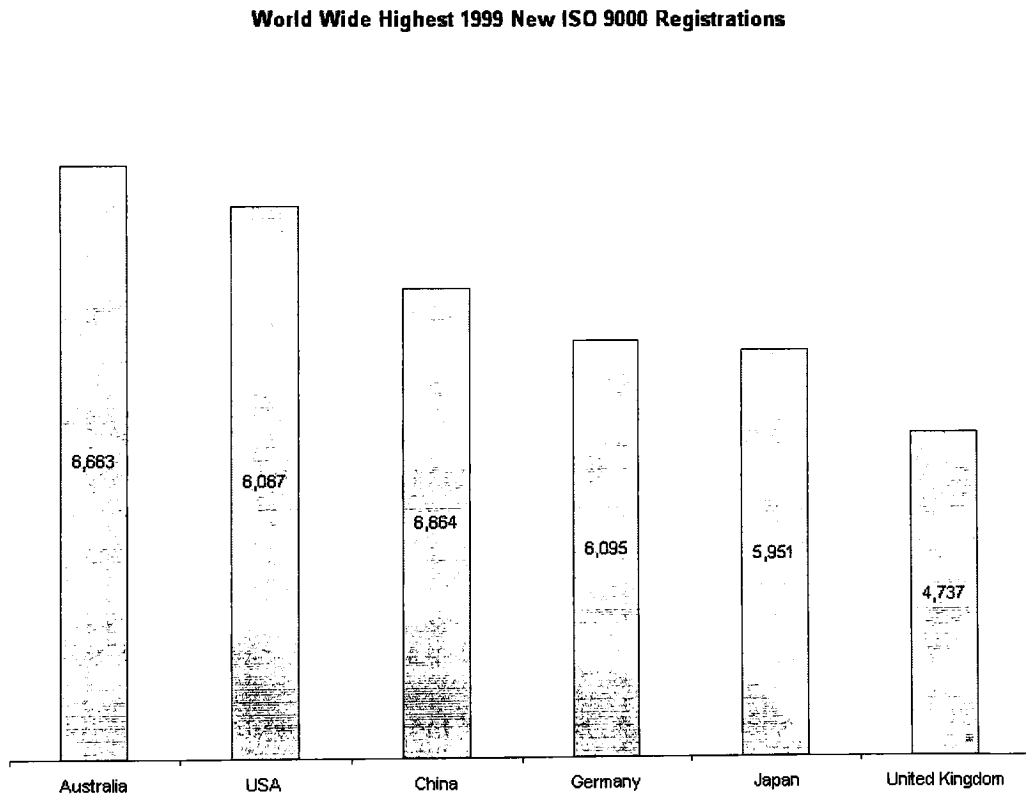


Figure 4.1

⁴⁸ The ISO survey of ISO 9000 and ISO 14000 certificates-Ninth cycle, ISO/TC207 website, 1999
<http://www.iso.ch/iso/en/commcentre/pressreleases/2000/www.iso.ch>

World Wide ISO 14001, 1999 Highest New Registrations by Country

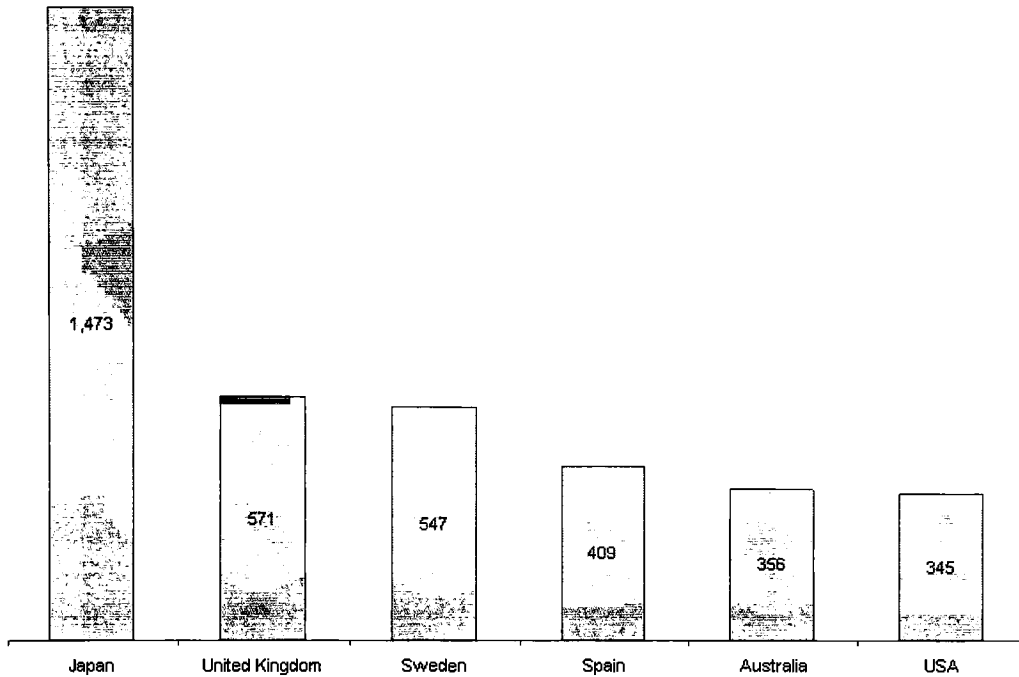


Figure 4.2

The benefit with strategy 1 is that the company is familiar with the systems. The company would have exposure to ISO 9002, familiarity with this system leads to the smooth adoption of ISO 14001. Initially it may take a little work to implement both systems directly after one another but it will all come together nicely towards the end. The benefit with strategy 2 is that it will be cheaper to get an auditor to certify the company you at one stage instead of having the auditor come at different times. If time is an issue, this is a recommended strategy. Trying to implement something this fast may need more work with training to make sure that everyone is aware of the two systems. The third strategy would be to implement what you need. If the company needs the ISO 14001 EMS and does not feel it wants the QS, it should go ahead and integrate it and

potentially making ISO 9002 less strenuous if that were to come into play after ISO 14001 integration.

Involving Outside Help

With the exception of two companies, the majority of interviewees had outside help in one form or another in the form of a professional consultant or a fellow associate who had gone through the process at some other stage.

