

Introducing Environmental Management Systems to Corporations

by

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in partial fulfillment of the requirements for the degree of
Master of Environmental Design (Environmental Science)**

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ABSTRACT

Introducing Environmental Management Systems to Corporations

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Prepared in partial fulfillment of requirements of the M.E.Des. Degree in
the Faculty of Environmental Design, The University of Calgary

An environmental management system (EMS) is a system that enables an organization to manage environmental issues in a consistent and considered way. EMSs are increasingly being suggested as a means for organizations to improve environmental performance, however, practical information on how EMSs may be successfully introduced to a corporation is lacking. The study sought to: synthesize information on processes and elements involved in the introduction of EMSs to organizations; to identify and analyze barriers to successful introduction; and to suggest strategies for effective EMS introduction.

Barriers to EMS introduction were found to include: (1) factors which affect the initial commitment to an EMS by corporate decision-makers; and (2) factors which affect the design and implementation of an EMS. A contingent approach, using both structural and behavioural perspectives, was used to develop possible strategies and tactics for overcoming these barriers.

Key Words: environmental management systems, environmental driving forces, management system implementation, barriers to organizational change

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1. INTRODUCTION

1.1 BACKGROUND

An environmental management system (EMS) is a system that enables an organization to manage environmental issues in a consistent and considered way. EMSs are increasingly being suggested as a means of ensuring that continuous progress is made in the environmental performance of organizations. Practical information on how EMSs may be successfully introduced to a corporation is, however, lacking. An analysis of the processes and elements involved in introducing EMSs to corporations and development of strategies for more effective introduction should improve the likelihood of environmental management system success.

1.2 STUDY OBJECTIVES

The study objectives were to:

- synthesize information on processes and elements involved in the introduction of EMSs to organizations;
- identify and analyze barriers to successful introduction; and
- suggest strategies for successful introduction of EMSs to corporations.

1.3 DOCUMENT OVERVIEW

A review of literature on management, organizational behaviour and environmental management systems is included in Chapter 2.

Chapter 3 presents a summary of organizational and management theory which may be applied to EMSs.

The definition of environmental management systems, environmental driving forces, the elements of an EMS and EMS standards are discussed in Chapter 4.

Requirements for the introduction of an EMS are discussed in Chapter 5.

Barriers to EMS introduction are identified in Chapter 6.

Measures to overcome these barriers and strategies for introducing EMSs to corporations are presented in Chapter 7.

Conclusions and suggestions for further work are offered in Chapter 8.

1.4 METHODS

As there has been little published work on the implementation of EMSs, the subject study involved a discovery-oriented approach in which information was gathered from various sources to develop preliminary qualitative observations. Literature on factors related to EMS implementation, including environmental driving forces, possible EMS elements, EMS standards, and organizational behaviour was reviewed. Vice-presidents, CEOs, and environmental department heads of 29 medium-sized and junior oil companies, two large utility companies, and a pipeline company, were interviewed in order to develop information about

corporate approaches to environmental management systems. A summary of characteristics of the companies that were surveyed is presented in Figure 1.

Primary Company Activity		Area of Operation	Number of Employees			
			0 to 20	20 to 50	50 to 200	200 +
Oil and Gas Exploration and Production	<i>29</i>	<i>Alberta</i>	<i>2</i>	<i>8</i>	<i>19</i>	
Gas Transmission	<i>1</i>	<i>Western Canada</i>				<i>1</i>
Utility	<i>2</i>	<i>Western Canada</i>				<i>2</i>

Figure 1. Characteristics of Surveyed Companies. Italicized numbers indicate number of companies within each category.

Information from these interviews was combined with the author's work experience in developing environmental management systems and in managing corporate environmental issues on a consulting basis. Information analysis involved the constant comparison method (Glaser and Strauss, 1967) where the results of interviews and literature searches were analyzed to detect emerging themes.

Themes developed during the research were compared with a number of approaches to implementing EMSs, including those outlined by international standards organizations, and used previously by the author. Specific strategies for EMS implementation were then developed using a synthesis of this information and organizational behaviour and management theory.

1.4.1 INTERVIEWS

Interviews used in the development of this study were, for the most part, carried out in confidentiality. This approach was indicated as the author found that information revealed by corporate executives differed according to whether the information was to be attributed to that individual / company or whether they were offered the opportunity to discuss issues confidentially. When interviewees were asked what they would be willing to be specifically quoted on, it was found that very little useful information would be forthcoming. Therefore, while the author kept notes on specific conversations, companies and individuals who were contacted are not referenced within this text in order to preserve that confidentiality.

Interviewees were selected on the basis of their availability to the author and their willingness to discuss environmental management issues. Contact with some of the interviewees was facilitated through pre-existing work relationships. Other interviewees were contacted through "cold calling". Approximately 25% of potential interviewees who were approached by the author were unwilling to submit to interviews.

Interviews were unstructured and open-ended. In each interview, the first set of questions posed were general, in an attempt not to lead the interviewee. Questions in this portion of the interview included "What are the main environmental issues your company deals with?", "How do you deal with these?", and "What do you think drives environmental issues at your company?" After the interviewee was allowed ample time to respond to general questions, possible influences on the company's environmental approach were suggested by the interviewer for verification by the interviewee.

Interviews were documented through written notes taken by the interviewer. Interviews were not tape recorded as it was felt that this might inhibit the candour of the interviewees.

1.4.2 PROFESSIONAL EXPERIENCE

Much of the material within this study was developed through the author's practical experience in introducing EMSs or EMS components to companies in western Canada. This experience included participation in the development of an EMS for a recreational development in British Columbia, development of an EMS for two mid-sized oil and gas companies in the Calgary area, development of environmental operating guidelines and procedures for a number of resource-based companies in Western Canada, training of oilfield field personnel in environmental operating procedures, environmental auditing and assessment of over 60 commercial and industrial businesses, and two years experience managing the day-to-day operations of two oilfields for a large petroleum company.

The author's experience was combined with discussion with her thesis supervisor regarding his experience in introducing environmental management to companies.

1.4.3 DATA ANALYSIS

As the number of corporate officials who were interviewed was small, and the companies were all resource-based and centred in Western Canada, the study was considered to be exploratory and the data were not analyzed statistically. Observations and conclusions within this study are, therefore, presented as areas for further detailed work.

1.4.4 STUDY ASSUMPTIONS, LIMITATIONS AND SOURCES OF ERROR

Analysis of EMS implementation is limited by the lack of documentation in the literature of workers' experiences in implementing EMSs. EMS development is a relatively new endeavour and there are few available examples of companies that have implemented a full EMS.

The author's experience in EMS implementation has been limited to companies operating in Western Canada. The majority of the companies the author has dealt with have been resource-based, so her experience does not represent a broad range of company type. Bias may also have been introduced into the study through the author's weighting of comments made by interviewees.

A significant limitation was the reticence of corporate executives in speaking about their company's environmental motivations and actions. While the author would have preferred to have referenced specific companies as examples of observations made in this study, confidentiality of information was required in order to obtain what appeared to be forthright answers to questions. This confidentiality severely limited the ability to provide information which might indicate particular companies and precludes easy verification of some of the material presented.

This study was conducted over a period of approximately one year and reflects the state of environmental management at a point in time when the discipline is undergoing significant development and change. It is, therefore, probable that some of the material contained within this study will become dated as there are new developments in EMS application.

1.5 LITERATURE REVIEW

Little published work on the practical aspects of EMS design and implementation was discovered in the available literature. Literature about related issues and from related disciplines did, however, provide information and theories which appeared to have relevance for the study.

While specific information and concepts derived from the literature are discussed in subsequent chapters, a summary of types of available literature and key authors is offered below.

1.5.1 LITERATURE ON ENVIRONMENTAL DRIVING FORCES

Environmental driving forces are the factors that drive an organization's need for environmental action. Most authors who identified environmental driving forces categorized them according to fairly broad criteria. Linnanen, Bostrom and Miettinen (1995) sought to determine driving forces according to their types of causation: ecological, societal, and consumer behaviour. Epstein's (1996) environmental driving forces were determined according to the stage of environmental awareness of an organization. Greeno and Robinson (1992) and Williams, Medhurst and Drew (1993) identified several specific environmental drivers.

Recent surveys of Canadian corporations were used by the KPMG (1996) to develop a longer list of specific environmental driving forces. This list, however, can be seen as being somewhat disorganized and lengthy. Thompson (1996a) refined specific driving forces into a more considered list.

Information on driving forces was also available in the form of case examples illustrating the forces at work. Sources for this information included legal cases, as reported in the popular press (including the *Globe and Mail* and local newspapers), legal journals and compendia, environmental journals (including *Business and the Environment* and *Enviroline*), rulings by regulatory bodies (Alberta Environmental Protection, 1996), and discussions with other EMS designers. Much of this material was not easily accessible and it was necessary to relate many of these cases to environmental management through synthesis of information about the case with previous understanding of environmental issues.

1.5.2 LITERATURE ON EMS ELEMENTS AND STANDARDS

A large body of literature describing EMS elements and standards was readily available. This included publications by the Canadian Standards Organization (1994, 1996), the International Organization for Standardization (1996), the British Standards Institute (1994), the Global Environmental Management Initiative (1993) and the Chemical Industries Association (1995). Numerous recent guides to understanding EMS standards, and elements included work by Rothery (1993), Bisson (1995), McCreary (1995), Neaves (1996), and von Zharen (1996).

While some of the literature on EMS standards discussed EMS theory (including great detail on elements and frameworks) little advice was offered on how to apply it to working companies. One notable exception was a workbook from the Canadian Standards Organization (1996) that attempted to walk EMS neophytes through the stages of developing a system. However, this workbook seemed to present an oversimple view of EMS development.

1.5.3 LITERATURE ON ORGANIZATIONAL BEHAVIOUR AND MANAGEMENT

Research on organizational dynamics and management identified approaches which could be applied to EMS introduction and implementation. Summaries of theories relevant to this study follow in Chapter 4.

Much of the literature on introducing new systems to organizations was site-specific narratives. Unfortunately, there seemed to be little synthesis of these case studies into more general models which could be applied to other organizations. On the otherhand, papers on innovation in the workplace tended to be very general (Harari, 1995; Kimberly and Bouchickhi, 1995; Greenwood and Hinigs, 1996; Weaver, 1995).

Exceptions to this lack of synthesis were found in an analysis of the relationship between management, science and environmental management by Thompson and McKay (1984), work on corporate environmental responsiveness strategies in the North American oil and gas industry by Sharma (1995), and Klein and Sorra's (1996) recently developed model for the introduction of innovation in an organization.

1.5.4 LITERATURE ON EMS DESIGN AND IMPLEMENTATION

Bentley *et al's* (1995) outline of the development of a health, safety and environmental management system in an oil company and Kosasih and Shorbirin's (1995) paper on implementing an EMS in Sumatra were both descriptive and did not contain much analysis of the process nor insight on how the specific experience they described could be applied to other cases. Presentations by Phyper (1994, 1995) on implementing an EMS were found to be summaries of EMS elements rather than discussion of implementation itself.

2. ORGANIZATIONAL AND MANAGEMENT THEORY

The literature review indicated that previous work offered little consideration of how EMSs fit within common organizational and management theory. Still, some general approaches developed by organizational and management theorists may be of value in understanding and developing an EMS. Summaries of these theories, and assessment of their application to EMS introduction, are provided below.

2.1 THE CLASSICAL APPROACH

Classical management theorists, including Gilbreth (1914), Gantt (1916), Taylor (1947), and Fayol (1949) believed proper structuring of work and defining the role of managers is key to improving a company's performance and that "the one right way" of doing things is determinable through careful analysis. Under the Classical Approach, management involves five functions: planning; organizing; commanding; coordinating; and controlling (Fayol, 1949).

While the Classical Approach identifies functions which may be involved in EMSs such as planning and responsibility, it does not recognize organizational diversity and complexity. It cannot be applied to complex situations. The narrowness of the Classical Approach severely limits its application to EMSs. However, an understanding of the Classical Approach may be required when dealing with managers influenced by it.

2.2 THE SYSTEMS APPROACH

The General Systems Theory is based on the concept that an organization must be understood as an integrated system (von Bertalanffy, 1951, 1952; Mockler, 1968). While parts within the system may be somewhat independent, they are always related. Guidelines to analyzing a system from a Systems Perspective have been outlined by Hopkins (*in* Certo and Applebaum, 1986, p.37):

1. The whole should be the main focus of analysis, with the parts receiving secondary attention.
2. Integration is the key variable in wholeness analysis. Integration is defined as the interrelatedness of the many parts within the whole.
3. Possible modifications in each part should be weighed in relation to possible effects on every other part.
4. Each part has some role to perform in order that the whole can accomplish its purpose.
5. The nature of the part and its function is determined by its position in the whole.
6. All analysis starts with the existence of the whole. The parts and their interrelationships should then evolve to best suit the purpose of the whole.

If a Systems Perspective is taken in the development of EMSs, the elements within the EMS become secondary to the EMS as a whole. The Systems Perspective implies that in order to be successful, an EMS must be designed and implemented at one time. This perspective would preclude the phasing in of EMSs and predicts that individual EMS elements, such as environmental operating guidelines, will function poorly as stand-alone measures.

2.3 THE STRUCTURAL PERSPECTIVE

The Structural Perspective emphasizes approaching an organization as a structure or framework. Ott (1989, p.5) distilled the Modern Structural School into four main tenants:

1. Organizations are rational institutions whose primary purpose is to accomplish established objectives; rational organizational behavior is achieved best through systems of defined rules and formal authority. Organizational control and coordination are key to maintaining organizational rationality.
2. There is a "best" structure for any organization in light of its given objectives, the environmental conditions surrounding it, the nature of its products and/or services, and the technology of the production processes.
3. Specialization and the division of labor increase the quality and quantity of production - particularly in highly skilled operations and professions.
4. Most problems in an organization result from structural flaws and can be solved by changing the structure.

Modern proponents of the Structural Perspective have included: Kast and Rosenweig (1970) and Thompson (1967), who focused on an organization's information system and its decision-making processes; Burns and Stalker (1961), Blau and Scott (1962), and Mintzberg (1979) who saw the structure of the organization, the delegation of work within the structure, and procedures and rules as important elements of an organization; and Salanick and Pfeffer (1977), Pfeffer (1981) and Kotter (1995) who looked at organizations from a "power perspective", where real and perceived power relationships and conflict management is crucial. Handy (1981) and Daft (1986) developed models of formal reporting relationships indicating where functions within an organization may be vested.

Formal organizational structure has been related to environmental management by Thompson and McKay (1984), Thompson (1995), Weaver (1995) and Bilkhu (1996). Thompson (1996b) recognized several task structures for environmental management within organizations:

- Centralized, where one department performs most of the environmental tasks. This allows specialization and may develop one group as environmental advocates for the company, however, this functional placement may deter integration of environmental concerns within other departments' activities;

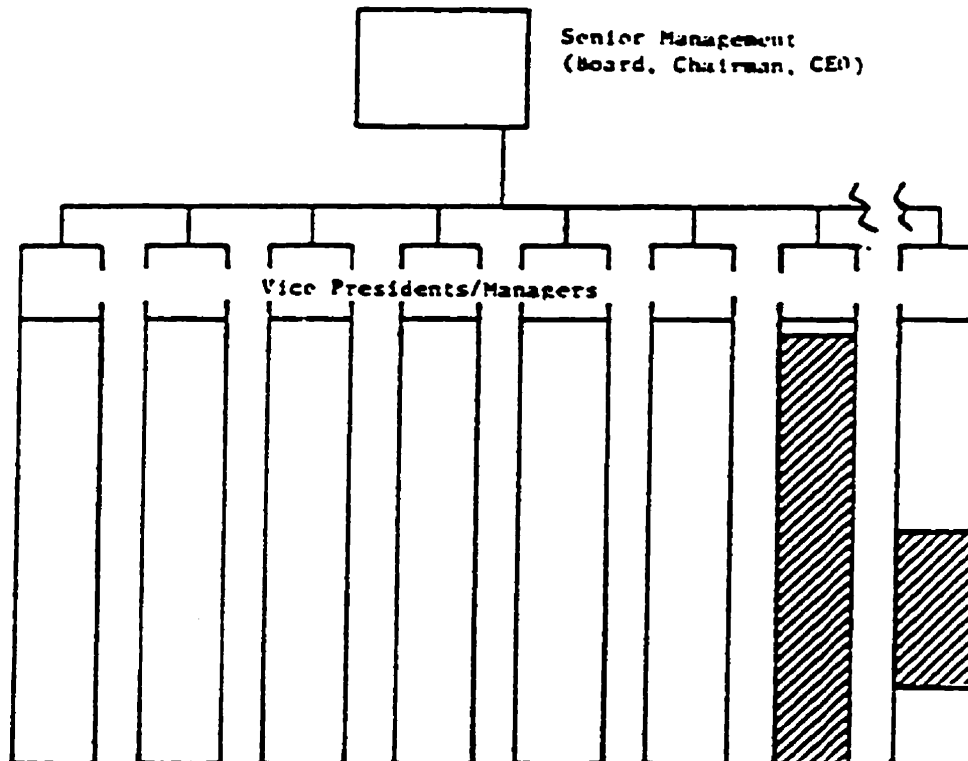


Figure 2. Centralized Task Structure for Organizations (Thompson, 1996b).

- Decentralized, where responsibility for environmental management is distributed through many groups. This structure should facilitate integration of environmental management with other activities of the groups, however, it does not provide a focused advocacy for environmental management;

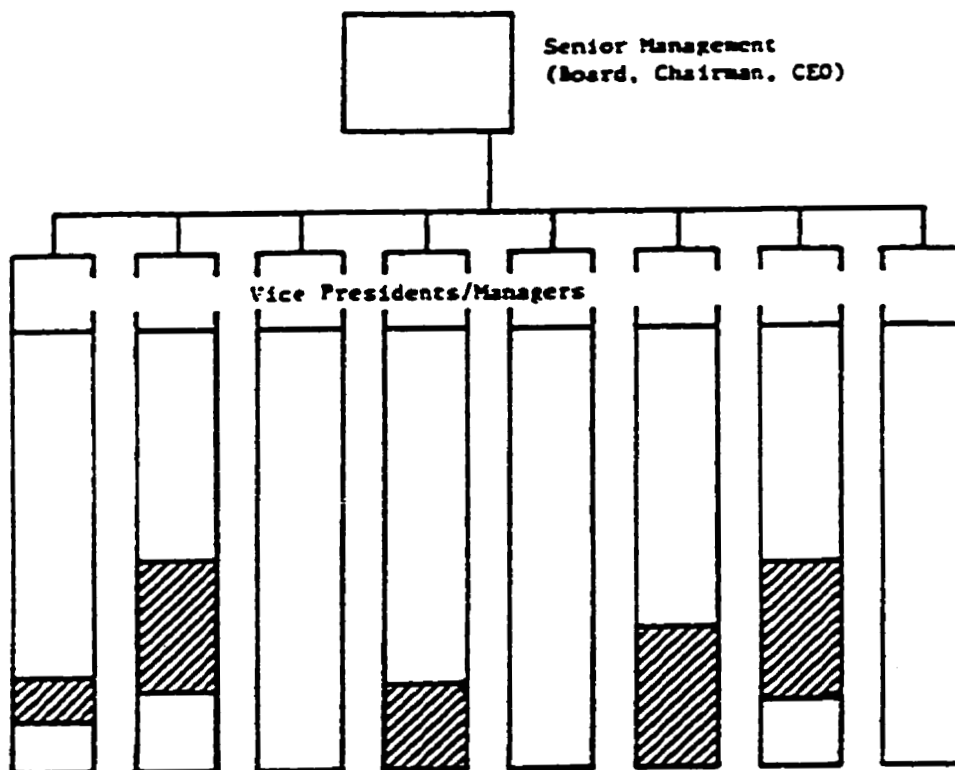


Figure 3. Decentralized Task Structure for Organizations (Thompson, 1996b).

- Theoretical Matrix, where those primarily responsible for environmental matters are spread throughout the organization and can report to both their line groups and to a specific environmental coordinator. This structure may aid communication between groups and may be particularly effective for complex problems. The structure may, however, present difficulties by dividing loyalties. It may also be problematic when there are conflicts between those with the responsibility for environmental matters.

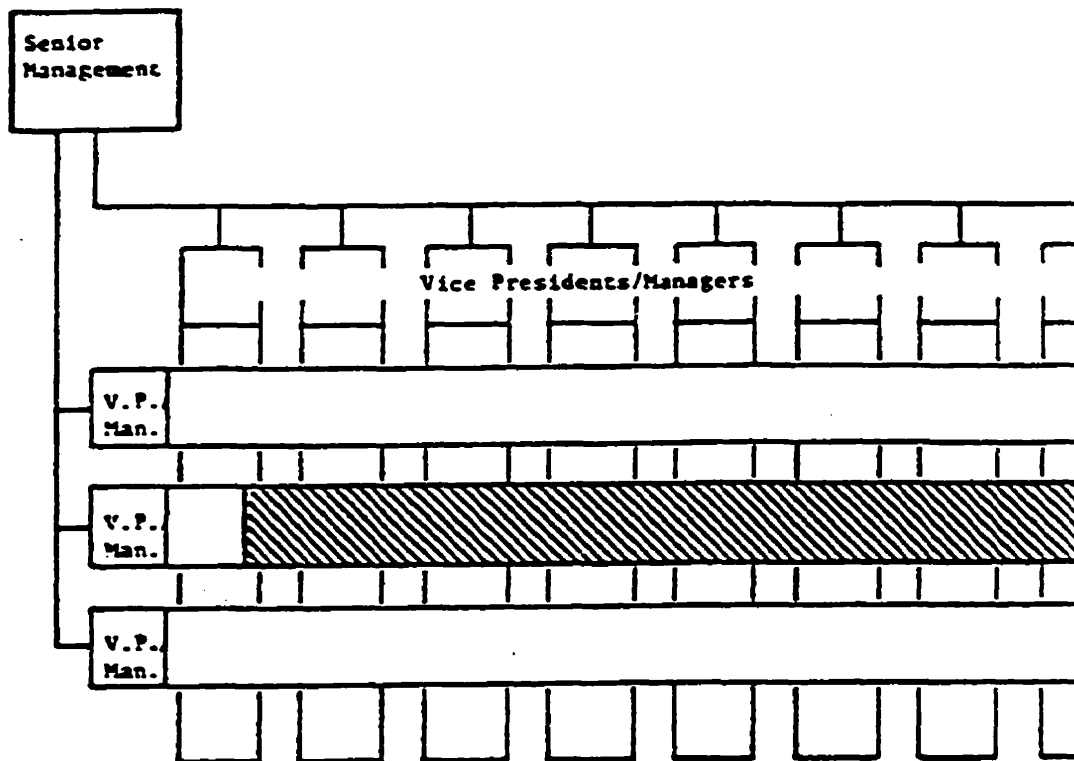


Figure 4. Theoretical Matrix for Organizations (Thompson, 1996b).

- Modified Decentralized, where environmental responsibilities are spread throughout the organization but are coordinated by senior management. This is also referred to as a staff function.

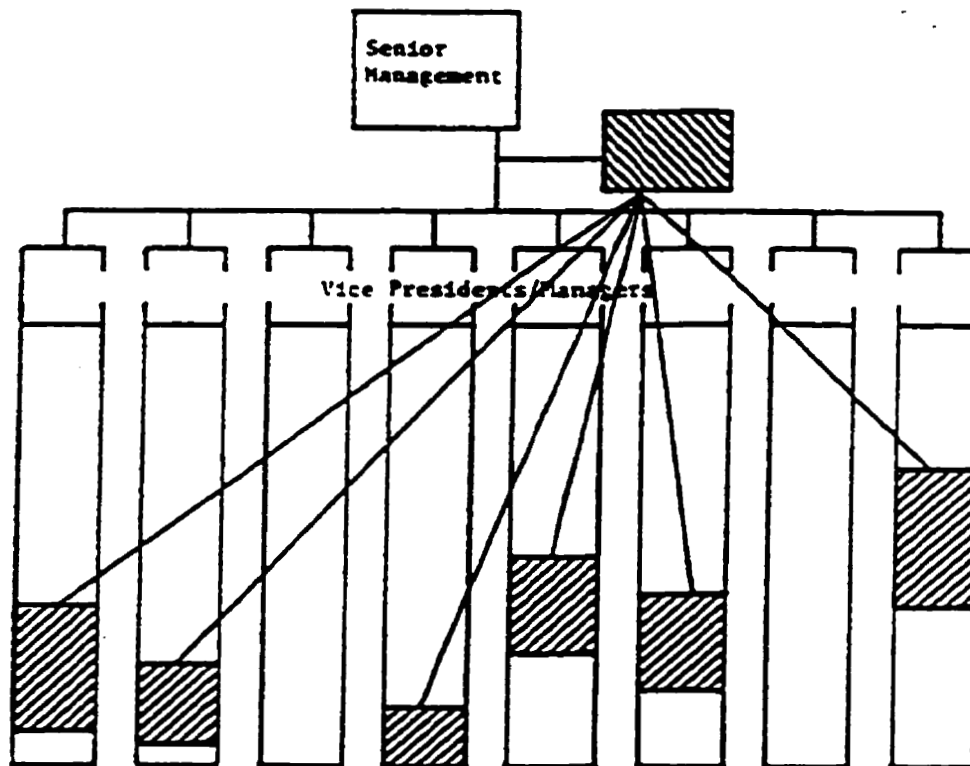


Figure 5. Modified Decentralized Task Structure for Organizations (Thompson, 1996b).

While the above task structures may be suitable for larger organizations, it may be difficult, or impossible, to apply them to smaller organizations. Alternatives to these task structures are discussed in Section 6.5.

Although it is not specifically referred to in the EMS literature, the Structural Perspective has been the most widely-adopted approach to EMSs. EMS standards, such as ISO 14000 (discussed in more detail in Section 3.4.2) are largely based on structure.

2.4 THE BEHAVIOUR PERSPECTIVE

The Behaviour Perspective closely aligns the success of organizations with the growth and development of its employees. Ott (1989, p.3) explained that:

those who see organizations through the *lenses* of the organizational behavior perspective focus on people, groups, and relationships among them and the organizational environment.

Emphasizing "cooperative effort" as a determinant of success, Barnard (1938) concluded that employees would only accept management orders that were in tune with their own goals and personal interests. Maslow (1943) believed that organizational success was related to meeting a hierarchy of workers' needs, including safety, love, esteem, and self-actualization.

Current versions of the Behaviour Perspective generally contains four assumptions (Ott, 1989, p.7):

1. Organizations exist to serve human needs. Humans do not exist to serve organizational needs.
2. Organizations and people need each other. Organizations need the ideas, energy, and talent that people provide, while people need the careers, salaries and work that organizations provide.

3. When the fit between the individual and the organization is poor, one or both will suffer. The individual will be exploited or will seek to exploit the organization or both.
4. When the fit is good between the individual and the organization, both benefit. Humans are able to do meaningful and satisfying work while providing the resources the organization needs to accomplish its mission.

The Behaviour Perspective is extremely popular in current management literature. Teal (1996, p.36) has echoed the sentiments of many in observing that "Managing is not a series of mechanical tasks but a set of human interactions." The Behaviour Perspective has been adapted by many workers and has resulted in a number of management approaches, including:

- Management by Objectives. Developed by Drucker (1954), Management by Objectives is based on the assumption that workers will function best if they have defined goals. Drucker has also concluded that goals will be most effective if those implementing them have had some part in developing the goals. Under Management by Objectives, setting suitable environmental goals and objectives is crucial to EMS success.
- Theory X and Y. McGregor's (1960) Theory X and Theory Y capture opposing views characterized by Taylor and Mayo (respectively). In Theory X, people are assumed to be inherently lazy, naturally adverse to work, and resistant to responsibility. According to this theory, employees must be closely supervised and made to work. Theory Y is based on the assumption that people enjoy work, seek challenges, and will work well if offered fair rewards. Theory X and Y have ramifications for employee responsibilities within an EMS. If Theory X is to be followed, then strong punitive measures for non-performance must be designed into an EMS. If Theory Y is adopted, implementation of the EMS can be based on challenging employee capabilities and on rewards for good environmental performance.

- Theory Z. Theory Z (Ouchi, 1981) emphasizes decision-making by group consensus. It stresses the achievement of the group over the individual and transforms management into a plural or team activity. Application of Theory Z requires EMS design and implementation be carried out by teams.

The Behaviour Perspective has also resulted in the organizational "culture" and "climate" being considered important factors in understanding organizations (Schein, 1985; Sinclair, 1993; Trice and Beyer, 1993; Schneider, Brief and Guzzo, 1996). An organization's culture can be defined as:

a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relations to these problems." (Schein, 1985, p.19)

Climate has been seen as:

the relatively enduring quality of the total [organizational] environment that (a) is experienced by the occupants, (b) influences their behaviour, and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the environment. (Taguiri and Litwin, 1986, p.25)

Recent work has suggested that organizational culture and climate are essentially the same thing (Denison, 1996). For the purposes of this study, culture and climate will be referred to collectively as "culture" and simply defined as the way things are usually done within the organization, attitudes and values.

In seeking to introduce an EMS to an organization, one may be attempting to formalize or change the way things are done within that company. EMS introduction is, therefore, intrinsically linked to organizational culture. This relationship will be discussed further in Section 4.4.1.

The Behaviour Perspective suggests that management systems should be analyzed and set up in humanistic or psychological terms. This approach entails

dealing with less tangible variables than those recognized by the Structural Perspective. Therefore, analysis and design from a Behaviour Perspective will likely be more difficult than from a Structural Perspective.

2.5 THE UNIVERSAL APPROACH

The Universal Approach is predicated on the belief that the same strategies may be applied to all organizations (Das, 1990). This approach would imply that an EMS can be templated and that once a successful EMS process is identified, it can be effectively applied to all organizations.

2.6 THE CONTINGENCY APPROACH

Diametrically opposed to the Universal Approach, the main premise of the Contingency Approach is that there are no universal solutions to management of organizations (Luthan and Stewart, 1978; Shepard and Houghland Jr., 1978). Contingency is based on the view that different organizations have somewhat unique dimensions or sets of attributes, and that the characteristics of an organization must be understood before choosing which principles to apply. Under the Contingency model, management may involve utilizing management techniques from a variety of other approaches, as appropriate.

McKinsey (*in* Peters and Waterman, 1982) recognized that a number of factors must be considered when analyzing an organization:

- strategy;
- structure;
- systems;
- skills;
- staff;
- style; and
- shared values.

Thompson (1995) identified the following additional organizational characteristics:

- setting;
- size;
- substance; and
- stage of development.

McKinsey and Thompson's organizational characteristics contain both structural and behavioural elements. The sets of characteristics also allude to differences in organizations due to size, setting, stage of development and style. These sets can only be handled by a contingent approach.

The Contingency model indicates that each organization is somewhat unique, and that each EMS must necessarily be a somewhat unique solution. The Contingency Approach requires the identification and understanding of alternative ways of introducing EMSs. Contingency suggests that successful EMS introduction may be very complex.

3. ENVIRONMENTAL MANAGEMENT SYSTEMS

Consideration of EMS introduction requires an understanding of factors necessitating its development and what, in fact, an EMS should be. The following chapter provides a synthesis of information on processes and elements involved in EMSs.

3.1 DEFINITION OF AN EMS

The Canadian Standards Association (1994, p. 2) and the British Standards Organization (1994, p.6) defined an EMS in terms of components:

the organizational structure, responsibilities, practices, processes, and resources for implementing environmental management.

This definition reflects a structural approach to EMSs.

Setting an organization's EMS within the overall management system and relating EMSs to environmental policy, the International Organization for Standardization (1995, p.7) described an EMS as

that part of an overall management system that includes organizational structure, planning activities, responsibilities, practices, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environmental policy.

Using a functional perspective, Thompson (1995) defined an EMS as a management system that enables an organization to:

- establish appropriate environmental goals and objectives; and
- ensure that continuous improvement is made in achieving these goals and objectives.

Without an environmental management system, an organization's approach to environmental issues will likely be inefficient and ineffective, and reactive rather than anticipating and avoiding environmental liability. An EMS should allow a company to learn to improve its environmental performance.

3.2 DRIVING FORCES

3.2.1 Introduction

Effective introduction, design, and implementation of an EMS requires an understanding of the forces that drive an organization's environmental actions. Although current standards for environmental management systems do not seem to fully recognize the importance of driving forces in environmental management, it is crucial that the driving forces, and their relative importance, be identified so that the EMS can be designed to deal with these forces.

3.2.2 Previous Work

Identification of the forces propelling environmental initiatives has ranged from the development of lists of specific drivers to attempts to categorize motivators according to source or the stage of environmental performance the company is at.

Taking a broad approach, Linnanen, Bostrom and Miettinen (1995) identified three categories of environmental driving forces:

- ecological;
- societal; and
- consumer behaviour changes.

Epstein (1996, pp.2-3) grouped environmental driving forces according to three stages of implementing a corporate environmental strategy involving (1) regulatory compliance, (2) efficient use of resources, and (3) sustainability:

- Stage 1 organizations, which manage regulatory compliance "develop environmental management programs in response to increases in both external pressure and internal awareness. Stage 1 organizations are motivated by concerns about the potential liability exposure they may face. They realize the possible risks, such as litigation and cleanup costs, associated with current practices; and they develop systems for identifying and monitoring physical risks and hazards relative to regulatory requirements...."
- Stage 2 organizations "realize that using resources more efficiently can gain them a competitive advantage"
- Stage 3 organizations "have fully integrated environmental considerations into corporate life....Stage 3 companies recognize that long-term economic growth must be environmentally sustainable."