Hiring a consultant can be expensive, but can be considered essential due to time constraints. If a consultant and an employee can give you the same quality of work, the employee is obviously someone to choose since it is more resourceful. The employee will stay on with the company to take on further opportunities that may arise such as educating other employees. This learning process can then be filtered down to would-be managers who may do the same thing within the company. It is more cost effective and efficient because the employee is also familiar with the industrial process. This is clearly said with training in mind. The employee has to be trained in ISO 14001 to ensure that the EMS requirements are implemented and maintained.⁴⁹

It is often helpful to have an employee who has background experience with ISO. Four of the industries interviewed had employees who worked on ISO 9000 before exposing themselves to ISO 14001. For the most part, the same team who were originally allocated to make ISO 9000 work were also chosen for the same task with ISO

⁴⁹ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001
"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001
"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001
"Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001
"Interview with magnetic materials industry" S. Brisson, Quality Assurance Manager, Western NY Summer 2001
"Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001
"Interview with Electroplating Industry" M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001
"Interview with Waste to Energy facility" Environmental Engineer, Western NY Summer 2001

14001.⁵⁰ Assigning the team leader to attend an ISO training program along with a team member may prove to be an intelligent approach to doing business with ISO. Although textbooks are a good source, clarification might be needed, as some textbooks are not coherent enough for an implementation guide.⁵¹

Options to integrate with outside help are to:

1. Hire a consultant to give lectures on EMS to employees. Get the consultant to look over the existing system by performing a gap analysis and then allotting precise information on what to do in order to integrate and implement ISO 14001. Have some employees learn in the process by requesting that they assist the consultant.⁵²
2. Train a handful of employees (2-8) by sending them for two-day lectures.⁵³
3. Ask larger partner companies that have mutual business to send delegates to instruct you on what to do and train.⁵⁴
4. Headquarters can pass guidelines to the subsidiaries on what approaches are to be taken.⁵⁵

⁵⁰ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

⁵¹ "Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

⁵² "Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

⁵³ "Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

⁵⁴ "Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

⁵⁵ "Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

"Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

5. Affiliated companies that have common business interests who are ISO 14001 certified can help by sending their information, documentation, and a representative to the other.⁵⁶

⁵⁶ “Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001
“Interview with Turbine Industry” D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001
“Interview with Ink Industry” D. Maternowski, General Manager, Western NY Summer 2001

SECTION 4.2

Case: Should Occupational Health and Safety be incorporated into the ISO 14001 EMS?

The relevancy of asking whether incorporating H&S into ISO 14001 is to determine whether or not it is possible to combine them under one umbrella.

Can we incorporate H&S into ISO 14001?

In answering this question, the majority of interviewees stated that they had integrated health and safety (H&S) into the EMS because they could not separate such an integral part.⁵⁷ For the general manager at an ink producing industry, it was better to integrate H&S while there was room for it, even though ISO 14001 does not require it. The general manager claimed, “We have incorporated it. It’s not perfectly “isofied” and throughout 3rd party audits the auditors are like ‘that is H&S, we cannot audit it’”. It is clear that 3rd party audits will not touch H&S. Once you have placed even a small part of H&S into ISO 14001, even if it may seem to work perfectly, they will not touch it. This is because it is H&S and is not part of ISO 14001. This has been the case for all the industries interviewed. It is much easier for a small business to integrate both Environment and H&S (due to the close knitting of the two in a small environment). A lot of the larger companies choose to keep them separate although on paper they can clearly see the advantages of combining the two. When conducting an interview with a larger company, the company stated that in the future it would definitely like to see the two combined and that the only thing preventing the merger would be financing the integration between the two.

⁵⁷ “Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001
“Interview with Electroplating Industry” M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001
“Interview with Ink Industry” D. Maternowski, General Manager, Western NY Summer 2001

How do we incorporate E, H & S

In small companies where a lot of people have more than one responsibility, it is easier to incorporate H&S into ISO 14001 (partly because it is small and with more responsibility comes vast knowledge and the inner workings of the facility). For example an environmental chemist at an electroplating industry stated;

“It is two-thirds of the environment, I didn’t have all of the H&S concerns, our maintenance supervisor looks for the H&S at the plant, it depends too on what the concerns are. For example, the hazardous communication, which is an OSHA standard, is my responsibility, MSDS (Material Safety Data Sheet), spill prevention they are all under my responsibility. Specific items like machine guarding and confined space, more of the mechanical aspects are the supervisors’ responsibility. Some of the procedures like the confined space procedures, specialty training items and fire extinguishers they fit right in the stuff. The items like machine guarding, fall injuries, they don’t fit as well. We came across some things where they need some improvement; they come and do something like OSHA inspection so you have to just fix whatever you find. Our maintenance manager has the responsibility of OSHA monitoring; he also has the title of lead internal auditor so it’s a lot easier to make it a 14001 procedure e.g. hazardous waste handling there are three different regulations we are talking of EPA standard, RCRA standards, transportation regulation also OSHA regulations. We had it all in one procedure, and each procedure had a separate paragraph. So it’s pretty much the same so it’s the advantage in the small company you have multiple people doing multiple things so you can see how things work out.”

This example revealed how small companies may be looking to integrate the two. The second example is from an environmental engineer at a waste-to-energy facility who spoke about integrating H&S and the Environment in the field that he was part of. He commented that, “As certain things overlap, like the safety contingency plan and emergency preparedness which are audited by safety people; checking to see that everyone was trained and trying to put that into document control so that it can be verified, this is how we are slowly trying to integrate the two but there is no guarantee.” Although there is no guarantee that there will be a complete integration and the auditors will not audit any incorporation of H&S in ISO 14001 it can be done efficiently and effectively so as to maximize resources and minimize complications e.g. excessive paperwork, dealing with two separate departments and time management.