In 1992, Greeno and Robinson listed several forces which can motivate an organization's environmental approach:

- demands by stakeholders to measure, document and disclose environmental performance;
- competitive and strategic advantage;
- demands of sustainable development; and
- stiffer regulatory requirements.

After surveying 117 British organizations, Williams, Medhurst and Drew (1993) recognized a number of environmental driving forces which echoed those identified by Greeno and Robinson:

- increasingly stringent environmental legislation and enforcement;
- increasing costs for environmental control and disposal;
- increasing investor interest in an organization's environmental performance;
and
- increasing environmental expectations from the local community and work force.

A 1996 survey of privately held and publicly owned Canadian corporations identified numerous environmental motivators of corporations. Ranked according to the percentage of respondents who considered them important factors, the drivers in the KPMG survey included:

• compliance to [sic] regulations	92%
• director/officer liability	72%
• employees	63%
• cost savings	52%
• customer requirements	46%
• insurers' requirements	48%
• shareholder's concerns	44%
• public pressure	39%
• marketing advantages	31%
• lenders' requirements	32%
• underwriters' requirements	29%
• voluntary programs	29%
• supplier requirements	18%
• international standards	17%
• interest groups	16%
• trade considerations	12%

Thompson (1996) organized the driving forces into eleven categories:

- stricter environmental laws and enforcement;
- regulatory requirements;
- liability;
- lending institutions;
- investors;
- insurance;
- employee concerns;
- marketplace;
- ENGOs and other stakeholders (public);
- international standards and trade agreements;
- industry and corporate codes; and
- accounting practices.

Upper management of the businesses who were surveyed for this study recognized two environmental motivators: liability and regulatory requirements. Other drivers were not volunteered as motivators by the interviewees. However, when prompted with a list of possible drivers, the interviewees identified industry and corporate codes, requirements by investors, lending institutions and insurers, public opinion, and accounting requirements as motivators. Other drivers, such as employee concerns, the marketplace, and international trade standards and trade agreements were not thought of as being important factors by the individuals who were contacted. The lack of recognition of these other drivers by company executives does not necessarily negate these drivers as influences on companies' environmental activities. It may indicate that some drivers are unrecognized by management.

The author's experience does not coincide with much of the results of the KPMG study. This may reflect a gap between the public face of corporations and their actual motivations and approaches, or it may be the result of surveying different types of groups, or other problems in the surveying process.

3.2.3 Driving Forces Included In This Study

Driving forces that were included in this study were categorized according to the system outlined by Thompson (1996). This categorization was found to fit best with the author's observations of driving forces.

Thompson's list of drivers could possibly be grouped so that forces related to "asset value" (lending institutions, investors, and financial liability) are grouped together (Figure 5). "Company image" could encompass employee concerns and some external stakeholders concerns. In some jurisdictions, "stricter environmental laws and enforcement" may be replaced by "de-regulation or regulatory reform" as drivers.

Another approach to grouping driving forces could be to differentiate them according to whether the driver is "hard" or "soft". Hard drivers would be those drivers whose results are tangible or easily discernible, amenable to measurement, and are most easily understood and accepted by management.

Soft drivers would involve issues that are more value-laden or intangible, difficult to measure and that might be difficult to explain. Categorization of driving forces according to type or ease of measurement would link the drivers with the type of environmental performance measurement which could be used to assess how these forces are being met.

Environmental Driving Forces (Thompson, 1996)	Forces by Category	Type of Driver
stricter laws and enforcement	legal - regulatory requirements	hard
regulatory requirements		hard
liability		hard
lending institutions	asset value	hard
investors		hard
insurance		hard
employee concerns	stakeholder concerns	soft
market place		soft
ENGOS and other stakeholders (public)		soft
international standards and trade agreements		soft (in the oil and gas industry) to hard (for companies selling internationally)
industry and corporate codes		soft
accounting practices		soft to medium

Figure 6. Categorization of Driving Forces.

3.2.4 Discussion of Individual Driving Forces

Liability

Environmental liability is one of the primary driving forces behind seeking an EMS. In the 1996 KPMG survey, 72% of corporations surveyed named director/officer liability as a driver of environmental initiatives. Regulatory compliance was named as a driver by 92% of those responding to the survey. All companies who have expressed an interest in developing an EMS to the author, have named liability (personal and corporate) as their primary motivator. During the interviews for this study, the head of one corporation's environmental department declared that "All I want to do is stay out of jail".

Environmental liability may be legal or financial. Legal liability may be statutory, civil or contractual in nature.

Civil suits for environmental damage may be a threat where:

- there have also been criminal charges;
- where existing legal and regulatory requirements do not cover the environmental issue;
- where individuals or environmental groups do not feel that regulations have been adequately enforced; or
- specific individuals, corporations or groups can prove damages.

In some instances, legislation may specifically facilitate civil action. For example, under the Saskatchewan Water Corporation Act (1984, Section 44), any person who diverts or impounds water without authority is liable for civil action by any person who is damaged.

Notable examples of recent civil actions in Canada include a suit against TransAlta Utilities by the Rocky Mountain Ecosystem Coalition for the interruption of fish habitat in the Kananaskis River, Alberta, and a suit by the Friends of the West Country environmental group against the federal fisheries department for

not triggering an environmental assessment of a logging road in the Rocky Mountain Foothills (Laghi, 1996).

Three levels of environmental offenses: have been recognized in Canadian Law (*R.v.Sault Ste. Marie* [1978] 2 S.C.R. 1299, 85 D.L.R. (3d));

- knowingly committed offenses;
- strict liability offenses; and
- absolute liability offenses.

In knowingly committed offenses, or "true crimes", wrongful intention (*mens rea*) on the part of the defendant must be proven. A defense of reasonable care ("due diligence") is possible in the case of strict liability. In offenses of absolute liability, (*actus reus*) the defendant cannot defend himself by showing he was free from fault.

Not meeting federal and provincial regulatory requirements may result in significant legal liability for companies and individuals. Penalties may include fines and/or jail sentences.

A recent sentence against Dow Chemicals involved the highest environmental fine assessed in Alberta. In this action, Dow Chemicals pleaded guilty to three offenses under the Alberta Environmental Protection and Enhancement Act. In addition to a \$150,000 fine, the judge ordered that Dow set up a \$75,000 trust account for university research on air pollution and an additional \$75,000 trust fund for the development of a monitoring program (Alberta Environmental Protection, 1996).

Legislation has established that directors and officers of a corporation may be held liable for environmental actions of their companies. The Canadian Environmental Protection Act (Section 12) and the Alberta Environmental Enhancement and Protection Act (Section 128) stipulate that:

Where a corporation commits an offense under this Act, any officer, director or agent of the corporation who directed, authorized, assembled, assented to or acquiesced in or participated in the commission of the

offense is a party to and guilty of the offense, and is liable to punishment provided for the offense, whether or not the corporation has been prosecuted or convicted.

The Bata case (*R. v. Bata Industries Limited, Douglas Marchant, & Keith Weston.*, 1992, 7, C.E.R.L. (N.S.) 245; *Journal of Environmental Law*, 1994) demonstrated that company directors may be held accountable for environmental damage caused by their company. Bata's president and general manager were found guilty of failing to take all reasonable care to prevent an unlawful discharge under the Ontario Water Resources Act. One of the terms of Bata's probation order was that environmental issues were to be a mandatory item on the company's Board of Directors meeting agenda. While an appeal held that the court cannot prohibit companies from indemnifying directors if the action was brought against the company, the principle of director's liability was upheld.

More recently, two directors of the Iroquois Pipeline Operating Company were found criminally liable for state (New York) and federal (U.S.) environmental violations. Iroquois Pipeline was assessed the second largest environmental fine in American history (\$18 million U.S. in federal fines and \$4 million U.S. in state fines) and the directors were sentenced to 6 months of confinement within their personal residences. The court declared that the sentence for the directors would have been greater had they not promised assistance in prosecuting others involved in the pipeline violations. Although the Iroquois Pipeline case was American, this case has also affected the way Canadian directors perceive their environmental liabilities. One of the Iroquois Pipeline directors was a well-known Canadian businessman and as the case received widespread publicity in the Canadian business press (*Calgary Herald*, 1996).

In August 1996, the U.S. Environmental Protection Agency (EPA) seized \$152 million (U.S.) in shares in a Canadian mining company (Inco) owned by executive Robert Friedland for alleged environmental violations in the United States. At the time that charges were laid against Mr. Friedland, a U.S. official declared that :

Polluters are now on notice that they cannot create an environmental hazard in this country, then turn off the lights and walk across a border.... The Justice Department has the will and the creativity to seek relief

available in foreign countries ... to obtain restitution for expenditures polluters have caused in the United States. (Hunger, 1996 *in* Corcoran, 1996)

Although the specifics of the EPA's case against Mr. Friedland did not hold up in a recent judgment, this case also illustrates the potential for great financial liability associated with a company's environmental actions.

In cases of strict liability, companies and their directors and officers may not be held accountable for environmental violations if they are able to establish that they took all reasonable precautions to avoid the violation. The defense of "due diligence" was established in Canada in 1981 in the Rohan's Rockpile Ltd. and Lowther case. In *R. v. Sault Ste. Marie* (1978, 2 S.C.R. 1299, 85 D.L.R. (3d) 161), the court noted that a defense of due diligence "involves consideration of what a reasonable man would have done in the circumstances" and that the defense of due diligence "will be available if the accused reasonably believed in a mistaken set of facts which, if true, would render the act of mission innocent, or if he took all reasonable steps to avoid the particular event." Due diligence also appears as a specific element in some legislation, including Section 215 of the Alberta Environmental Protection and Enhancement Act.

In the United States, the establishment of an EMS (based on BS 7750 and ISO 8800) was used by the 3M Corporation in an appeal which saw an environmental fine of \$1.2 million reduced to \$50,000 (768 Fed.2; Quevedo, 1997). Canadian case history has also established that effective environmental management by an organization may be used to demonstrate diligence. In *R. v. Courtaulds Fibers Canada* (1992, 9.C.E.R.L. (N.S.) 313 (Ont. Prov. Div.)), the Ontario court found that:

reasonable care and due diligence do not mean superhuman effort. They mean a high standard of awareness and decisive, prompt and continuing action.

A "high standard of awareness" requires feedback, which may involve EMS elements such as monitoring and auditing, and communications. "Prompt and continuing action" involves continuous improvement.

Citing environmental management systems specifically, the Supreme Court of Canada (*in* Daisley, 1996) ruled that an employer may not be liable for an act if it has:

exercised all reasonable care by establishing a proper system to prevent the commission of the offense and by taking reasonable steps to ensure the effective operations of the system.

The requirement for "a proper system" precludes the "as required" approach that some organizations take towards environmental management. Prevention requires anticipation. Therefore, due diligence requires a formalized, proactive system that anticipates and prevents.

The implementation of an EMS within an organization may be used to demonstrate due diligence if the EMS is effective and provides for decisive, prompt and continuing environmental action. The requirement for an EMS may also be part of sentencing of companies who have violated environmental regulations. In *R. v. Prospec Chemicals Ltd.* (Alta. L.R. 2d (Jud. Dist. Ft. Sask. P.C.)), the requirement to be certified under the ISO 14001 Environmental Management Systems Specification was part of the judgment against Prospec Chemicals. This was the first case in Canada where the courts specifically required that a company develop an EMS.

The effect of the possible environmental legal liability on a director or manager's approach to management of environmental issues within an organization should vary with their:

- knowledge of legal cases involving environmental liability; and
- perception of the severity of cases prosecuted and of the penalties invoked.

The effect of legal liability on corporate environmental actions should, therefore, shift over time as awareness of legal cases, and the severity of environmental penalties changes.

Regulatory Requirements

Another factor that may lead to the development of EMSs is the desire for a mechanism to allow an organization to meet regulatory requirements. This was one of the two most commonly cited reasons for interest in EMSs by those interviewed for this study. The KPMG study of Canadian corporations (1996) and a study of 18 American small-to-medium sized enterprises (Bellen, 1997) also identified regulatory requirements as a prime EMS driver.

Regulations may involve stricter environmental laws and enforcement, de-regulation or regulatory reform, or the desire to be self-governing. Some organizations may choose to introduce environmental initiatives to meet stricter requirements they believe will be in force in the future and be driven by the desire to be proactive rather than reactive. The proactive approach may offer long-term cost savings and / or competitive advantage.

In Alberta, environmental enforcement is currently being reformed and the requirement for self-regulation is increasing. The 1995-1996 Annual Report of the Alberta Ministry of Energy and the Energy Utilities Board (EUB) observed that:

Regulatory review calls for more industry accountability ... Formerly, [environmental] problems were addressed primarily through interaction among the industry, the public and EUB representatives to ensure regulatory compliance with regulations. With fewer staff resources, high industry levels and more industry operators, the Board was unable to maintain this regulatory model.

In this new approach, the Board began placing the onus on industry to assume responsibility for knowing and complying with regulatory requirements.

In October 1996, without having to go to court, the EUB ordered 547 wells closed for non-compliance isolation testing requirements (Nelson, 1996). In the past closures for this reason were rare and companies were given many warnings before any enforcement action was taken. The October closure notices reinforced the EUB's intention to move from a "Control and Command" system to a system where industry is given no second chances before regulatory measures are enforced. This reinforcement was well-noted by the industry as the closures resulted in significant cash flow decreases for some companies.

The trend towards self-regulation can also be noted in the United States, where the Environmental Protection Agency (EPA) is currently testing EMS performance. Launched in May 1996, the EPA's "StarTrack Program" allows "high-performing companies" to "commit to credible honest third-party audits of their environmental performance" (DeVillars, 1996 *in* Business and the Environment, June 1996, p.13). Test companies were selected on the basis of a record of good compliance, their having an EMS, and demonstrated pollution prevention and resource efficiency. Companies in the program are promised the benefits of expedited multimedia facility permits, limited enforcement amnesty, reduced and simplified regulatory reporting, no routine inspections, and public recognition (Business and the Environment, 1996a). Other EPA guided evaluations include the Merit Program (Reich and Barkett, 1995; Barkett, 1997), a joint project with California to evaluate ISO 14000 (Stephens, 1997), the Environmental Leadership Program and Project XL (Feldman, 1997). At a recent conference, an EPA representative noted that "at this point, there is not enough information to explore restructuring regulations." (Barkett, 1997)

However, Feldman (1997) observed that:

a management systems approach offers an opportunity to establish a new regime - an alternate regulatory pathway that would enable companies that make a commitment to "opt out" of the traditional "command and control" model.

This alternative or dual track would not replace or revamp the current system, nor would it relax any standards or performance requirements stipulated by existing regulations. Instead, it would offer regulated entities a choice: operate under command-and-control, or strive to reach the alternative track, which would be built on emerging environmental management trends and would be a more flexible, consistent and lower cost system.

Whether or not EMSs replace the command and control regulatory system in the United States, an EMS may help a company develop more a more positive relationship with environmental regulators. Citing ISO 14000, von Zharen (1996, pp.21-22) observed that:

The series has been labeled a "green passport" leading to a fast "trust track" between an organization and its regulatory body. An EMS system effectively incorporated demonstrates to an interested party that policies, objectives, and expectations have been met; that emphasis has been placed on prevention rather than corrective action; that a company can provide further evidence of reasonable care and regulatory compliance; and that the organization supports continual improvement.

Novartis, a chemical company, attributed its receiving the first incinerator license in Louisiana in fifteen years to the relationship it developed with regulators, particularly in developing an EMS (Finklea, 1997). United States Environmental Protection Agency legal counsel noted that "there can be a gravity waiver of the economic benefit in non-compliance cases" if a company has shown that it is working on environmental performance through measures such as an EMS (Riedel, 1997).

Value of Assets

An organization may also initiate an environmental program in order to avoid incurring financial liability from environmental costs or problems or a decrease in asset value. It has been noted that:

the one thing that environmental issues have forced upon real estate owners and lenders in the past several years is that there is only one kind of event that can create negative value in a property and that is environmental risk. Any other kind of loss, however catastrophic (an earthquake, for instance), can only carry the asset value down to zero. Environmental contamination can create liability where there had previously been equity. (Crittenden, 1994, p.20)

Lender Requirements

One of the major driving forces behind environmental assessments has been lending institutions. Since the Northern Badger court case (*Panamerica de Bienes v. Northern Badger*), established that environmental liability takes precedence over secured lenders, lenders have sought reassurance that property used as collateral for loans or other forms of financing, is (reasonably) free of environmental concerns. An amendment to the Canadian Bankruptcy and Insolvency Act, under proposed Bill C-5, also recognizes the primacy of environmental liability over secured creditors.

Lending institutions have increasingly required environmental site assessments for property loans (*Business and the Environment*, 1995a). As well, property purchasers have used site assessments to determine what future liabilities they may be assuming (Cube Energy Corp., 1994) and to decrease property sale price. Environmental assessments have generally been sufficient to satisfy lending institutions in the case of property loans and the financial community in North America has not required client organizations to develop an EMS. However, as environmental management systems become more common and financial institutions become more familiar with the concept and benefits of EMSs, introduction of EMSs may be driven by lending institutions and insurers. As of December 1995, 22 large international insurance companies have joined 80 commercial banks in signing a United Nations Environment Program-sponsored pledge to integrate environmental considerations into their business goals. Signatories are expected not only to make environmental progress within their own organizations, but to also encourage clients, partners, and suppliers to act in

an environmentally responsible manner. At least five major European insurance companies are taking their customers' environmental performance into account when setting premiums (*Business and the Environment*, 1995c&f).

Accounting Requirements

The requirement for a system in which to carry out environmental accounting may also be a driving force for environmental management systems. The development of environmental accounting concepts and practices by the Canadian Institute of Chartered Accountants and other accounting bodies signals that environmental accounting is a growing part of financial management. The Canadian Institute of Chartered Accountants (1990, Section 3060) has determined that costs of remediation and other environmental liability must be accrued against the assets of a company:

When reasonably determinable, provisions should be made for future removal and site restoration costs, net of expected recoveries, in a rational and systematic manner by charges to income.

Future removal and site restoration costs include costs, net of expected recoveries, for dismantling and abandoning a property. Provisions are needed to accrue the liability for future removal and site restoration costs, when the likelihood of their occurrence is established as a result of environmental law, contract or because the enterprise has established a policy to restore a site, and when such costs can be reasonably determined. Provisions are recorded as liabilities and are not classified with accumulated amortization.

Securities commissions, including the Ontario Securities, the Quebec Securities Commissions, and the United States Securities Commission require disclosure of environmental costs in annual reports. In the United States, the American Institute of Certified Public Accountants has developed a draft disclosure rule requiring more complete environmental disclosure on corporate financial statements (*Business and the Environment*, 1995d).

Investor Requirements

Corporations have begun to recognize that environmental costs / benefits can affect asset value. The CEO of Monsanto has declared that:

Monsanto has undertaken to equate [sic] environmental protection with shareowner value - not in an abstract sense, but in a business sense. We fully intend to become a sustainable industrial enterprise, and we will enhance shareowner value in the process." (Business and the Environment, 1995g, p.11)

The development of "ethical" investment funds and investor requirements that a corporation be environmentally sound, also drive environmental management. Miller and Szekely (1996) have estimated that \$625 billion has been invested in companies deemed to be environmentally-conscious.

Corporate Image

An organization may also seek to introduce an environmental management system to enhance their company image, either to external parties, such as the public, government regulators, and the media, and/or to internal stakeholders, such as shareholders and employees. The Canadian Institute of Chartered Accountants (1994, p.14) noted that environmental activities of a corporation may affect employees in that:

- sustainable profitability affects their job security;
- environmental performance affects their personal health; and
- environmental practices may challenge their personal values.

In an informal survey of business representatives from 17 countries by the International Institute for Sustainable Development (1992), over half of the respondents noted community and interest group pressure as important forces in encouraging businesses to improve their environmental performance and their communication with stakeholders.

While a survey of small and medium-sized enterprises in Britain found that only 5% of businesses surveyed thought they could increase customer satisfaction through improved environmental performance, 41% of the surveyed businesses reported that they have been asked about environmental performance by customers (*Business and the Environment*, 1995b). A survey of 115 large North American manufacturing firms found that 61% of respondents said that meeting ISO 14001 standards could offer potential competitive advantage (*Business and the Environment*, 1995e). In his company's 1994 annual report, Baxter International Inc.'s CEO observed that Baxter's environmental program is "returning dividends in the form of cost reductions, reduced liability, enhanced customer relations and positive public image" (*Business and the Environment*, 1995g, p.10).

Industry and Corporate Standards

Environmental management initiatives may also be driven by industry, corporate and international standards. Some industrial and business organizations are now advocating the use of EMSs. These organizations include the Canadian Association of Petroleum Producers, which has recently developed guidelines for introducing a basic environmental program, and the Canadian Institute of Chartered Accountants. Other organizations, such as the Canadian Chemical Producers Association, the Canadian Pulp and Paper Association, the Canadian Manufacturers Association, the Canadian Petroleum Institute, the Mining Association of Canada, and the Canadian Bankers Association have developed Codes of Practice which provide guidelines on managing environmental issues.

International Standards and Trade Agreements

If an organization is international or trades outside of its country of origin, international standards and agreements may be a driver for environmental management systems. An ISO-certifiable EMS is expected to become an

important factor for suppliers who trade with the European Union and other countries which have adopted the ISO EMS standards:

Companies with major export markets may be more likely to get value from ISO 14001 certification. Interest in environmental management standards tends to be strongest outside North America, and companies with significant operations in Asia or Europe may want to give serious consideration to obtaining ISO certification. (Arthur D. Little Inc. *in Business and the Environment*, October 1996, p.2)

Countries may use EMSs as standards by which to select trade partners and lack of an EMS may be a non-tariff barrier to trade.

Porter (1990,1991) also argued that attention to environmental performance enhances the competitiveness of a company, particularly if they operate internationally.

Requirements By Partners or Clients.

A growing number of business partners and clients are requiring organizations they deal with to have environmental policies or systems in place. For example, members of the Canadian Chemical Producers' Association Responsible Care Program must ensure that their suppliers, distributors, and customers meet standards set out in the program's code. In Europe, two influential companies, Daimler-Benz and Siemens AG are requiring that their suppliers meet European Eco Management Scheme EMS standards (Quevedo, 1997).

Cost Avoidance

An effective EMS allows an organization to avoid costs which might otherwise be incurred. Costs which may be avoided include:

- fines;
- civil damages;
- legal fees;
- remediation costs;
- wasted or unnecessary materials;
- waste disposal;
- increases in insurance premiums;
- revenue loss associated with production slow-downs or shut-downs;
- employee time taken in reactively dealing with environmental issues;
and
- administrative fees that may be imposed by regulatory bodies.

These costs may be difficult to quantify until they are incurred, but they may be significant and their avoidance must be considered when assessing the benefits of an effective EMS. Researchers including Smart (1992), Bonifant *et al* (1995), Porter and van der Linde (1995), Repetto (1995), and Hart and Ahuja (1996), Kurtzman (1997), and Millman (1997) have linked positive environmental performance with positive corporate financial performance. The Intel factory at Rancho Rio, California, recently reduced liability insurance by 20% by identifying environmental issues at the design stage and changing some processes (Quevedo, 1997).

3.2.5 Evolution of Driving Forces

The importance of driving forces may change over time. Liability and regulatory requirements are currently key drivers. As companies become aware of other reasons for environmental management, driving forces other than liability and regulations should become more prominent. For example, financial requirements and accounting practices will become more important as financial institutions and investors become more familiar with environmental issues and environmental management, and as environmental accounting becomes part of Generally Accepted Accounting Practices.

3.2.6 Processes for Identifying Driving Forces

As the results of the survey indicate, EMS driving forces may vary from organization to organization. The environmental driving forces for a particular organization must be specifically identified and ranked. Processes used to identify the driving forces specifically affecting a company may include:

- a checklist of generic driving forces;
- a stakeholder analysis, in which stakeholders are identified then queried as to forces which they believe affect the need for environmental management in an organization; and
- a situational analysis, in which the organization's past environmental history and of current environmental conditions and needs are assessed. A situational analysis may include environmental audits and assessments of the company and its facilities.

3.3 ELEMENTS OF AN EMS

The elements of an EMS are generally framed within a plan-do-act-monitor cycle. For example, the EMS model developed by the International Organization for Standardization (1996) involves planning, implementation, checking and corrective action (Figure 7).

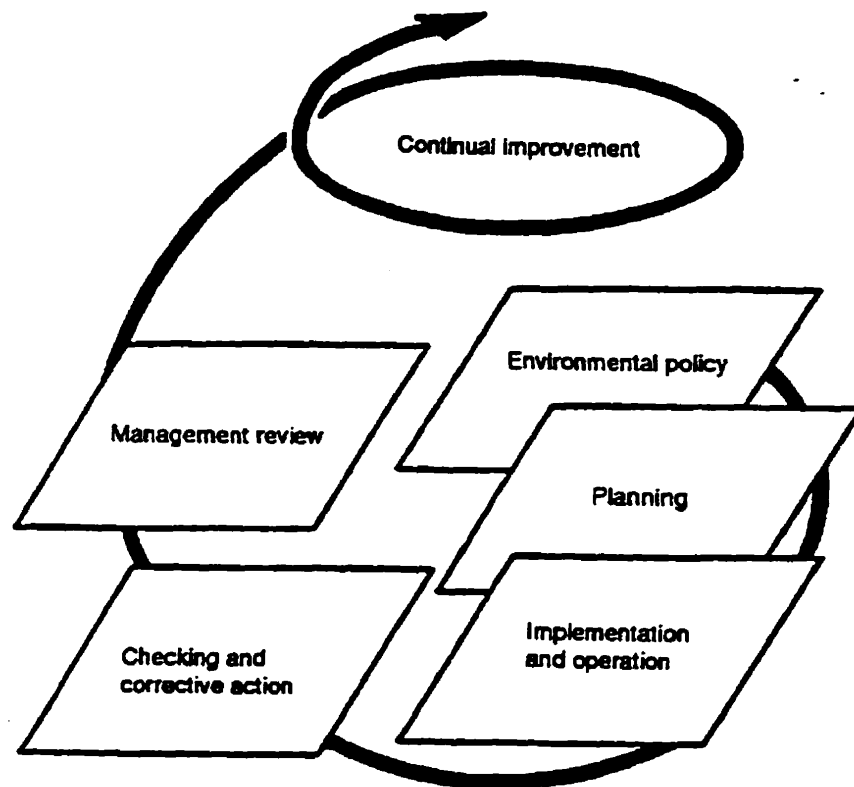


Figure 7. ISO 14000 Environmental Management System Model (International Organization for Standardization, 1996).

Proposed EMS cycles are compatible with organizational development theory (O.D.), which has been developed as part of the organizational behaviour based approach. A summary of the O.D. theory, offered by Ott (1989, p.514) recalls many of the elements an EMS plan-do-act-monitor cycle:

O.D. practitioners have developed numerous strategies and techniques for improving organizations: Most of them utilize *interventions* facilitated by outsiders (often called *change agents*). Some of the most common strategies include organizational diagnosis, process consultation, team building (in many forms), action research, data feedback, job enlargement, job enrichment, and conflict management. But each author has his or her own preferred tactics. For example, in one of the best known such lists, Schmuck and Miles (1971) include: training and education, process consultation or coaching, confrontation meetings, data feedback, problem solving, goal setting, O.D. task force establishment, and techno-structural activity.

As Ott has noted, organizational development practitioners may have preferred "tactics" or approaches to organizational improvement. The author has found that the EMS cycle developed by Thompson (1995) includes key EMS elements and is the most workable EMS model available. Thompson's model for designing and implementing an EMS includes:

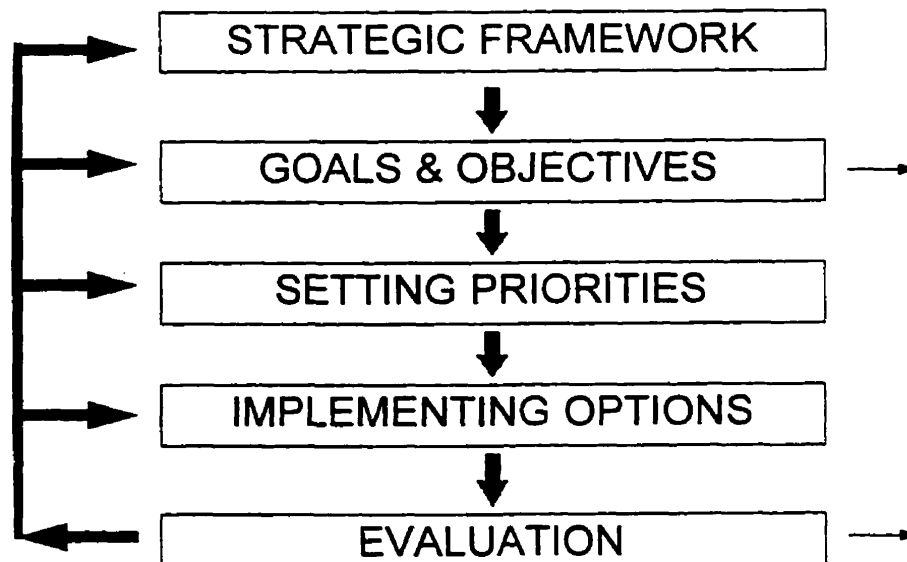


Figure 8. Thompson's EMS Model (Thompson, 1995).

Individual elements of the EMS are interdependent. The individual elements must work well both individually and together.

This model is suitable for larger organizations which can commit to extensive process and development phases, however, this model may be difficult to apply in small organizations due to the limited scope of work they may be willing to undertake. Strategies for overcoming this barrier are discussed in Section 6.5.

3.3.1 Strategic Framework

Following from the driving forces, the strategic framework is the means by which an organization defines its purpose, its values and its future vision. The organization's environmental policy is a guide to the organization's strategic framework and is the foundation of an EMS, guided by strategic planning.

The environmental policy represents the organization's commitment to environmental performance and captures central values which need to be understood by all employees. Policy (Harrison, 1986 *in* Ryley, 1995):

- defines and clarifies the mission of the organization;
- underlies the planning of future courses of action;
- delineates the assignment of responsibility and the concurrent delegation of authority at all levels;
- facilitates the managerial coordination of activities and control of outcomes; and
- provides a basis for the evaluation of managerial decision-making.

Elements within the policy should be tied to aspects of the environmental management system, objectives and targets. In order to show due diligence, the organization's environmental policy must be followed through with appropriate actions. Discrepancies between the environmental policy and an organization's

actual performance could potentially damage the company's credibility, so while the policy should set laudable goals, the goals should also be realistic.

Goals are the general direction in which the corporation wishes to go. The Canadian Standards Association (1994) has described goals as "the overall aims in terms of environmental performance." The goals should be contained within the company's environmental mission statement.

The environmental policy should be reviewed and amended as needed, so that it adequately reflects the corporation's intent as internal and external driving forces affect the company's environmental issues and as the company makes progress in environmental issues. Thompson (1995) has suggested that policy should be reviewed on an annual basis.

3.3.2 Objectives and Targets

After the corporate environmental policy, including environmental goals, has been set, objectives and specific targets should be developed to guide the EMS.

Objectives are more specific than goals in what the company wishes to achieve. The objectives should move the company towards its goals. Objectives should be summarized by the company's environmental policy and there should be one or more objectives for each policy issue.

The goals and objectives will determine which environmental management tools the company will use.

Targets are objectives within a specific timeframe. The Canadian Standards Association (1994) has described targets as "the detailed performance requirements" of an organization. Targets should be measurable so the corporation can assess the efficacy of its efforts. The target should also be associated with a timeframe or target date to ensure that action takes place.

As the EMS includes continuous improvement, objectives and targets will change as targets are met or re-set.

3.3.3 Prioritization and Selection of Options

Resources (including finances, personnel, and time) are limited. Environmental issues must be ranked so that a prioritized sequence for taking action can be developed. An analysis of the forces driving environmental management at the company, and risk assessment, may be used in prioritization.

3.3.4 Implementing Options

An important distinction between planning and management is that management entails implementation (Thompson, 1995). While current EMS standards and guidelines offer frameworks for an EMS, they provide little information on how the EMS can actually be implemented. Although the EMS must be tied to environmental driving forces, current standards do not link these forces with an EMS framework. The challenge in implementing an EMS is, therefore, applying EMS theory to actual corporate situations (which include the corporation's current management style and structure and the corporation's environmental driving forces), as illustrated in Figure 9.

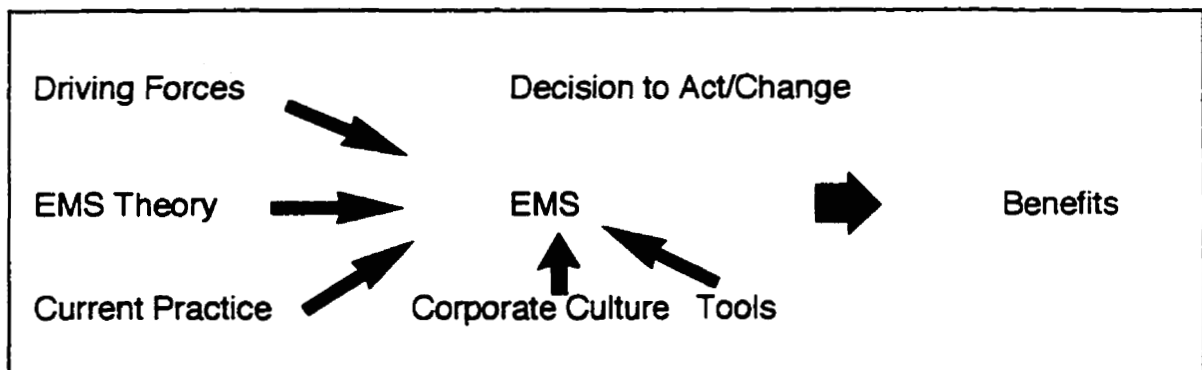


Figure 9. Elements of EMS Implementation.