One system two philosophies

It is the author’s assumption to say that a lot of the companies interviewed and a lot more industries are suggesting that they incorporate the two under one heading for simplicity, time, and better interaction between the two, since a lot will argue that they are linked. (This statement is derived from the overwhelming similarities in the raw data taken from the interviews conducted). It is very likely that the two be linked; another suitable example is the Environmental Affairs Manager at a turbine manufacturing company. When asked about having integrated the two he replied, “Yes we have; in fact we used Lloyds Registry. They also did our 9000 they were 9000 people but I gave them our info and we learned up front that the 14001 is only a standard for environmental and Lloyds told me that no matter what you put into your system, they can only look at the environmental portion of it. So we got to thinking and we put everything that I am

reading into perspective it is like environmental health and safety is coming whether it is 18000 or some other form of system so we said that we might as well put it into place. We focused on environmental for a year but what we did is we called it the health safety and environmental system. Then we went ahead and we got certified so now what we are doing instead of doing EIS (Environmental Impact Statements) is we are doing JSA (Job Safety Assessments). Those again are a combination and some of the machine operators are doing some of those evaluations so not only is that good for this program but it was good from a union management point of view. This is because we got those people directly involved so what we are doing now is we are using the same 14001 structure. We are going to go through our 19 environmental procedures that 26 safety procedures we are going to use the same document control and same internal auditing. The internal auditor is going to go out and look at it and we have included the safety so if he goes through the process not only will he identify the safety issues but he will identify the environmental issues. Obviously it is a liability somebody can get hurt if it is something long range it will have to be audited every six months at some point in the future we will have everything in there.” H&S is always an issue that has to be addressed when integrating ISO 14001. It is essential due to its parallel relationship with the environment.

Best Practices

In order to make the most of integrating an ISO 14001 EMS, taking some extra steps is the appropriate way to approach this. The usual factor in taking extra steps consists of adding a portion if not the majority of H&S into the ISO 14001 equation. Although it is not part of the criteria, it may become part of the requirement in the next

rewrite of ISO 14001 to come. Various industries that were interviewed had amalgamated the two into one system because it was feasible to do so.⁵⁸

Even though ISO may not require H&S, it can successfully be integrated into the system. The benefit of following this process is the rationale behind it. The rationale is that they are closely related and require little to no modifications, as the process is easier to understand. The main agenda should always be ISO 14001 since it is the template that should be used. If H&S were to be integrated, it could never be audited under ISO registrars or any third party auditor. This will not hurt the certification process and the SMB will still be able to achieve ISO 14001 registration and certification without any trouble. In any case, it is suggested to have more than just enough. The methods for integrating H&S into an EMS are very logical. The upcoming are various methods of integrating H&S. Initially one should look over the H&S regulations from OSHA or any other regulatory agency that has H&S standards when reading these regulations one must notice any overlapping of the environmental regulations. The overlapping can be used to insert the H&S into the EMS. Expanding on it can be used to incorporate more approaches. It can also be done vice versa where an environmental standard may have mention of H&S. This should be followed through to expand into the H&S. Another method that is used as an example is the JSA as it is capable of venturing into the environmental field. These examples can be used within various industries; there are other solutions but those are industry sensitive. This section has stated that it is worth the

⁵⁸ "Interview with magnetic materials industry" S. Brisson, Quality Assurance Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

effort to include H&S into an EMS as it will only further the company's goals in the future and it does not infringe on ISO's specifications for implementing an EMS.

SECTION 4.3

Case: How to integrate an Environmental Management System into an organization

The relevancy of asking this question is to find out what methods were used in the actual integration stage e.g. who was involved and how was it done and who pressed to implement the EMS.

Where to start

In the first section there was a discussion of culture and how it needs to be addressed during the initial stages of integration. This segment comes in as part of the initial training. A Chief Environmental Officer at an electroplating industry remarked at what gradually needs to be prepared, “You have to do a lot of training, a lot of communication and basically you have to treat people comparable to assets and they have to see evidence over time that they still are valued. When you write these systems they start to think, and sometimes the company makes mistakes of saying ‘oh yes this system’. You know once we have this system they feel they have a threat to their jobs.”

Assurance to the employee is the most important step in the initial process.

With this in mind, the team assigned to integrate and implement ISO 14001 to the company has to know the standard well. It is necessary for environmental professionals to be involved with knowledge of EPA, DEC, state laws and regulations (industry sensitive).

The process should begin by the examination of the standard and assessing what processes are in place. Many industries already have an EMS in place but it can be considered part of their environmental awareness or a subsidiary requirement, this was the case for two industries that were subsidiaries of larger corporations based out of

Japan.⁵⁹ There are few industries that have not taken the initiative to have something done about their performance in order to eliminate potential fines when dealing with runoffs, potential spills and emissions. This is the case with various industries in the United States, where a home grown phenomenon of being precautionous and environmentally cognizant of certain processes that may lead to environmental impacts. These present a negative reflection on the images that are set to the public. The integration itself is very industry sensitive, in some areas there needs to be more information on intricate processes aimed at covering all possible scenarios. In this respect the integration of an EMS will always be unique to that area of operations since no two-implementation and integration strategies are the same. As previously stated the management system should be familiar to the team members and they should realize what laws and regulations apply so they can set up the EMS accordingly.

Gathering information based on what processes are in place requires a team that is well aware of the procedure of operations. This may be a reason to avoid using a consultant since the consultant maybe unfamiliar with the industry or process. The team leader should already be aware of the processes and have ample knowledge of the deficiencies in the existing strategy. The team leader is usually the head environmental professional (EP) in the company, but it is not always necessary to have the head EP as the team leader. Exception can be made where the EP delegates the tasks of running and setting up the task force to a junior EP in order accomplish the integration.⁶⁰ At times the head of the company realizes that it is necessary to have the majority of previous team members who had worked on implementing a former ISO standard like ISO 9000 to

⁵⁹ "Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

⁶⁰ "Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

implement the EMS due to their familiarity with ISO.⁶¹ As previously discussed this is advisable and can be quite helpful. The other members of the team should be educated in the EMS and should undergo training as illustrated in the previous sections. The managers should be educated to better understand the concepts and to help the team with the implementation. It is also essential that the entire plant be aware of the developments so they can gradually accept the changes and ensure that ISO 14001 is properly integrated into the industry. Other roles to consider when allocating tasks to implement ISO 14001 are the roles for Document Control, Training, Structuring, EMS Documentation, Communication, Operational Control and Emergency Preparedness and Response as demonstrated in section 4.4. (Implementation and operation of the ISO 14001:1996 standard). These guidelines must be addressed if the company wishes to be measured for ISO 14001.