Implementation of the options a company selects for dealing with environmental issues will involve environmental management tools. Thompson (1996) recognized 15 EMS tools:

- list of driving forces;
- management structure;
- environmental policy statement;
- strategic environmental planning and assessment;
- environmental impact assessment;
- product and technology assessment;
- life cycle assessment;
- life cycle costing;
- environmental audits;
- environmental indicators;
- environmental reporting;
- new systems of accounting;
- risk management;
- economic instruments; and
- education and training.

Other elements which might be added to the above list include environmental operating guidelines and procedures, and environmental information systems. The appropriate environmental management tools must be selected and fitted into the company's EMS framework in order for the EMS to work effectively.

3.3.5 Evaluation and Continual Improvement

Evaluation of how well the environmental goals, objectives and targets of the organization are being met by the EMS is necessary to ensure that the system is meeting the company's needs. Evaluation may be informal or may involve processes such as an EMS audit, performance assessment (including development and use of environmental performance indicators) and audits. There may a distinct difference between an EMS audit and performance

measurement. EMS audits may be focused on determining whether the process elements required in an EMS are in place and are functioning. EMS audits usually refer to formal EMS standards. Performance measurement is focused on determining changes in an organization's environmental performance. This is then taken as a measure of the effectiveness of the EMS.

Continual improvement, where each step is assessed and, if necessary, re-designed, is required so that:

- the system continues to improve;
- the system moves towards appropriate goals and objectives;
- the system can adapt to change as it takes place;
- due diligence requirements can be met; and
- the system can be sustained.

3.4 EMS STANDARDS

A number of organizations have developed guidelines for environmental management systems. These standards include:

- EMAS
- BS 7750
- GEMI
- CSA Z750
- ISO 14000 series

There has been some controversy as to the benefits and advantages of the specific EMS standards outlined above. Depending on a company's driving

forces, and the size and state of development of its EMS, one system may be preferable to another. Implementation of an EMS may also involve a hybrid of several recognized EMS systems or the development of an EMS framework that is unique to an organization.

3.4.1 EMAS

The European Eco Management and Audit Scheme (EMAS) was published in 1992 for use by the European Community (Quality Network, 1996a) EMAS is a voluntary program requiring a documented environmental protection system and audits of an organization's environmental activities.

EMAS requires an extensive initial review of a company's environmental issues. The review must include (Quality Network, 1996a):

- quantified data on current emissions and environmental effects from the site;
- quantities of waste generated;
- inputs into the production process (including raw materials, energy and water);
- an assessment of current applicable regulations and an assessment of whether these are currently being met; and
- information of other environmental issues related to the site.

EMAS emphasizes improvement in environmental performance. An externally validated public environmental statement is required under the scheme as is public access to a company's environmental policies, programs and EMS. The Scheme also stipulates that a company must carry out environmental audits every three years or more frequently and prepare a register of environmental effects of their activities.

EMAS is site-specific and was designed for the industrial sector. However, non-industrial activities have been included under EMAS recently on an experimental basis (*Business and the Environment*, 1996).

3.4.2 BS 7750

Developed by the British Standards Institute, the BS 7750 Specifications for Environmental Management Systems (British Standards Institute, 1994) was first introduced in 1992 and updated in 1994 (Quality Network, 1996b). BS 7750 was designed to conform to EMAS and ISO 14000 requirements.

BS 7750 is a rigid prescriptive program emphasizing documentation. Under the program, an organization must have an environmental policy that :

- is fully supported by senior management of the company;
- assures compliance with applicable regulations;
- contains a commitment to continuous improvement; and
- is available to the public as well as the organization.

3.4.3 GEMI

Developed by a group of 23 American companies, the Global Environmental Management Initiative (GEMI) was founded to "promote a worldwide business ethic for environmental management and sustainable development, to improve the environmental performance of business ... and to enhance the dialogue between business and its interested publics." (Global Environmental Management Initiative, 1993, pp.11) GEMI has developed a Total Quality Environmental Management system (TQEM) that combines environmental management with the Total Quality Management approach. GEMI's TQEM takes a customer-satisfaction approach, defining customers as consumers, legislators,

regulators, community and national environmental groups, and internal stakeholders. The basic elements of GEMI include:

- identifying the customers;
- continuous improvement;
- doing the job right the first time; and
- taking a systems approach to work.

3.4.4 CSA Z750

CSA Z750 was designed by the Canadian Standards Organization (1994) as an interim environmental management system guideline to be used until ISO 14000 became available. The system is voluntary rather than registration-oriented and offers broad guidelines for the development of an EMS. CSA Z750 contains four main aspects:

- focusing of the organization on what needs to be done;
- commitment to take appropriate action;
- organization support for the organization's environmental objectives; and
- continuous improvement.

CSA provides the basic elements and theory behind EMSs. However, it is very general and is not international in scope.

3.4.2 ISO 14000 Series

Governed by the International Standards Organization, ISO 14000 (International Standards Organization, 1996) was built on an earlier quality management system - ISO 9000. ISO 14000 outlines a framework for the process of managing

environmental issues. It does not offer performance standards. ISO 14000 was intended to provide international standards for environmental management and has been adopted as a standard in a number of countries. ISO 14000 certification is, or may become, a requirement for companies who wish to have access to certain markets.

ISO 14001 is designed for third-party verification and registration. The other components are guidance documents only. ISO 14001 contains only those elements of the EMS that can be audited. 14004 provides guidelines on developing and implementing an EMS.

ISO 14001 outlines a five-stage process:

- (1) Commitment and Policy;
- (2) Planning;
- (3) Implementation;
- (4) Measurement and Evaluation; and
- (5) Review and Improvement.

Unlike EMAS where auditing is to be used to determine actual environmental performance, auditing within ISO 14000 only requires an assessment of how the EMS process is working.

Kurtzman (1997) observed that ISO 14000 does not specifically include the following:

- employee health and safety;
- community involvement;
- product stewardship;
- second party assessments;
- new product development
- former sites;
- productivity; and
- public policy development.

Regulatory compliance is mentioned in ISO 14000, however, it is not an important element in the standard, and auditing of the system does not include compliance auditing.

The United States Environmental Protection Agency and the American Society for Quality Control hope that the ISO 14000 framework may be extended beyond the standards to include other elements, such as compliance and environmental performance measurement. In piloting ISO 14000 standards to determine whether they may serve as a "dual track" or "green Track", the EPA (Reich and Barkett, 1995) noted that:

A narrow reading of these requirements is that companies' self audit and the subsequent certification is limited to determining whether the company has properly operated its system and not the extent to which the company is meeting its compliance obligations. A broader reading of the standards is that companies are establishing a procedure whereby they are, in part, examining their compliance status, so that any deficiencies can be identified and corrected, consistent with the requirement of a commitment to continual improvement.

Currently, there are mixed views on the future of ISO 14000 and the need for an ISO 14000 certifiable system within North America. For example, the American Petroleum Institute declared (Rucker, 1997) that "ISO 14001 Should Not Become Explicit or Implicit Legislative or Regulatory Mandate" and that "Government should not disadvantage any organization that chooses not to implement 14001." Representing 700 utility companies (and 82% of the generating capacity in the United States), the Electric Power Research Institute's position (Radcliffe, 1997) is that the industry is "definitely taking a wait-and-see approach" in regard to ISO. However, ISO 14000 standards have been adopted by over 90 countries worldwide and they are expected to have a significant effect on environmental management in the future.

4. REQUIREMENTS FOR THE INTRODUCTION OF AN EMS

Introducing an EMS to an organization involves four key stages:

- (1) the organization becoming aware of EMSs;
- (2) obtaining the go-ahead to develop an EMS for the organization;
- (2) designing the EMS; and
- (4) implementing the EMS.

4.1 DEVELOPMENT OF EMS AWARENESS IN THE ORGANIZATION

There are many avenues for the development of awareness of EMSs in organizations. Awareness may occur on an individual or group basis. It may be brought to the company by employees or by external sources.

Awareness of EMSs may develop at different levels within an organization. The likelihood of an EMS being pursued by the company, should be related to the power (formal and informal) within the organization or the individual(s) who are interested in EMSs, the receptivity of the organization to new ideas, and the strength of EMS drivers. Development of awareness is an educational process which should be most successful when linked with need and benefits.

4.2 OBTAINING THE GO-AHEAD TO DEVELOP AN EMS

Corporate executives and upper managers are the key decision-makers in almost all corporations. Their go-ahead must be obtained in order to design and implement an EMS for their corporation. (Strategies and processes for introducing EMSs and obtaining commitment are discussed in Chapter 6.) Case law and legislation have assigned the bulk of environmental legal liability to these individuals and most EMS standards specifically vest responsibility for an EMS with upper management. Executive commitment is also required so that:

- funds will be allocated for the development of the EMS;
- an environmental policy which is compatible with corporate goals and objectives can be developed;
- information necessary for the development of the EMS can be made available;
- employees can be directed to cooperate with the development of the EMS; and
- the EMS is perceived as part of the recognized corporate culture.

The corporate decision-makers who were contacted during this study reported that they had become aware of EMSs through:

- discussions with their lawyers;
- discussions with their peers;
- articles in newspapers;
- seminars sponsored by professional organizations (such as the Canadian Association of Petroleum Producers); and
- presentations by environmental consultants.

Organizations may also become aware of EMS through contact with regulatory officials, bankers and financiers.

These initial introductions to EMSs must usually be enhanced with further education prior to the decision-makers committing to the development of a corporate EMS. The author's experience has been that the benefits of an EMS and the process used to develop an EMS must be outlined in a brief (15 to 30 minute) initial meeting with a company's senior management. Several additional meetings may be required to answer further questions about EMSs or to offer a specific proposal for EMS development.

Go-ahead then, usually, takes the form of provision of funds (in the case of an external consultant) or the direction to proceed, time and resources (in the case of internal development).

4.3 DESIGNING THE EMS

In its discussion of EMS implementation and operation, the International Organization for Standardization (1995, Section A.4.3) listed a number of requirements for EMS implementation:

- commitment of all of the employees of the organization;
- establishment and maintenance of procedures for identifying training needs;
- implementation of a procedure for receiving, documenting and responding to relevant information and requests from interested parties;
- a description of the core elements of the EMS and their interaction;
- direction on where to obtain more detailed information on the operation of specific parts of the EMS;
- creation and maintenance of documents in a manner sufficient to implement the EMS;
- establishment and maintenance of procedures for investigating and correcting non-conformance; and
- review and evaluation of the EMS at defined intervals.

However, aside from outlining the above requirements, the International Organization for Standardization does not offer much specific guidance on how introduction and implementation of the EMS should take place. While the ISO speaks of the requirement for commitment, it does not offer suggestions on how to obtain it.

The Canadian Standards Association (1996) has issued a workbook that "walks" companies through some of the elements required for an ISO 14000 EMS. While the format of the workbook makes it easily usable, the process of EMS design and implementation is oversimplified and it does not contain important elements such as an assessment of driving forces.

The Responsible Care Management Systems for Health, Safety and Environment, developed by the Chemical Industries Association (1995) provides more specific suggestions for development and implementation of a Health, Safety and Environment system. It includes elements such as:

- initial review;
- development of policy and objectives;
- development of an organizational structure, including management representation, resources, communication, training and documentation;
- identifying requirements;
- setting targets and plans;
- aspects of implementation including personnel; and
- monitoring; and management review.

The following process of EMS design and implementation is based on work by Thompson (1995) and the author's experience.

4.3.1 Needs Assessment and Analysis of the Driving Forces

The first step in designing an EMS should be to determine what needs it must meet. These needs may be determined by identifying the environmental driving forces which affect the company and the current environmental status of the company. This analysis can be carried out through:

- interviews with company management;
- a review of company environmental records, including past audits and assessments;
- use of checklists to review issues;
- visits to company facilities to develop an informal or formal assessments or audits;
- discussions with company employees;
- discussions with relevant regulatory officials and other external stakeholders (such as neighbouring land owners and ENGOS);
- an analysis of environmental driving forces affecting the industry the company belongs to; and
- review of current activities.

Needs which are identified at this stage may be verified or nullified during the remainder of the design and implementation process and additional needs may become apparent.

4.3.2 Selection of EMS Elements

EMS elements related to these driving forces should then be identified. Some elements within the EMS may not be directly necessitated by these driving forces but, rather, may be required so that the rest of the EMS can function properly.

Once elements are identified as being necessary or desirable for the EMS, they should be matched with suitable environmental management tools and

measurements so that the elements can be implemented and the effectiveness of their implementation can be measured.

4.3.3 Development of an EMS Framework

The elements must be placed within an EMS framework which fits with the elements, the driving forces (particularly if the driving forces indicate that a certain EMS standard is required), and the corporate culture. This framework, its components, and the context in which it has been derived and should be operated, should then be documented and presented to corporate decision-makers and internal stakeholders for their comments and suggested changes.

4.4 IMPLEMENTING THE EMS

The effectiveness of EMS introduction rests not only on what is introduced but also on how it is introduced. Klein and Sorra (1996, p.1055) noted that:

Increasingly, organizational analysts identify implementation failure, not innovation failure, as the cause of many organizations' inability [sic] to achieve the intended benefits of the innovations they adopt.

4.4.1 Implementation and Corporate Culture

Possible approaches to EMS introduction lie along a continuum with the introduction of an EMS which matches the corporate culture at one end of the possibilities and with the introduction of an EMS that requires great change at the other end of the spectrum (Figure 10). Change may involve what has been variously referred to as "innovation"(Klein and Sorra, 1996), "transformation" (Kotter, 1995) "paradigm shift", and "re-engineering" (Bartram, 1994; Manganelli and Klein, 1994).

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Klein and Sorra (1993) presented the following model of Determinants and Consequences of Implementation (Figure 11).

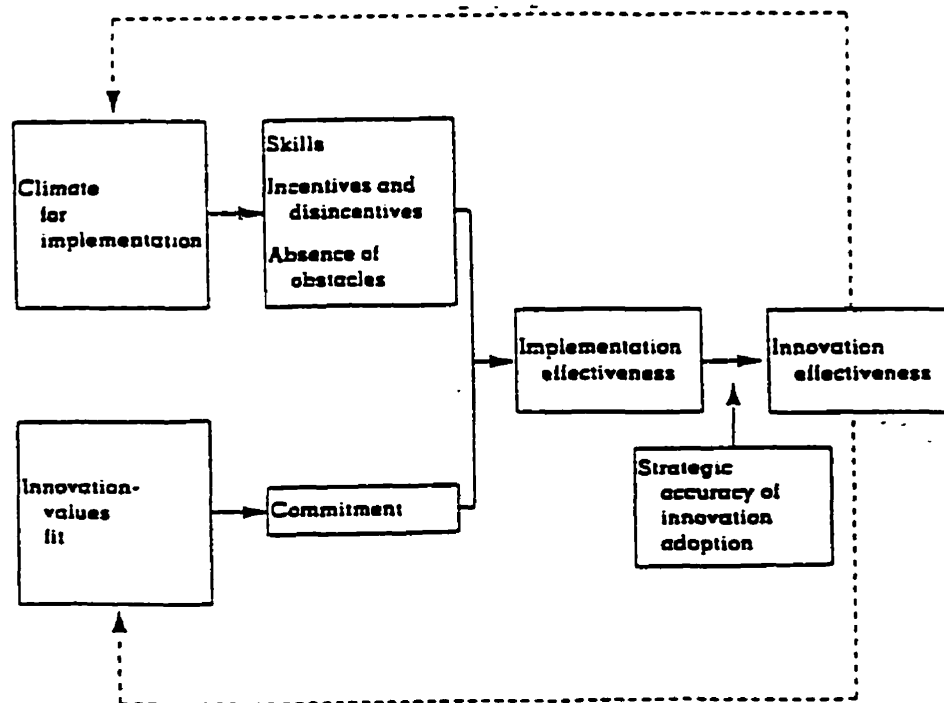


Figure 11. Model of Determinants and Consequences of Implementation.
(Klein and Sorra, 1993).

"Innovation adoption" or executive commitment is required at two crucial points in the EMS process - (1) in the decision to design an EMS; and (2) in the decision to implement the EMS. That is, both commitment and re-commitment are needed from the company's senior management. It has been the author's experience that although senior management may commit to developing an EMS, they often do not fully realize the effort (particularly the cost and change) involved in implementation until they are presented with an EMS design. At this point, they must re-commit to the process, or the EMS will remain an ineffective 'paper exercise'.

Klein and Sorra (1996) have noted that implementation involves "targeted organizational members' perception of the fit of the innovation to their values." In

the case of an EMS, implementation involves the 'buy-in' of employees who must carry out various parts of the EMS. This 'buy-in' may be facilitated through:

- senior management ensuring that employees understand the company's commitment to the EMS;
- employee education and training; and
- positive or negative reinforcement of behaviour related to the EMS.

If the EMS introduces practices or values which are new to the company, education and training will be required so that employees will meet the new demands placed upon them. Should the EMS be highly compatible with the corporate culture, education about the EMS can facilitate employee recognition of the fit of the EMS with the way they do things.

4.4.2 Implementation Timing

One other aspect of EMS introduction is timing. If a Systems Approach is taken, and an EMS considered as an organic whole, with highly interrelated components that must all be in place before the system can function, then an EMS must be introduced all at once in order to function. If, however, individual elements of the EMS are capable of functioning as stand-alones, EMS implementation may be phased. Phasing may be used to defer total cost of implementation or to reduce disruption. It has been the author's experience that some of elements of an EMS are able to temporarily function as stand-alones with some degree of success. For example, environmental operating procedures may improve environmental performance of a company unwilling to commit to a full EMS. These stand-alones offer the advantage of initiating a company to environmental management, but will not allow the company to realize the full benefits that a complete EMS can provide. A phased approach may be attempted when costs, lack of executive commitment or other factors preclude the introduction of a full EMS. The phased approach may be followed through so that a complete EMS may be eventually developed.

Factors, such as legal or regulatory requirements, may determine whether EMS implementation may be phased in. EMS drivers may preclude phasing as an option.

4.4.3 Continual Improvement

Whether or not continual improvement is required as part of a formal standard that has been chosen for the EMS, it is required in an effective EMS as continual improvement allows the EMS to:

- deal with change, including changes in regulatory requirements;
- be sustainable;
- include learning from experience;
- select priorities; and
- to improve over time.

As no system can be designed to be perfect, continuous improvement means that the process of environmental management can be started and then improved upon, rather than waiting for a non-existent perfect approach (while environmental liabilities continue to be incurred).

Learning is an important aspect of EMS implementation. As each organization's situation may be somewhat unique, implementing an EMS will involve a degree of trial-and-error. Effective implementation of an EMS will, therefore, require that the organization learn from both positive and negative experiences with initiatives. If the organization is not able to learn from or tolerate negative experiences within the EMS, commitment to the EMS may be lost. Continual improvement implies that an organization's commitment lasts over time.

5. IDENTIFICATION OF BARRIERS TO EMS INTRODUCTION

Barriers to EMS introduction were identified by synthesizing results from interviews carried out during this study (Figure 12), experience of the author, and material found in environmental management, management, and organizational literature. These barriers may include: (1) factors which affect the initial commitment to an EMS by corporate decision-makers; and (2) factors which affect the design and implementation of an EMS.

5.1 BARRIERS TO COMMITMENT

Barriers which may prevent commitment to an EMS include:

- lack of recognition of the need for an EMS;
- perceived cost of implementing an EMS;
- avoidance of the unknown;
- distrust of or unfamiliarity with management;
- reluctance to use relatively-new solutions;
- belief that current practices cannot be improved upon;
- lack of concern about environmental issues; and
- concerns about legal issues.

		<i>Unprompted Recognition</i>	<i>Prompted Recognition</i>
DRIVING FORCES	Liability	11	20
	Regulatory Requirements	32	n/a
	Lender Requirements	2	15
	Accounting Requirements	0	6
	Investor Requirements	1	5
	Corporate Image	3	14
	Industry and Corporate Standards	1	25
	International Standards and Trade Agreements	0	0
	Requirements by Partners / Clients	0	2
	Cost Avoidance	5	10
		<i>Unprompted/Prompted Recognition</i>	
BARRIERS TO COMMITMENT	Belief that the Company Does Not Need an EMS	5	
	Cost	30	
	Reluctance to Use a New Solution	3	
	Avoidance of the Unknown	0	
	Distrust of Management	2	
	Belief That Current Practices Cannot Be Improved Upon	4	
	Lack of Concern About Environmental Issues	0	

Figure 12. Summary of Information Obtained from Interviews. Numbers represent the number of interviewees who mentioned (unprompted) or agreed with (when prompted by the possible answer) the above factors affecting their company's need for an EMS. Representatives from 32 companies were interviewed, however, some interviews did not include discussion of some factors.

5.1.1 Lack of Recognition of the Need for an EMS

An organization may be at one of five states in regard to EMSs:

- unaware; or
- aware: and ignoring EMSs
 postponing dealing with EMSs
 starting EMS development
 having an EMS

Lack of recognition of the need for an EMS is a significant barrier to EMS introduction. In a 1996 survey of 426 Canadian companies, 57% of companies that did not have an EMS reported that they deal with environmental issues on an as-needed basis. An additional 22% of the survey respondents declared that they did not have an EMS because they were unsure of the benefits (KPMG, 1996). These responses were similar to responses from the companies contacted during this study.

73% of the companies that were contacted by KPMG in their 1996 Canadian environmental management survey failed to respond. This may signal lack of time or interest to respond to the survey, or a general ignorance or disinterest in environmental management. It is probable that many organizations are unaware of EMSs. Thirteen of the thirty-two companies the author contacted were unaware of EMSs.

5.1.2 Perceived Cost of Implementing an EMS

Almost all of the interviewees expressed concerns about the costs of an EMS. EMS were generally perceived as an expensive endeavour and, in several cases, their value related to their cost was called into question. None of the individuals who were interviewed spoke of any cost-savings associated with an EMS. Even when prompted by the interviewer to consider possible cost-savings which could be realized through an EMS, most of those interviewed did not seem to consider

this as a significant factor. Cost avoidance was, however, recognized by approximately half of those interviewed.

Time may also be considered as a cost. Some corporate decision makers may be hesitant to commit to an EMS fearing that the process will consume too much of their time or the time of their employees. A vice-president of one intermediate oil company observed that "I know I need to do it, but I just don't have the time."

5.1.3 Avoidance of the Unknown

Although none of those interviewed for the study expressed a reluctance to consider EMSs due to their lack of knowledge about them, lack of knowledge about EMSs may be a barrier to their introduction. Individuals or organizations may be hesitant to pursue solutions they are unfamiliar with. This hesitancy may be particularly pronounced in managers who are accustomed to being in control of situations and are reluctant to reveal ignorance about any matter.

Cohen and Levinthal (1990, p.128) referred to "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" as the firm's "absorptive capacity". They suggested that absorptive capacity is "largely a function of the firm's prior related knowledge". Organizations or individuals may not pursue EMSs because their knowledge base and, therefore, their "absorptive capacity" is limited.

5.1.4 Distrust of or Unfamiliarity with Management

The ease with which environmental management can be introduced to an organization may be related to the status of "management" within the organization. Organizations that have some recognized management system in place, and in which executives and managers are conversant with common management theory, may be more amenable to introducing an EMS.

Working with small-to-medium sized enterprises, Rosenbaum (1997) observed that "individual [companies] have neither the expertise or understanding [of EMSs] and there appears to be a very large fear factor."

The medium-sized oil and gas companies which the author dealt with generally had simple management systems. Upper management in these companies tended to define management success in narrow terms, often equating it with increased production and low hydrocarbon finding costs. In some cases, introduction of the term "management" in the interview evoked some derision from upper managers. One corporate vice-president observed that "We don't have much time for that stuff - we are too busy drilling." It has been the author's experience that persuading companies unfamiliar with many basic management principles to consider development of an EMS is much more difficult than proposing environmental management actions at companies with a greater familiarity with formalized management systems and techniques.

5.1.5 Reluctance to Use Relatively-New Solutions

Research on the sources of organizational innovation indicates that "most innovations result from borrowing rather than invention." (von Hippel, 1988; Cohen and Levinthal, 1990, p.128) Although organizational innovation is much lauded in current popular management literature, many organizations seem hesitant to try new solutions until they have been tested by other organizations. Several of the interviewees expressed concern about using EMS due to the newness of the discipline. One executive declared "I don't want to be on the cutting-edge - let somebody else make the mistakes first." Bellen (1997) has also noted that some companies in the United States have delayed pursuing an EMS as they feel uncertain about the intent of EMS standards (such as ISO 14000) and are waiting to see how trends in environmental management develop.

5.1.6 Belief That Current Practices Cannot Be Improved Upon

Four of the interviewees were very optimistic about their companies' environmental performance and stated that this performance could not possibly be improved upon. The author was able to carry out a detailed assessment of one of these company's environmental performance in the course of designing an EMS for that company. It was found that this company had several recent environmental stop work orders and was currently in negotiations with regulatory officials over permitting infractions. This illustrates that reluctance to admit that current environmental practices can be improved upon may occur in instances where there is, indeed, need for improvement.

5.1.7 Denial

A number of studies have documented cases in which a group or organization with ample indications that a matter should be dealt with, has chosen to ignore the issue and suitable solutions (Miller and Friesen, 1980; Janis, 1982; Argyris, 1993; Pfeffer, 1996). Pfeffer (1996) concluded that the most fundamental reason for organizations not following rational practice is that the best way of managing falls outside of the "point of view" or "focus of attention" of managers. Denial may be the result of other processes, such as the belief that if a problem is ignored for long enough, it will resolve itself.

5.1.8 Lack of Concern About Environmental Issues

Results of the KPMG 1996 survey of Canadian corporations indicate that some companies may not be interested in an EMS due to their lack of concern about environmental issues. This was not noted during the interviews conducted for this study, even though the interviews were confidential and other candid comments were offered by interviewees. This may reflect a biased interview sample as companies which did not have an interest in environmental issues would probably have been among those that declined to be interviewed.

5.1.9 Concerns About Legal Issues

EMS development may be deterred by concerns about legal issues. McCarty (1997), Reidel (1997) and Hartman (1997), among others, have identified that developing an EMS could result in the identification of issues with legal implications, such as non-conformance and confidentiality of information, and raise the spectre of fines and penalties for a company. Recognizing this barrier, the State of Michigan recently enacted privilege legislation for EMS material (Wilson, 1997).

5.2 BARRIERS AFFECTING DESIGN AND IMPLEMENTATION

Factors which may affect the proper design of an EMS or its effective implementation include:

- lack of studies and explanations on how to implement an EMS;
- lack of identification of specific environmental drivers affecting a company;
- problems with resources;
- assigning higher priority to issues other than environmental performance;
- approaching environmental issues on a reactive ("fire fighting") rather than proactive basis;
- application of inappropriate solutions;
- the EMS not being compatible with the corporate culture;
- union resistance;
- loss of commitment.

5.2.1 Lack of Studies and Explanations of EMS Implementation

As was noted in the summary of previous work, the literature contains very little specific information on how an EMS should be introduced and implemented. There is almost no documentation and analysis of specific cases of implementation. The design and implementation of EMSs has, therefore, largely been carried out without practitioners benefiting from each other's experience and thus, without much of an experiential base. Effectiveness of EMS implementation may, therefore, be hampered by the lack of experiential sharing and vagueness of instructions for design and implementation. This barrier would be anticipated to be greatest where the individual(s) designing and implementing the EMS have had little or no practical experience in the process or where they are working in isolation from other practitioners.

5.2.2 Lack of Identification of Specific Environmental Drivers Affecting an Organization

Not identifying the specific environmental drivers which are affecting a company can result in the development of poorly-targeted or ineffective environmental management initiatives. Resources may be wasted on issues which are of less importance rather than being allocated where environmental performance can be enhanced. If problems are misunderstood, solutions for them are likely to be poorly designed.

5.2.3 Problems With Resources

EMS introduction may be hampered by not recognizing or providing needed resources. These resources may include personnel to design, implement and guide the EMS, money and time. Resources may be a problem due to their not being allocated properly, or their simply not being available. Provision of inadequate resources may result from other barriers such as lack of commitment or prioritization of other company issues over environmental management.

5.2.4 Prioritization

Prioritization may be a barrier to EMS development and implementation when issues other than environmental performance are assigned a higher priority. Prioritization is related to perceived risk or benefits, so this barrier is a result of low risk or benefits being assigned to environmental management in relation to other organization issues.

5.2.5 Reactive Approach

As environmental management involves being proactive rather than reactive, environmental management initiatives will be impeded when organizations adopt a "firefighting" (reactive) style to dealing with issues, only dealing with matters after they have become serious threats to the organization.

5.2.6 Application of Inappropriate Solutions

Application of inappropriate solutions may involve the attempt to apply a "quick fix" where a more involved solution is required, or the attempt to apply general solutions to specific cases.

Some organizations may be tempted to apply an easy but inappropriate type of "EMS" instead of one that would meet the company's needs but would require greater effort, in terms of time, money, or thought. Working as a consultant, the author has found that some individuals who sell their services as environmental management consultants to organizations seek to obtain work with promises that they can develop a system with little cost and no effort on the part of the organization. Clearly this approach is not compatible with the basic requirements of an EMS as captured in the common system standards and legal requirements.

It can, however, be a significant barrier to those seeking to introduce effective EMSs to organizations.

Organizations may also attempt to apply inappropriate solutions when they use a templated EMS without making suitable modifications. Attempts to apply generalized EMSs to a company may be ineffective and result in companies being frustrated not only with the EMS template which was used, but with EMSs in general. Of the 32 companies interviewed by the author, two had attempted to use a generalized EMS "system" developed by an industry group (the Canadian Association of Petroleum Producers). The two companies had found that they were unable to understand the steps within the template and both had concluded that EMSs were a relatively useless pursuit.

Use of a generalized EMS may also be a problem in that some companies may be given a false sense of security about the EMS's effectiveness and feel that their company's environmental needs have been adequately dealt with, when in fact they have not. As was discussed in the section of this study on legal liability, the Supreme Court of Canada has determined that "a proper" EMS and "reasonable steps to ensure the effective operations of the system" are required to demonstrate due diligence. Use of a non-specific system might not meet these requirements.

Inappropriate solutions may also be developed if individuals with little understanding of environmental management attempt to design and implement an EMS. The author's experience has led to the belief that incompetent practitioners are a significant concern at this time.

5.2.7 Incompatibility with Corporate Culture

It has long been noted that change can be difficult to effect:

It must be considered that there is nothing more difficult to carry out, nor more doubtful to success, nor more dangerous to handle, than to initiate a new order of things. (Machiavelli, 1513)

Resistance to change may signal that the change is not appropriate for an organization. However, there may be resistance to change even if the change will be beneficial to the organization.

Several studies have indicated that individuals and organizations tend to approach problem-solving using previously adopted methods (Luchins, 1942, 1959, and McGrath and Kelly, 1986, *in* Waller *et al*, 1995; Gersick and Hackman, 1990; Louis and Sutton, 1991). Even those who have suggested that some change in corporate culture might foster innovation by overcoming inertia, have had to conclude that radical shifts in organizational behaviour may be difficult, if not impossible, to effect (Reger *et al*, 1994). Researchers have noted that a strong positive relationship between innovation success and its compatibility with the corporate climate. Klein and Sorra's (1994) implementation model suggests that major determinants of the success of an "innovation" are its fit with the company's climate and its fit with the values of organizational members. Design of an EMS within the boundaries of the current corporate culture was also seen as desirable by many of the upper managers who were surveyed for this study. Several of the managers specifically expressed the desire to find an EMS that fit with the way they do things rather than initiating any radical changes in their organization. Radical change may also be associated with increased costs of implementation.

Compatibility with corporate culture may be important in order to reduce dissonance for both organizational decision makers and the organization itself. Proposals for EMSs that change the way things are done within an organization may be perceived by decision-makers as a criticism of their work. They may, therefore, look at these proposals with a negative bias. Bacharach *et al* (1996, p.480) referred to "cognitive dissonance" and "cognitive consistency":

Theories of cognitive consistency have maintained that parties often seek to avoid or reduce inconsistency even if this reduces the potential for utility maximization.

Tolerance for change may also vary from personality to personality. Das (1990, pp.469-470) observed that:

Persons with a low tolerance for change find even minor changes threatening to their material and psychological well-being. Research findings indicate that persons with low self-esteem and low tolerance of ambiguity are more likely to resist change than individuals who have a high sense of adequacy and high self-confidence.

Some employees may resist change if the change results in less desirable conditions such as less power or status downgrading or if the change breaks up group or friendship cliques or political coalitions (Das, 1990).

Dissonance reduction is believed to occur not only on an individual level, but on a collective level as well. Bacharach et al/ (1996, p.480) noted that:

If, we assume, parties who are members of the same group share a common logic, it is likely that they will experience a common sense of dissonance whenever that logic is threatened.

In some cases, dissonance reduction may involve attitude change so that the attitude conforms with the innovation. However, dissonance reduction may tend to result in innovation being rejected or ineffectively adopted.