Progression through 14001

When it came to reporting progress, much of the information obtained led the author to believe that it would be common for the team leader to report directly to the president of the company and sometimes even go a step further and relay the progress to corporate HQ in the case of a subsidiary.⁶² This is an interesting factor which illustrates how involved and concerned the superiors are with achieving ISO 14001 certification. It is important to consider that although the team performing the brunt of the work, their superiors will undoubtedly give them all the assistance they need to complete the task by

⁶¹ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

⁶² "Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

a given deadline. Adhering certification is a very tedious job and time will vary depending on the size of the facility. Reporting progress weekly can help accommodate better resources to implement ISO 14001.⁶³ This can be seen as both a top-down and bottom-up strategy. Top-down in the sense that HQ needs it done and supplies the resources, and bottom-up where all the work floor employees and managers are educated while an EMS binding the entire company from the bottom (industry process) to the top (conveying the public image). Reporting progress should be a continued practice throughout implementation and after the EMS is initially in place. It is important to see what may look good on paper and what may actually prove to be a better process to follow. This is why reporting the progress is key to integrating an ISO 14001 EMS.

Procedures: what to do and what not to do

Part of the interview questionnaire asked the interviewees what procedures should be avoided and what should be done differently if they were to go through it again. The answers vary from industry to industry but there was a basic concept that remained consistent. The majority of interviewees agreed that being headstrong and not seeking support from anyone was a common ground. This was a definite setback since no one person constantly has the answers and there are always people or organizations that may be of assistance.⁶⁴ It is also important to remember when implementing ISO 14001 that it goes beyond the team of people who are working on it; without any assistance the team will struggle and will fail to get off of the ground.⁶⁵ Another issue that was also raised by the team members was education. An environmental affairs manager who worked in the

⁶³ "Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

⁶⁴ "Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

⁶⁵ "Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

turbine industry stated, “I struggled with it [ISO 14001] for about six months trying to educate myself to do whatever amount of training I could. I talked to other managers about getting on board and the biggest thing that I would have done different is to get all the people involved from day one.” The interview conducted with the Chief Environmental Officer at an electroplating industry stated some of his recommendations, “We had gone to see a few companies, looked at their management systems, and got involved with the local ISO group that meets once a month and discusses issues. The big issue is we brought a consultant on board. However, it’s knowing your own operations and knowing what the standard requires. After that it’s being able to bring them together in a way that is functional and not a bunch of paper, it’s really got to work. So it can’t be a bunch of theory because once it gets down on the floor people are going to try and do it. And you can see construction done by people that are all theory and it’s just not good if you are using it on a day to day basis having people write this stuff and review it is really, really important.”

In order to approach integration in the right manner, you need education. Education is the key. It was repeated throughout all the interviews conducted. Whether it is educating your team, educating the staff, president, or the managers, it has always been the proper method of integrating and implementing such a system. A statement from an interview with an Environmental Safety Supervisor in a beauty products industry declared, “Let the managers know all the aspects with creating a brand and their impacts accordingly so that if we had a foresight of things it could be better managed. It is easy to come back but it would cost a lot more relatively ISO 14001 betters this approach”. It is the educated manager who creates a product when producing it, acknowledges all the

risks involved, and fashions the product with little to no effect on the environment.⁶⁶ As mentioned and stated before, education is integral to making ISO 14001 a success in any industry, at any given time and in any given location.

When questioning which procedures to use and which to avoid, all the industries declared to follow the ISO 14001 guidance as stated in the ISO 14001 guidebook as not very long and it is quite simple in comparison to any other system. The guidelines should be followed and nothing should be overlooked. The ISO 14001 cannot be implemented without using everything in the guidelines. There are no shortcuts in avoiding certain steps and none of the industries interviewed were willing to take the time to try.⁶⁷ The Continual Improvement Manager at a plastics industry reaffirmed this by stating that their integration was done by following guidelines, hiring a consultant and reading published literature on 14001.⁶⁸ This demonstrates that following through the guidelines is important in starting and finishing the integration as well as in the implementation of the process.

If you were to do it again what would you do?

This question left the interviewees thinking of what could have been improved. There were similar responses across the board. A lot of the interviewees made a remark such as, “when following the guidelines given by ISO, you do not really encounter any problems”. The responses were similar to those in the previous section where the

⁶⁶ “Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

⁶⁷ “Interview with plastics industry”, D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

“Interview with Electroplating Industry” M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

“Interview with Ink Industry” D. Maternowski, General Manager, Western NY Summer 2001

“Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

“Interview with Electroplating Industry” M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

“Interview with Turbine Industry” D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

⁶⁸ “Interview with plastics industry”, D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

majority stated the need to get on the ball as soon as possible and further educating or training all those who will be involved.

Some of the things that were said include:

- A lot of training and a lot of communication⁶⁹
- Training of managers in the environmental field⁷⁰
- All information that gets passed on needs to be communicated⁷¹

As seen there is a lot of repetition with other sections in the report and this reiterates the importance of training and communication. This also shows that the majority of industries were seeking more in terms of these criteria before implementation in order to facilitate the flow during integration. Communication is key and people have to become aware of what is happening and what changes may have take place so they become accustomed to the manner in which things operate.

So how is it done?

As previously illustrated, the only one way is by following the guidelines issued by ISO to integrate the ISO 14001 into an industry. Within that guideline there are several different methods an industry can use which are entirely industry sensitive due to the different processes involved within their particular industry. These are some steps showing how it is done. The following is one method to examine, and is the author's given best practice after reviewing all the evidence in this case.

1. Read published literature and get comfortable with the ISO 14001 guidelines.
2. Familiarize yourself with ISO 14001 and how it pertains to the processes at the industry level (look for similarities of systems in place).

⁶⁹ "Interview with Electroplating Industry" M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

⁷⁰ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

⁷¹ "Interview with Waste to Energy facility" Environmental Engineer, Western NY Summer 2001

3. Review industry processes in place and communicate comprehension.
4. Get involved with your local ISO group.
5. Send key element of people involved to ISO 14001 training.
6. Educate, Train and Communicate at all levels of your organization.
7. Evaluate whether or not consultants are needed.
8. Begin writing EMS that is unique to industry.
9. Communicate all problems and opportunities that arise.
10. Constantly review the guidelines and systems in place.
11. Communicate all changes and educate on changes made.
12. Begin integration and implementation. *

From the above we can derive that it is a continuous learning process and that everybody will reach a point where they will know the system well in conjunction with the environmental standards that pertain to the facility. This will in turn save a lot of resources and contribute to a better environmental image among industry partners and customers combined.