For these reasons, EMS incompatibility with the corporate culture may present a barrier to EMS introduction, particularly in the case of extreme incompatibility.

5.2.8 Union Resistance

Resistance by unions has been found, in some instance, to be a barrier to EMS development (Mills, 1997). Union representatives and members may resist the development of environmental operating procedures or other elements of an EMS for two reasons:

- they may believe that documenting procedures will facilitate the use of non-labour workers during strikes; and/or
- they may perceive changing the way things are done as a threat to established work relationships.

5.2.9 Loss of Commitment

Loss of commitment to an EMS during the design or implementation may severely affect its introduction. As has been discussed previously, people who drive EMSs within organizations may commit to an EMS but lose interest in it when they become fully aware of what is involved. Loss of commitment may also occur if the commitment has been shallow and the organization shifts from solution to solution easily. In studying how organizations learn, Senge (1990, p.x) observed that the time it takes to "understand, apply, and eventually assimilate the capabilities suggested by a 'new idea' may be longer than the fad cycle of that idea". Kotter (1996, p.13) noted that:

Until changes sink down deeply into the culture, which for an entire company can take three to ten years, new approaches are fragile and subject to regression.

5.3 BROADLY-BASED BARRIERS TO EMS INTRODUCTION

Barriers to EMS introduction are present not only in introducing EMSs to specific corporations, but also at a more general level. Broadly-based barriers to EMS introduction include:

- the gap between theory and practice;
- lack of mechanisms for communication between practitioners; and
- the need for better tracking of environmental costs.

5.3.1 The Gap Between Theory and Practice

There is a large gap between EMS standards and theory and their practical application. Work on environmental management systems (by standards groups, such as the International Organization for Standardization and the Canadian Standards Organizations, and by others) has focussed on identifying and describing necessary elements and frameworks. There is little guidance on how to apply EMS theory to real life situations. Published EMS guidance assumes that there is already commitment to an EMS, and does not indicate how commitment can be obtained and maintained.

5.3.2 Lack of Mechanisms for Communication Between Practitioners

EMS introduction is also adversely affected by lack of communication between EMS practitioners. While the practice of EMS introduction is, admittedly, relatively new, the experience that does exist has not been collected or shared between consulting firms and companies. Lack of an experiential base may be partly attributable to competition amongst consultants or companies implementing EMSs. It may also result from a lack of leadership.

5.3.3 The Need for Better Tracking of Environmental Costs

While it is easy for organizations to see the cost of an EMS, they are often unable to recognize hidden costs that would be mitigated by an EMS. This results in a negative cost image for environmental management system. Companies must be able to recognize true environmental costs to develop an appreciation of the benefits of environmental management. Tracking of costs should allow for the recognition that investment in an EMS provides returns and that it is not just a cost of doing business.

6. MEASURES TO OVERCOME BARRIERS TO EMS INTRODUCTION

As was discussed previously, organizations and management may be approached from a number of perspectives. These perspectives may be applied to understanding barriers to EMS implementation and to developing strategies for overcoming them. Some of the barriers to EMS introduction may be overcome through an understanding of human psychology or from the Behaviour Perspective. The Behaviour Perspective may be most useful in dealing with barriers to commitment and with design and implementation barriers related to corporate culture. The Structural Perspective may be useful in developing strategies for overcoming barriers related to EMS design and implementation. Some barriers may require application of both the organizational behaviour and structural perspectives.

The following discussion includes possible strategies and tactics for overcoming barriers to EMS introduction. Results of interviews from this study and the author's experience indicate that each organization presents a somewhat unique challenge and individuals involved in the process may have widely varying personalities, backgrounds and education. Therefore, certain strategies and tactics may not be applicable in certain cases. A Contingency Approach (rather than a Universal Approach) to EMS introduction is, therefore, required.

6.1 STRATEGY - IDENTIFY THE ENVIRONMENTAL DRIVING FORCES AFFECTING THE ORGANIZATION

Environmental driving forces affecting the organization should be identified as early in the introduction process as possible in order to allow for their use in obtaining commitment to develop an EMS, and in determining what elements should be included in the EMS.

6.2 STRATEGY - EDUCATE AND COMMUNICATE

Education and communication are vital to introduction of EMSs. As Kotter (1996, p.14) observed:

When people are left on their own to make connections, as is often the case, they can easily create inaccurate links.

Many of the barriers to EMS introduction involve a lack of understanding or knowledge. Understanding and knowledge can be improved through education. Effective communication is required to convey information and knowledge to where it is required.

Education can be used to overcome barriers such as:

- lack of recognition of environmental benefits and threats for the organization;
- lack of recognition of the need for an EMS;
- misperceptions about the cost of implementing an EMS;
- avoidance of the unknown (absorptive capacity);
- distrust or unfamiliarity with management;
- hesitance to use relatively-new solutions;
- belief that current practices cannot be improved upon;
- denial;
- lack of concern about environmental issues; and
- application of inappropriate solutions.

Sub-Strategy - Educate and Communicate to Obtain Commitment

Organizations are often unaware of many of the environmental drivers affecting them. They should be made aware of the threats to the organization that may result from inaction on environmental issues and of the benefits that can result from proper environmental management. Benefits which can be discussed include direct benefits, such as cost savings from waste reduction, and indirect benefits, such as faster turn-around time on approvals. The possibility of turning threats into benefits should be highlighted.

Many organizations seem to be unaware of EMSs at all. Much of the task of successfully introducing EMSs may, therefore, involve making organizations aware of EMSs, the broad range of forces driving environmental demands, and of the advantages of improved environmental performance.

Tactics for Introducing EMSs to Upper Management

It has been the author's experience that successful introduction of environmental management issues in talks with corporate management involves first determining what drivers are affecting corporate management, and then using this as a basis for discussion about EMSs. While circumstances and personalities of those involved in gaining the go-ahead to develop an EMS for a corporation may vary, some general observations and tactics may be considered.

Tactic - Obtain a Meeting With Organizational Decision-Makers

Obtaining the opportunity to present the benefits of an EMS to a corporate executive may be difficult. If one is introducing an EMS from within an organization, the ease with which new ideas can be brought to upper management will be dependent on the organization's formal and informal structures. Depending on the level of the person seeking to introduce EMSs, various tactics may be required to bring EMSs to the attention of people with decision-making abilities. These tactics may include simply sending the suggestion up through the formal structure of the company, writing a memo outlining the needs and benefits of an EMS, or obtaining a place on a committee that makes recommendations to upper management.

External parties may be given the opportunity to present information on EMSs to an organization through:

- an invitation from the organization;
- an introduction from another party to the organization;
- a referral or recommendation from another party to the organization; or
- when the external party contacts the organization.

If the person seeking to introduce an EMS to an organization is an external party (such as a consultant), contacting the organization's management may be a challenge. External parties may require excellent "connections", the status of "an industry insider", or excellent marketing/sales techniques, to obtain time with an organization's executives.

Tactic - Introduce the Concept of EMSs Informally

If it can be arranged, the topic of EMSs might be informally broached to company decision makers on several occasions so that the concept somewhat familiar to

senior management prior to formal discussions about developing an EMS. This tactic is suitable when the introducer has some prior relationship with the organization and is dealing with senior management on a social level or on other issues.

Tactic - Provide Background Information on EMSs

Meetings with senior management about EMS introduction can be facilitated by providing decision-makers associated with the organization with background information on EMSs. This might include "success" stories or "horror" stories in order to evoke an interest in EMSs.

Tactic - Attempt to Optimize Meeting Times

If one manages to schedule a meeting with upper management, the initial meeting is liable to be short in duration (usually 15 minutes) and may, in some cases, be subject to interruptions or postponement. The author has found that the best way to schedule a meeting is as a lunch or breakfast, where the executive is available for a longer period of time and where there are fewer interruptions. If it is not possible to schedule a meeting over a meal, scheduling a meeting at 11:30 a.m., just before lunch may facilitate the meeting being carried over into a lunch.

Tactic - Assess Management's Knowledge of EMSs

Efforts should be made as early as possible to assess how much an organization's upper management knows about EMSs. If an external party (consultant) is seeking to discuss EMSs with an organization, they should conduct a review of literature from the organization (such as annual reports) in order to determine the level of understanding within the organization and to gauge the level of comfort there may be in discussing management issues.

In meeting with officials from the organization, a person introducing EMSs should focus early on further determination of the organization's knowledge level. If executives have some familiarity with EMSs or management theory and the information being presented is too simplistic, the executives may feel that the presenter is uninformed or condescending. If, on the other hand, a presenter presumes a greater knowledge base than exists, there is the risk that the presentation will not be understood. If the organization is not familiar with basic management theory, management terminology may have to be avoided or used with care.

Tactic - Present the EMS as an Opportunity Not a Threat

While decision makers should be made aware of the threats to their organization from inadequate management of environmental issues, EMS should be conveyed as a positive solution to environmental management problems. When discussing environmental issues, particularly liability, executives may be overwhelmed by their increased understanding of potential risks and liabilities, and the conversation may become extremely stressful for the executives. Solutions, as well as problems, should be identified. Dutton and Ashford (1993, p.412) observed that:

The more the issue framing conveys that an issue will have a higher payoff and/or that top management is capable of resolving the issue, the greater the level of top management's attention invested in an issue.

Executives should not be put on the defensive about their company's environmental performance. The EMS must be put forward as an opportunity, not as a threat, and tact must be exercised in discussing negative aspects of a company's performance.

Efforts should be made to demonstrate how threats may be turned to advantages by proper environmental management. For example, if a bank requires that a company carry out an environmental audit, the audit may have added value in facilitating future loans and possibly reducing interest rates on loans.

Tactic - Use Domain-Specific Experts

The individual(s) who are responsible for educating corporate management about EMS should have expertise in EMS development and implementation, and should have a knowledge of the business the corporation is involved in. Dutton and Ashford (1993) referred to this as "domain-specific expertise". Domain-specific expertise lends credibility to the presenter and establishes a rapport with the audience.

It may not be possible to locate an individual with knowledge of both EMSs and a specific industry. Therefore, a team approach may be indicated. Care should be exercised in determining the size of the team which meets with management, as teams of more than two individuals may not work together well, may seem intimidating to an executive or executive groups, or may be too costly.

It should also be noted that if a person on a team is not adept at interacting with people, efforts should be made to partner this person with someone with good social skills. Although the introduction of EMSs involves technical knowledge, the psychological aspects of many of its barriers, indicates that "people skills", such as good communication, are required.

Tactic - Link Environmental Management to Organizational Performance

The importance of environmental management to the corporation's overall performance should be clearly demonstrated. Dutton and Ashford (1993, p.415) noted that "The more a middle manager can get an issue framed as strategic, the greater the level of top management's attention invested in the issue."

As perceived cost is often a barrier to EMS introduction, attempts should be made to identify cost-savings from an EMS including direct reduction of operating costs, reduced licensing and approval costs, and avoided costs.

Specific examples of EMS benefits or case histories should be provided in order to support the need for an EMS. If they are available, examples should be provided from the industry the organization belongs to, so that the analogies between other cases and the organization are as clear as possible.

Tactic - Present Information Clearly and Succinctly

Hilgartner and Bosk (1988) and Lyles (1987) indicated that the succinctness and clarity in the presentation of issues to executives is important. The author has noted that most executives have little patience with unfocused discussion.

Before presenting information to an executive, the way in which it is to be presented should be considered from his/her viewpoint, rather than that of the presenter's. It is important to answer the question "so what?" rather than to become bogged down in details.

The presenter must also follow the interests of the audience and provide a flexible presentation, not a fixed monologue, so that the presentation is an objective, focused presentation, not a "sales pitch".

Tactic - Present Balanced Information

The presentation of information about EMS should be balanced. Difficulties or uncertainties in the process of developing an EMS, as well as benefits, must be discussed. Lumsdaine and Janis (1953) found that if upper management did not have well-formed beliefs about an issue, a two-sided appeal was more effective than a one-sided appeal. It has been the author's experience that a well-balanced presentation adds to credibility.

Sub-Strategy - Educate and Communicate When Designing and Implementing the EMS

Education and communication are required in order to:

- properly identify environmental driving forces and company needs;
- determine how the EMS can be fitted into the corporate culture;
- overcome possible opposition to the EMS within the organization; and
- obtain re-commitment to the EMS, if necessary.

6.3 STRATEGY - ALIGN THE EMS WITH THE ORGANIZATION

As was discussed previously, an EMS must fit with the organization's environmental needs, and with the organization itself. After the environmental driving forces affecting the company have been identified, EMS elements and a starting point from which to build a suitable framework must be determined. To preclude potentially significant barriers, the EMS must be aligned with the organization's culture. As culture and organizational structure may not be in synch with one another, it may also be necessary to consider measures to align the EMS with organizational structure.

Sub-Strategy - Align the EMS With Organizational Culture

Although organizational culture may be difficult to assess, it is imperative that some understanding of the organization's culture be developed and that the EMS not be dissonant with that culture. Individuals within an organization may be able to develop a fuller understanding of their organization's culture as they live within it. However, their perspective may be biased or they may not be able to recognize aspects of a system they are intimately involved in. External parties

who may work on an EMS may have difficulty becoming familiar with an organization's culture. However, external parties may have a deeper background in understanding organizational culture, and be more objective. The following tactics may aid in identifying the most important elements of corporate culture affecting an organization's EMS.

Tactic - Interview Employees

Employees may be interviewed in order to determine how things are done within the company and their perspective on proposed elements of the EMS. Interviews may be done on a one-to-one basis, in focus groups, or by survey. The author has found that a good appreciation of corporate culture may be developed by accompanying employees during their daily work routine. Although the scope of the project may preclude a great deal of time being allocated to employee interviews, they may offer invaluable information as formal ways of doing things in an organization may vary from those in practice.

Tactic - Involve Employees In Planning the EMS

Important aspects of an organization's culture may be identified when employees actively participate in the design of the EMS. As elements are suggested and developed, employees may comment on the practicality of ideas based on their own experience with the organization.

Sub-Strategy - Align the EMS With Organizational Structure

Alignment of the EMS with organizational structure may be desirable in order to lessen structural dissonance, to utilize approaches which have been already proven to work within the organization, and to use resources as efficiently as possible.

Tactic - Integrate the EMS With Already-Existing Programs

Fitting the EMS to a compatible framework within the organization may aid in its acceptance and implementation by a company. Most commonly, environmental management is partnered with, or considered a sub-class of, corporate Occupational Health and Safety (OH&S). In many industries, OH&S has been well-established because of regulations and enforcement programs. The existence of some common elements between OH&S and the environment, such as spill response, may allow for some synergies between OH&S and environmental management. However, if the OH&S system is firmly entrenched and company personnel favour things they are most familiar with, environmental management may be relegated to a role secondary to OH&S. When the author spoke with four oil and gas companies who had vested environmental management within their companies' OH&S systems, environmental management did not appear to be given as much importance as OH&S matters. For example, one company official admitted that in his company's Environmental Health and Safety system, environmental matters were discussed for a "few minutes" at the end of one hour long safety meetings. Another difficulty in linking OH&S and environmental management may be that OH&S systems tend to be largely regulation-driven and may favour a conservative, non-creative approach to problem solving. That is, OH&S systems tend to favour "command and control" styles of problem solving and do not foster highly innovative thinking. An EMS focused on compliance cannot provide the wide range of services and benefits that are possible. Environmental matters may require more innovation or paradigm-shifting than OH&S matters.

An EMS may also be built upon existing quality management systems (such as ISO 9000) within an organization. Kurtzman (1997) found that the cost of developing an EMS for a company with an existing ISO 9000 program (single site, 1250 employees) was \$53,000 (U.S.) as compared with a \$88,000 cost for an EMS at a similar company without a quality management system (single site, 750 employees). Hartman (1997) estimated that there is an 'overlap' of approximately 60% between ISO 9000 and 14000 requirements.

Tactic - Design Elements of the EMS After Other Successful Programs

If elements of the EMS can be designed using a model which has been proven to work within an organization, the elements may be designed more effectively. Therefore, successful programs in the organization should be identified and analyzed to determine whether the lessons learned from them can be applied to the EMS.

If elements of the EMS can be introduced in a format already familiar to the company, there should be less resistance to the element and an easier "learning curve".

6.4 STRATEGY - PHASE IN THE INTRODUCTION OF THE EMS

It is preferable to introduce a complete EMS to an organization as the more complete a system is, the better the chances are that it will result in positive benefits. However, if executives are hesitant to commit to a full EMS, due to unease with the newness of the process, concerns about costs, or other reasons, it may be possible to persuade them to consider a scaled-down form of EMS, or the introduction of some EMS elements. It has been the author's experience that if an executive can see positive results from an EMS element, such as introducing some environmental operating procedures, they may eventually agree to further environmental management initiatives.