* The above stated steps are a best practice based on the authors opinion solely derived from the information received by interviewing various industries throughout this project.

SECTION 4.4

Case: What obstacles and opportunities are faced when integrating an EMS into operation?

The relevancy of asking this question is to determine whether or not there is a method to bypass any obstacles that have become a trend in integration and to determine if there are any opportunities as a byproduct of the obstacles through the integration and implementation process.

Where is the obstacle?

Individuals in charge of a certain project like CEOs, project managers and team leaders often question themselves and the people they work with by asking, “what is the obstacle?” The process needs to continue without any hesitation. There needs to be an achievement and an end product. This question has a variety of answers since no obstacle is the same and the obstacle can be based on multiple varying roots ranging from the culture at a company to the type of industry run by the company.

Initially there has to be a gap analysis to see what would be missing from the overall future EMS. Once that is established there are usually no foreseeable obstacles, which is what the company anticipates. Eventually the company is bound to have overlooked something small that may be the root of the difficulty in the integration of the EMS. At times eliminating what would be the root of all the trouble can actually contribute to the greater good of the EMS and it may reinforce what may arise in the next EMS edition several years later.

“Initially when the obstacles were encountered, the biggest obstacles were justifying the cost...”⁷² At first glance the ISO program for implementing and integrating 14001 seems lengthy and tedious. This combination can lead to added expense if the

⁷² “Interview with Turbine Industry” D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

program is not kept on schedule. One advantage of the ISO or any EMS is that the majority of companies have a lot of preexisting components and that is required to fill in the blanks. This is one method of saving time and ensuring that cost does not skyrocket. If a good and in depth gap analysis is done, the company can save money before it starts by identifying the existing programs in place which require adjusting and the ones that do not yet exist for the system to be in place. The quality of the existing environmental programs makes a difference and will continue to do so in the future.

“The obstacles that were faced included managers having improper training and not being aware of the environmental field and did not have experience....”⁷³ As covered in the previous sections, education is essential for all those involved with 14001 or any other EMS. Involvement in ISO 14001 is continual and therefore learning the requirements of the standard and understanding the organization and its processes is essential. Training is always a key issue in order to ensure that everyone is comfortable with his or her knowledge of the EMS. “I struggled with it for about six months trying to educate myself trying to do whatever amount of training I could. I talked to other managers about getting on board. The biggest thing that I would have done different and I always said this, get all the people involved from day one.”⁷⁴ Training, awareness and competence are three words represented by ISO 14001 and these words should be turned into action in order to ensure success amongst the organization when trying to implement the EMS. Identifying training needs and catering to those needs by development of more in depth guidance and education is key when setting up training awareness.

⁷³ “Interview with plastics industry”, D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

⁷⁴ “Interview with Turbine Industry” D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

“I think the hardest part was to get the employees to change a set of pattern of what they were doing, accepting the change and applying it; something that they had been doing for 15-20 years they get into a certain mindset/habits while you try to explain something like waste management what does anyone care as it goes to a landfill. Now if you know that the waste needs to be segregated this means more work so there is a typical resistance. Then we have to get everyone to realize that it is a ISO 14001 requirement.”⁷⁵ Resistance to change, fear of a new culture being developed, and the prospect of not being able to keep up can initially hamper the significance of an EMS which is why awareness is needed along with the training. Communicating with the employees to reassure them and educating them in terms of incorporating an EMS supports payback for the entire group of employees and the community in general. This can be reaffirmed through what an Environmental Safety Supervisor at a beauty products industry said: “I think it was more to do with the mind set-up in other words explaining and getting the employees to work differently; I think it exists across industry; maybe it’s the “American worker” they think they are overworked and underpaid; to me if you give them something more to do they always say so what’s in it for me? ISO 14001 is nice because when you cut your recyclables you cut your dependency on the landfill, you improve your recycling, and you get a payback. Then it’s possible for you to give a Christmas bonus or a raise. And the employees recognize that it is something constructive, and that’s what you have to do to cross this bridge.”⁷⁶

⁷⁵ “Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

⁷⁶ “Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

“Document control was the biggest obstacle, also making sure that all the information that needs to be passed on is communicated.”⁷⁷ This industry that was interviewed did not have ISO 9001 when they were trying to incorporate ISO 14001. As discussed previously ISO 9001 quality standards usually do a good job of making document control in ISO 14001 as an obstacle obsolete. If it has already been implemented then documentation control and communication should not be a problem. A communications system has to be set up since communication is very important to all parties involved. In some instances ISO 9001 may not be in place but other channels such as Voluntary Protection Programs (VPP) or other preexisting systems can be used. There is bound to be a channel that an industry can build on, if not, the company should identify its needs and incorporate those appropriate channels to integrate and implement ISO 14001 through proper structure and responsibility (ISO 14001:1996 4.4 Implementation and operation 4.4.1): “Roles, responsibility and authorities shall be defined, documented and communicated in order to facilitate effective environmental management.”⁷⁸ This is the basis for communication since without roles and responsibility in any hierarchy there would be chaos and it is therefore quite self-explanatory that it is essential to have everyone communicate. It is communication that leads to organization and documentation. Communication techniques should be reviewed annually and revisions for the improvement of the EMS should be made in addition to revisions for documentation in the EMS manual.

⁷⁷ “Interview with Waste to Energy facility” Environmental Engineer, Western NY Summer 2001

⁷⁸ “ISO 14001”, 4.4 Implementation and operation 4.4.1, 1996

“I think I would be the biggest obstacle, I thought that I knew everything that I needed to know about the system standards and regulations but I didn’t.”⁷⁹ This example is crucial because one cannot integrate ISO 14001 alone. Everyone must be trained and all must be educated as to what the bottom line is when it comes to ISO 14001. If all are educated then they will be able to contribute to integration and implementation. It is not for one person or division of the company but it is for the entire company. The company and industry should begin by developing an environmental awareness by being constantly aware about the environment and how any change may affect it.

A window of opportunity

When trying to achieve a goal not all things encountered are unpleasant, in fact there are usually opportunities that are presented. Certain prospects in the implementation process are the ability to design the ISO 14001 EMS around the company and the ability to adjust everything that is needed to suit the needs of the company and its culture. Since ISO 14001 is universal throughout the company and everyone is exposed to it, it brings different levels of skill together for the better of the EMS. Middle management and regular employees can provide indispensable information on the EMS. Environmental responsibility is shared within the company from top to bottom and roles will develop from compliance with regulations and laws to incorporate direction and instruction for all the employees involved. “I couldn’t look at any integrating issue and tell that they were obstacles, I will just say the opposite it was beneficial.”⁸⁰ For the most part many of the obstacles were presented to industries as opportunities which they could learn from and make use of by turning them into an opportunity. The majority of

⁷⁹ “Interview with Ink Industry” D. Maternowski, General Manager, Western NY Summer 2001

⁸⁰ “Interview with magnetic materials industry” S. Brisson, Quality Assurance Manager, Western NY Summer 2001

industries interviewed were compelled to state that they had learned from their obstacles and that there were few obstacles as well as stating that they would not have gone through any drastic measures to change a lot if they were to go back and start the process over.⁸¹ *

Jumping Hurdles

1. Gap analysis (always perform one to see exactly where you stand).
2. In integrating an EMS one has to design it around the culture of the company, this contributes greatly towards success.
3. Set a standard for success by defining what success would be and how to measure it.
4. Emphasize the weak point of the existing approach and how an EMS could add value to it from a business and financial perspective.
5. The biggest advantage is to change the way a company interacts with the environment. It has to be seen from the business' perspective; what can the environment do for the company?

⁸¹ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

"Interview with magnetic materials industry" S. Brisson, Quality Assurance Manager, Western NY Summer 2001

* Things that could have been done better can be found in section 3

SECTION 4.5

Case: What resources are usually stressed upon when implementing an EMS?

This is important to see what do you want to have and what do you need to have in order to get the job done and to get it done efficiently and effectively.

What, where and how much?

In planning to integrate and implement the EMSs time and effort are usually two resources that no company can do without. Is this all that is required? For the most part it is⁸² and depending on the size of the company and people working to implement it, it may take anywhere from a year to three for implementation. Allocation of these resources may be an issue. The chart on the following page is based on a survey conducted with eight industries during the interviews listing the importance of resources on a scale of no significance to extreme importance (consecutively 1-10).⁸³

⁸² "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

"Interview with magnetic materials industry" S. Brisson, Quality Assurance Manager, Western NY Summer 2001

⁸³ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Wells, Environmental Chemist/Special Products Coordinator, Western NY Summer 2001

"Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

"Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

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"Interview with Turbine Industry" D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

"Interview with Electroplating Industry" M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

"Interview with Waste to Energy facility" Environmental Engineer, Western NY Summer 2001

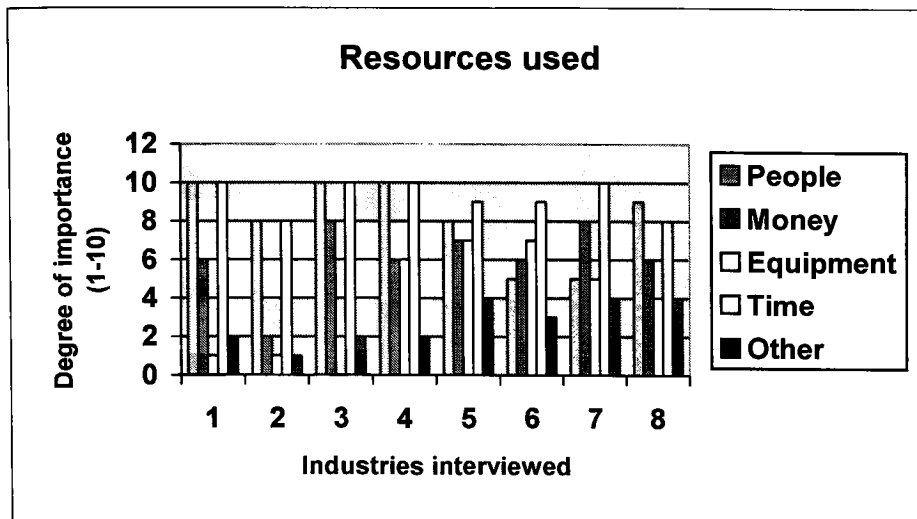


Figure: 4.3

As depicted by figure 4.3 time and people are a major resource. Other things may also be important such as equipment and money, but that is predominantly industry sensitive and it is usually found that different processes require different degrees of attention. In the category of other resources as shown in the graph the various industries stated that the other resources were accrediting agencies, standards e.g. ANSI guidance, ISO courses and guidance, training the program, other companies (customer resources) looking at different systems in place at other companies and picking out what would work (subsidiaries), and employee testing.⁸⁴ These can be identified and defined as other resources that can be helpful in integrating and implementing an EMS.

⁸⁴ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

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People, time and money

By default, people as a resource, is the single most important resource anyone can possess. It is through the use of people that implementation and integration occurs.

Without people nothing can be accomplished. It is through people and their ability to adapt that they can be used to play double roles in doing their job and in addition help to incorporate the EMS. "The existing people were given more responsibilities."⁸⁵ In adding more people or giving people more tasks to do, time can be reduced but cost increased. "The cost factor is more related to peoples time. It's a knowledge thing that you are really transferring and you have to develop. The initial development part of it is enormous and that's a big cost."⁸⁶

Time is another issue, time can save money and time can cost a lot of money. It is through the proper allocation of human resources that time can be saved or misused. The integration and implementation guideline should be followed and if any problems are encountered then a corrective action should follow. These are basic guidelines since the more a project is prolonged the more the resources are strained upon placing the entire operation at risk. Time is undoubtedly a major contributing factor that an industry cannot do without when considering implementing and integrating the EMS. If there is a set timeline and schedule falling short of the original set date it could run the industry some money.

In reference to cost, many industries claimed that cost, although important was not the most influencing factor in completing the job. The average ranking of cost as a major resource was of 6.1 on a scale of 10; this shows that it is slightly above average but

⁸⁵ "Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

⁸⁶ "Interview with Electroplating Industry" M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

not entirely essential. Again the author would have to state that from the data conducted money is entirely circumstantial basing the analysis on these following influencing factors.

- Size of industry.
- Operations being run (some may have more concerns addressing the environment).
- Original guidelines and timeline.
- Over or under allocation of resources.
- No existing management system.

These influencing factors can end up placing more strain on money as a resource for implementing and integrating an EMS at a SMB. As stated above there are various factors that can sway how much resources an industry uses. In dealing with such circumstances, the best method is to allocate the resources accordingly and present a timeline as well as research its feasibility and then adapt it accordingly.

SECTION 4.6

Case: What materials can be used as a guideline for implementing the EMS?

The relevancy of asking this question is to determine what materials if any are indeed a lifesaver and a timesaver. It is there to ask if it is at all practical or is it sufficient to apply what you have learnt through the years on the job.

Are books my best friend?

It can be said that beyond question there exists an assortment of books on ISO 14001. In fact too many books are published on ISO 14001 and from what was gathered at the interviews few were put to use. A chief environmental officer stated, “It can’t be a bunch of theory because once it gets down on the floor people are going to try and do it and you can see construction done by people that are all theory, its just not good.”⁸⁷ In relation to the question asked the answer did not correspond as expected from where the author anticipated a long list of materials. One interviewee stated “all the books I read I ended up throwing out. It was quite fluffed.”⁸⁸ This sentiment was shared amongst all but two industries.⁸⁹ One that was interviewed claimed, “I had a couple of decent books on implementing ISO 14001 and they were okay.”⁹⁰ As you may probably have been able to derive from the above remarks and statements in implementing ISO 14001 when utilizing books a lot of people in the position of trying to implement the EMS into place have sought to utilize other methods than to turn to books for the good reason of time management. Theory is not practical when an application needs to be satisfied. That is

⁸⁷ “Interview with Electroplating Industry” M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

⁸⁸ “Interview with Ink Industry” D. Maternowski, General Manager, Western NY Summer 2001

⁸⁹ “Interview with Electroplating Industry” M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

“Interview with plastics industry”, D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

⁹⁰ “Interview with Electroplating Industry” M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

where books are usually placed aside in favor of other materials that keep the process short, simple and to the point.

What else is out there?

Although books may not always offer a solution, other forms of help may be significant e.g. case studies, computer software, other companies advising, different case scenarios, internet, consultants, ISO 14001 guidelines, and subscription services.⁹¹ One interviewee referred to the information found on the Internet as being quite useful, considering it is constantly updated and provides a plethora of information.⁹² The Internet is known to be a useful tool. Although one should be cautious as not to get entangled in the web it so pleasingly offers. The information found might not be of use placing one in an option not suitable for that industry. That or perhaps getting too immersed can take up too much time resulting in fewer relevancies for integration and implementation.

Amongst other materials the Environmental Safety Supervisor at a beauty products industry mentioned “Datamatrix supplied us with fictional companies like XYZ companies in a kind of a what if scenario, e.g. what if you were a plant manager, how would you deal with the situation and this enabled better understanding of the process and what is expected.”⁹³ Mock exercises and scenarios based on what if situations can be a useful tool in receiving better knowledge of what should go where. It can be used as a training aid and better help in understanding the process and where different pieces of the ISO 14001 guideline would apply.

⁹¹ This is an accumulation of all the other materials listed throughout the interviews conducted in Western NY Summer 2001

⁹² “Interview with magnetic materials industry” S. Brisson, Quality Assurance Manager, Western NY Summer 2001

⁹³ “Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

A subscription service for maintaining regulatory compliance can also be helpful in order to keep in conformity and to prevent any problems with regulatory agencies.⁹⁴ This can be used for awareness in the guideline and the operational control, section (4.4.6).

In the guidelines provided by ISO 14001 as a result of ensuing it and denoting which sections have already been met to standard, it is within itself one of the most favorable methods used since this material is the blue print for an environmental management system and no industry can do without it.

Case studies were seldom used. In fact the majority of industries interviewed have not even considered using case studies. The other industries reported that the case studies usually did not reveal any information that wasn't already known although for the most part the author believes that case studies can be very useful depending on the relation of the report and the shared processes utilized in the case and company.

What can be said about reading materials

Initially it is good to familiarize oneself with the materials that will help acclimatize the industry to that environment. It is good to know what to do and how to do it. It is the desire to search for the most perfect guide to integrate and implement an EMS. This may or may not be of assistance according to the time spent on it. If time is an issue and there is too much material then the best alternative is to filter the materials according to your needs. Initially look at it from a birds eye view follow the process and delineate which area needs more attention. This should be followed by a gap analysis to clarify how much attention needs to be provided. Based on these two applications there should be enough evidence to precision point the outliers and the need for more research

⁹⁴ "Interview with beauty products industry", A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

on those subjects. This may be the part where reading materials play a more vital and definite role in bridging the gaps in between the processes.

SECTION 4.7

This chapter has highlighted the results and analysis derived from the eight companies interviewed about integration and implementation of ISO 14001 in summer 2001. This following section is here to provide a quick summary and to review some keys to success as defined by the interviewees and derived by the author based on the interviewees and research.

- Corporation culture initially can have some adverse effects to integration and implementation; designing the EMS around the culture of the company can help prevent this.⁹⁵
- By presenting the strengths and weaknesses in the existing EMS or pseudo-system, highlighting the implications caused by the weaknesses, and advising how ISO 14001 can add value to the business, managers can be convinced to incorporate the system.⁹⁶
- The employees may have important input to the value of EMS and ISO 14001, but can be also seen as a burden so identify ways in which it benefits them to gain their support and feedback.⁹⁷
- Self-certification may sometimes be the best way when you are a close knit group that work well together and are very familiar with the processes and employees.⁹⁸

⁹⁵ "Interview with plastics industry", D. Atkinson, Continual Improvement Manager, Western NY Summer 2001

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⁹⁸ "Interview with Ink Industry" D. Maternowski, General Manager, Western NY Summer 2001

- ISO 14001 spreads environmental responsibility throughout the entire organization as opposed to other systems where they are not all integrated into all parts of the company.
- Many companies are moving easily into ISO 14001 because they were already doing many of the things it requires. If a company is uncertain about its timing and commitment for ISO 14001, it can identify those aspects of the standard that can benefit it now and begin fazing them in over time.⁹⁹
- Companies can turn their waste into profits when their wastes can be put into the process of other companies. Companies can reduce their materials cost when they use the wastes of another company as their input.¹⁰⁰
- Communication by top management is critical. The intent of the project benefits to the company and the individual, the overall vision, and the plan for accomplishment must be clearly communicated.¹⁰¹
- The pace of EMS development and implementation should be fast enough to keep employees interested and excited, but not so fast that errors occur or that it is a superficial effort.¹⁰²

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- For organizations with ISO 9001, the existing management process can be applied to ISO 14001. The technical and regulatory aspects of an ISO 14001 EMS are combined with the existing management system, discipline, audit process, and continual improvement process of ISO 9001. The unique aspects of ISO 14001 will be visible against the ISO 9001 background. This approach leverages the investment in ISO 9001 and reduces the cost of ISO 14001.¹⁰³
- The method that each company implements environmental management is unique. Accomplishment is achieved by designing the system to accommodate internal and external characteristics.
- The benefits of an ISO 14001 EMS are both short and long term. To maximize ongoing benefits, a long-term view must be taken and supported by management. If the long term is traded off for short-term objectives, long-term benefits will suffer.¹⁰⁴
- ISO 14001 stresses the creation of a system. This means that all parts of the program must be interconnected for it to survive. Connection to the organizational policy and the benefits must be visible and maintained.¹⁰⁵

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- Explain environmental facts and the EMS in an interesting way to help employees maintain their enthusiasm. Present information using marketing and communications techniques.¹⁰⁶
- Implementation should be pushed to the lowest level possible and as widespread as possible. Responsibility for environmental protection should no longer reside with a separate group but the entire company.¹⁰⁷
- Participation by many different stakeholders will increase the chances for success. These could include employees, stockholders, customers, insurance carriers, and suppliers.¹⁰⁸
- In organizations that have an environmental management department, their role will change from one of just responding to laws and regulations to one that includes leadership and education for all members of the organization.¹⁰⁹

¹⁰⁶“Interview with Turbine Industry” D. Leitzell, Environmental Affairs Manager, Western NY Summer 2001

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“Interview with beauty products industry”, A. Hawker, Environmental Safety Supervisor, Western NY Summer 2001

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“Interview with magnetic materials industry” S. Brisson, Quality Assurance Manager, Western NY Summer 2001

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“Interview with Electroplating Industry” M. Florczykowski, Chief Environmental Officer, Western NY Summer 2001

BIBLIOGRAPHY

“ISO 14000 is it time for you to become certified?” ISO 14000 Information center, Cappacio Environmental Engineering, Inc 01/13/01,
http://www.iso14000.com/implementation/iso14_cee_overview.htm

Turkow, David, “A Guide for Initiating an Environmental Management System in Academia,” RIT thesis proposal, May 8, 2001.

ISO/TC 207 web site; <http://www.tc207.org/articles/index.html>.

INEM web site; 2 February 1999 <http://www.inem.org/htdocs/iso/jensen-sme.html>.

EPA policies assist small businesses with environmental compliance; Small business ombudsman web site; <http://www.epa.gov/sbo>

Environmental Management Experts identify Obstacles to ISO 14001 Implementation in SMEs and suggest Ways to overcome them, web site; <http://www.environmental-expert.com/articles/article106/article106.htm>

Goodman, Sally L., “Is ISO 14001 an Important Element in BUSINESS SURVIVAL?” The Quality Magazine of Australia, June 1988

Memo from Deputy Administrator Fred Hansen regarding responsibility of EMS development, December 16, 1997.

Cascio, Joseph, The ISO 14000 Handbook, CEEM Information Services, ASQC Quality Press, 1996

Carey, Ruth E., Elements, The ISO 14001 EMS Element Cycle, website, <http://www.successfuliso14000.com/Element.htm>

Murray, Paula C., Inching toward environmental regulatory reform-ISO 14000: Much ado about nothing or a reinvention tool? American Business Law Journal, Austin, Fall 1999.

The number of ISO 14001/EMAS certification/registration of the world, ISO World website, Tsujii, K. Director, <http://www.ecology.or.jp/isoworld/english/analy14k.htm>

The ISO survey of ISO 9000 and ISO 14000 certificates-Ninth cycle, ISO/TC207 website, <http://www.tc207.org/articles/file4.pdf>

Baramasse, Matthew, “Implementation of the ISO 14001 EMS system can be feasible at Small US Chemical Companies” May 2001

Identifying environmental aspects and impacts, Block, Marilyn R, Milwaukee, Wis.: ASQ Quality Press, 1999

Implementing ISO 14000: a practical, comprehensive guide to the ISO 14000 environmental management standards, Tibor T, Feldman I., Chicago: Irwin Professional Pub, 1997

The ISO 14001 implementation guide: creating an integrated management system, Jackson, Suzan L., New York: Wiley, 1997

The ISO 14000 handbook, Cascio, Joseph, Milwaukee, Wis.: ASQC Quality Press, 1998, copyright 1996

The road to ISO 14000, Nestel, Glenn K, Roy F. Weston, Chicago: Irwin Professional Pub, 1996

ISO 14000: a guide to the new environmental management standards, Tibor, Tom; Chicago: Irwin Professional Pub, 1996

ISO 14001 Implementation Manual; Robert Kozak; Professional Safety, Park Ridge; Feb 1999; Vol. 44

Integrated management systems in small and medium enterprises; Alex Douglas; Total Quality Management, Abingdon; Jul 2000; Vol. 11, Issue. 4-6

Ford, GM Require ISO 14001 of suppliers, Business and the Environment, ISO 14000 Update, Cutter Information Corp. <http://www.cutter.com/iso14000/sample/iso9911a.html>.

Dufresne, Joseph, Will ISO 14001 Become a Customer Requirement? Environment Newsmagazines Inc. Capaccio Engineering Inc., http://www.environews.com/ISO%2014001_requirement.htm

Mauch, James E. & Birch, Jack W., Guide to Successful Thesis and Dissertation: A handbook for students and faculty. Fourth Edition, Revised and expanded, Marcel Dekker Inc., New York 1998

Montabon, Frank, Melynyk, Steven A., Sroufe, Robert, Calantone, Roger J., ISO 14000: Assessing its perceived impact on corporate performance, Journal of Supply Chain Management, Tempe, Spring 2000

The ISO survey of ISO 9000 and ISO 14000 certificates-Ninth cycle, ISO/TC207 website, 1999 <http://www.iso.ch/iso/en/commcentre/pressreleases/2000/www.iso.ch>