6.5 STRATEGY - ENCOURAGE EMPLOYEE ACCEPTANCE OF THE EMS

The degree to which employee acceptance of the EMS must be actively sought may vary. However, employee acceptance of an EMS is imperative as employees have the ability to actually accommodate or (consciously or unconsciously) sabotage environmental initiatives. Employee acceptance of the EMS will facilitate its alignment with the corporate culture.

Tactic - Educate and Communicate With Employees

Education and communication are crucial in developing employee acceptance. It is particularly important to demonstrate to employees that an EMS is a positive force rather than a threat to their status, or employment, and that it should not significantly increase their workload.

Tactic - Co-Optation

Individuals may resist an idea because they do not understand it or because they fear being left out. Involving those opposed to an EMS in its planning and implementation may result in their "buy-in". If an individual is, however, opposed to introducing an EMS for other reasons (such as the informed belief that other solutions are more viable), co-optation may or may not be successful in winning-over that individual.

As Das (1990) noted, co-optation may closely resemble manipulation. Co-optation is, however, a popular management method to neutralize opposition. If executive commitment to an EMS is firm, co-optation may not be required (reminding an employee that upper management supports the EMS may be sufficient to bring the employee "in line"). However, if the organization's

commitment is weak, forces opposing the introduction must be given serious consideration.

6.5 STRATEGY - SHARE RESOURCES

Difficulty may be encountered in attempting to introduce an EMS to a small- or medium-sized enterprise (SME) with limited resources. SMEs may be assisted in developing EMS through three means:

- use of outside consultants;
- assistance from industry groups which may sponsor the development of EMS programs suited to their members' needs; and
- sharing resources with organizations with similar needs.

6.6 STRATEGY - IDENTIFY REQUIRED RESOURCES

The author has noted a tendency to design EMSs from a theoretical rather than a practical point-of-view. This is reflected in "how to" books (CSA, 1996; ISO, 1996) assuming commitment rather than discussing how commitment can be acquired and maintained. A theoretical approach untempered by practicality may result in elements of the EMS not being realistic in terms of whether they can be effected. Often resources to effect the plan are lacking.

Tactic - Include Required Resources in Plans for the EMS

Descriptions of elements in the EMS should include an assessment of resources required and identification of where these resources may be obtained. In the case of financial resources and time, a budget should be included. In the case of personnel, efforts should be made to suggest appropriate people for each action. If appropriate individuals are not present within the organization, possible external personnel should be identified. Resource identification should prevent inclusion of elements which cannot be implemented.

6.7 STRATEGY - CONTINUALLY REVIEW THE PROCESS

Continual review of how the introduction process is proceeding is necessary to determine whether barriers to introduction are being successfully dealt with and whether new barrier are arising.

Tactic - Hold Process Review Meetings

Rather than holding a post-mortem of the introduction process or reacting when problems occur, the team introducing the EMS should review its progress on a frequent basis, and seek to prevent the development of barriers to introduction. These meetings may be held on a formal or informal basis, and should, on occasion, involve upper management, so there are no 'surprises' such as finding out that commitment has been lost, that budgets to carry out the EMS will not be forthcoming, or that other factors are affecting the need for the EMS.

If resistance to EMS introduction is being encountered, areas where success is obvious should be identified and focused on. If there is moderate acceptance of the EMS, introduction should be staged starting with high priority areas,

particularly those where success will be obvious. If there is high acceptance of the EMS, development should be planned for the entire EMS.

Continual improvement is an important element within EMSs. It should also be practiced in the EMS introduction process.

6.8 STRATEGY - ENCOURAGE COMMUNICATION BETWEEN THEORETICIANS AND STANDARD DEVELOPERS AND EMS PRACTITIONERS

In order to lessen the gap between EMS theory and practice, efforts should be made to combine theoretical work and practical experience and to encourage communication between individuals and groups attempting EMS introduction. These efforts could involve meetings and workshops, individual work, publication and other forms of communication between theoreticians and practitioners. As competition may be a factor in limiting communication between companies and consultants, leadership is required from non-competitive organizations with an interest in environmental management. Organizations that have been involved in developing environmental management standards, such as the International Organization for Standardization, the Canadian Standards Association, the Canadian Association of Petroleum Producers, etc., must follow through with their initial work and facilitate the use of their standards by working on solutions to problems associated with gaining corporate commitment and by providing guidance on how to implement EMSs.

6.9 STRATEGY - DEVELOP AND PROMOTE METHODS TO TRACK ACTUAL ENVIRONMENTAL COSTS

Development and use of methods to track actual environmental costs could be lead by a professional groups, such as the Canadian Institute of Chartered Accountants (CICA), by researchers and academics at universities or other

institutions, and/or regulators. Groups such as CICA have been active in preliminary work to develop and promote environmental accounting. If environmental costing can be developed and used so that there is improved realization of actual environmental costs by organizations, the benefits of environmental management systems should be better recognized. While EMS startup costs can be significant, they should be amortized over the lifetime of the benefits.

Accounting personnel should be brought into the EMS process and made members of design and implementation teams, so that mechanisms to track costs and benefits can be best designed.

6.10 STRATEGY - PROVIDE LEADERSHIP FOR EMS INTRODUCTION IMPROVEMENT THROUGH EXISTING ORGANIZATIONS

While strategies for barriers at the corporate level may be effected at the corporate level, overcoming broader barriers to EMS introduction would likely require leadership from standards organizations (such as the International Organization for Standardization and the Canadian Standards Association), industry groups (e.g. the Canadian Association of Petroleum Producers), learning institutions (universities, etc.), professional groups (such as the Canadian Institute of Chartered Accountants) and/or regulators and government. The participation of these potential leaders in studying barriers at the corporate level could also enhance the success of EMS introduction.

6.11 STRATEGY - REVIEW AND IMPROVE EXISTING EMS STANDARDS AND GUIDELINES

Results of this study suggest that existing EMS standards and guidelines may be improved, particularly in the areas of obtaining and maintaining commitment, and in providing practical guidance on implementation. Interview results indicated that the Canadian Association of Petroleum Producer's environmental management guidelines are confusing and difficult to use. Existing standards and guidelines should, therefore, be reviewed and improved.

7. SUMMARY AND SUGGESTIONS FOR FURTHER WORK

7.1 SUMMARY

An environmental management system (EMS) is a system that allows an organization to manage environmental issues in a consistent and considered way. An EMS enables an organization to:

- establish appropriate environmental goals and objectives; and
- ensure that continuous improvement is made in achieving those goals and objectives (Thompson, 1995).

While environmental management systems are increasingly being suggested as a means for organizations to improve environmental performance and some companies are, indeed, implementing them, there is little practical information on how EMSs may be successfully introduced.

The objectives of this study were, therefore, to:

- synthesize information on processes and elements involved in the introduction of EMSs to organizations;
- identify and analyze barriers to successful introduction; and
- suggest strategies for successful introduction of EMSs to corporations.

As there has been little published work on the implementation of environmental management systems, the study involved a discovery-oriented approach in which information was gathered from various sources to develop preliminary qualitative observations. The methodology included:

- a literature review, where literature on factors related to EMS implementation, including environmental driving forces, possible EMS elements, EMS standards, and organizational theory was reviewed; and
- interviews with representatives from 29 medium-sized and junior oil and gas companies, two large utility companies, and a pipeline company.

Information from the literature and interviews was combined with the author's experience in developing environmental management systems and in managing corporate environmental issues as a consultant. Specific issues or themes of importance were identified and specific strategies for EMS implementation were then developed.

Three important considerations in the introduction of EMSs are why a company needs an EMS, what elements are required in the EMS and how an EMS can actually be developed.

A number of forces that may drive the need for management of environmental issues for a company were recognized. Ranked in order of relative importance as indicated by those surveyed, these environmental driving forces include:

- liability;
- regulatory requirements;
- value of assets;
- lender requirements;
- accounting requirements;
- investor requirements;
- corporate image;
- industry and corporate standards;
- international standards and trade agreements;
- requirements by partners or clients; and
- cost avoidance.

When designing and implementing an environmental management system, it is crucial that the driving forces, and their relative importance, be identified so that the EMS can be designed to deal with these forces. Different companies may have different environmental management needs.

Although specific elements may vary from EMS to EMS, an environmental management system should contain some basic elements and be framed within a plan-do-act-assess cycle to ensure that the EMS is functional and achieves goals and objectives. A number of formal EMS systems offer guidance as to what elements should be included. Thompson's (1995) framework was found to include the key EMS elements and to be the most workable EMS model available. Elements within this model include:

- a strategic framework where the organization defines its purpose, its values and its future vision in terms of the environment;
- setting of appropriate environmental goals and objectives to guide the EMS;
- establishment of priorities;
- implementation of selected options; and
- evaluation to assess whether the system is meeting the companies needs and re-design of the EMS where necessary.

Continual improvement is necessary so the system can adapt to change and improve over time.

Four key stages in introducing an EMS were recognized:

- the organization becoming aware of EMSs;
- obtaining the go-ahead to develop an EMS;
- designing the EMS; and
- implementing the EMS.

Barriers to these processes were found to be either structural or behavioural in nature. The barriers may be related to commitment or they may affect EMS design and implementation.

The study identified the following barriers to commitment:

- lack of recognition of the need for an EMS;
- cost;
- avoidance of the unknown;
- distrust or unfamiliarity with management;
- beliefs that the company's current practices cannot be improved upon;
- denial;
- lack of concern about environmental issues; and
- concerns about legal issues.

Barriers affecting design and implementation were found to include:

- lack of studies and explanations of how to implement an EMS;
- lack of identification of specific environmental drivers affecting a company;
- problems with resources;
- assigning higher priority to issues other than environmental performance;
- approaching environmental issues on a reactive basis;
- attempts to apply inappropriate solutions;
- incompatibility of the EMS with corporate culture or structure;
- union resistance; and
- loss of commitment.

Barriers to EMS introduction are present not only in introducing EMSs to specific corporations, but also at a more general level. Broadly-based barriers to EMS introduction include:

- the gap between theory and practice;
- lack of mechanisms for communication between practitioners; and
- the need for better tracking of environmental costs.

Strategies and tactics for overcoming barriers to EMS introduction at the corporate level are outlined in Figure 13 (on the proceeding page). More broadly-based barriers that were identified could be approached by :

- encouraging communication between theoreticians and standard developers and EMS practitioners;
- developing and promoting methods to track actual environmental costs; and
- providing leadership for EMS introduction improvement through existing organizations.

A final recommendation was that existing EMS standards and guidelines should be reviewed and improved, particularly in the areas of obtaining and maintaining commitment, and in providing practical guidance on implementation.

		MEASURES TO OVERCOME BARRIERS															
		Identify Environmental Driving Forces	Educate & Communicate to Obtain Commitment	Assess Management's Knowledge of EMSs	Obtain a Meeting with Organizational Decision Makers	Present the EMS as an Opportunity	Use Domain - Specific Experts	Link Environmental Mgmt to Organization Performance	Present Information Clearly & Succinctly	Present Balanced Information	Educate & Communicate When Designing & Implementing	Align the EMS with Organizational Culture	Align the EMS with Organizational Structure	Stage the Introduction of the EMS	Encourage Employee Acceptance	Identify Required Resources	Continually Review the Process
BARRIERS TO EMS INTRODUCTION																	
Barriers to Commitment	Lack of Recognition of the Need for an EMS	✓	✓	✓	✓	✓		✓	✓					✓			
	Perceived Cost	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓			
	Avoidance of the Unknown		✓	✓	✓	✓	✓		✓			✓	✓	✓			
	Distrust or Unfamiliarity with Management	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓				
	Reluctance to Use Relatively New Solutions		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓			
	Belief that Current Practices Cannot Be Improved Upon		✓	✓	✓	✓		✓	✓	✓				✓			
	Denial	✓	✓	✓	✓	✓	✓	✓	✓	✓							
	Lack of Concern About Environmental Issues	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓			
	Lack of Studies/Explanations of EMS Implementation	✓					✓										✓
Barriers Affecting Design and Implementation	Lack of Identification of Specific Environmental Drivers Affecting An Organization	✓		✓			✓	✓									✓
	Problems with Resources		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓
	Prioritization	✓	✓	✓	✓	✓	✓	✓		✓	✓					✓	✓
	Reactive Approach	✓	✓	✓	✓	✓	✓	✓			✓						
	Application of Inappropriate Solutions	✓	✓	✓	✓		✓				✓	✓	✓			✓	
	Incompatability With Corporate Culture						✓	✓			✓	✓	✓	✓	✓		
	Loss of Commitment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		

Figure 13. Strategies and Tactics for Overcoming Barriers to EMS Introduction.

7.3 SUGGESTIONS FOR FURTHER WORK

This study explored issues and relationships on which little previous work was found, the study involved a discovery-oriented approach. Observations and recommendations within the study are, therefore, preliminary. Many of the topics covered within the study require further work in order to test the observations and ideas put forward.

The importance of various environmental driving forces, which were indicated by the author's experience and research for this study, did not coincide with the results of a survey by KPMG (1996). In particular, employee concerns were ranked as the third most important environmental driving force by KPMG, while the corporate decision-makers interviewed for this study gave employee concerns no importance.

Because identification of environmental driving forces is crucial for effective introduction of EMSs to organizations, a good understanding of these forces must be developed. Results of this study strongly suggest that further work is required to determine true environmental driving forces from a corporate point of view.

Determination of the importance of driving forces should involve confidentiality of sources as results of interview during this study indicated that the veracity of information is dependent on confidentiality. Surveying should also involve a much larger survey base than was attempted during this study in order to allow for statistical variations. A survey might be concentrated on a single industrial sector, geographical area, or size or type of company, in order to decrease scattering of results. A more structured, planned survey might also be designed so interviewer bias is minimized.

Further study might also be involve analysis of specific cases over time. This study was carried out over a brief period and at a time during which the discipline of EMS design and implementation is being developed. Analyses of specific situations over longer periods of time might offer insights into how the process

evolves over time and whether barriers which are identifiable in the short term, persist into the longer term.

This study attempted to synthesize material from a broad range of disciplines and looked at possible effects from both structural and behavioural elements. Further work could involve continued efforts to identify barriers to introduction and could possibly explore the relationships between structure or behaviour and EMSs to further define factors affecting the process.

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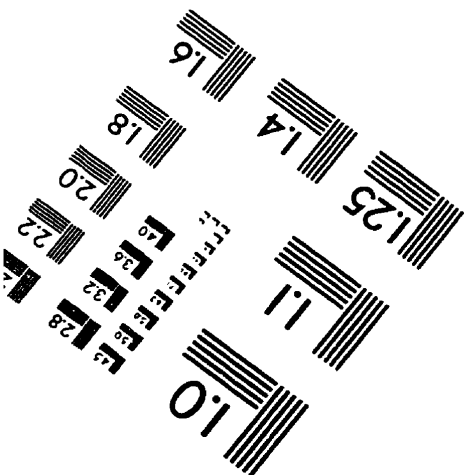
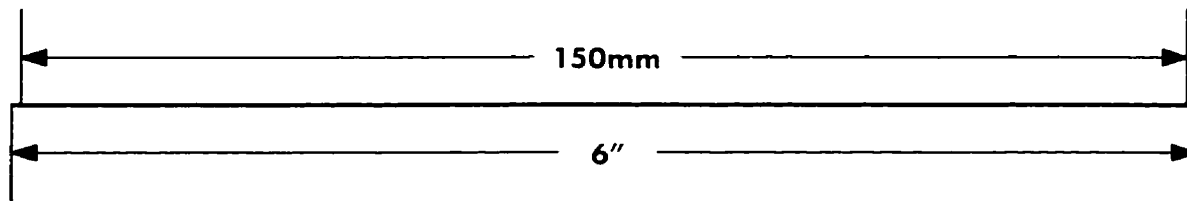
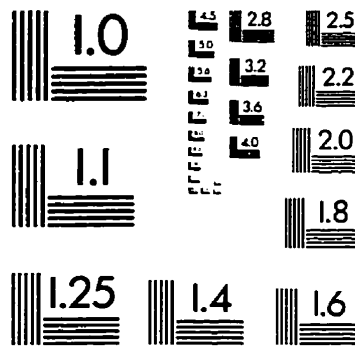
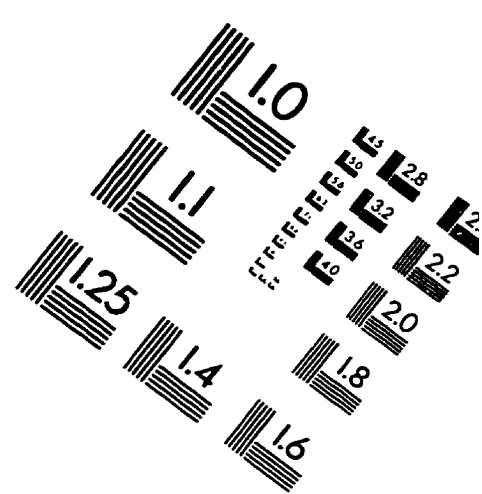
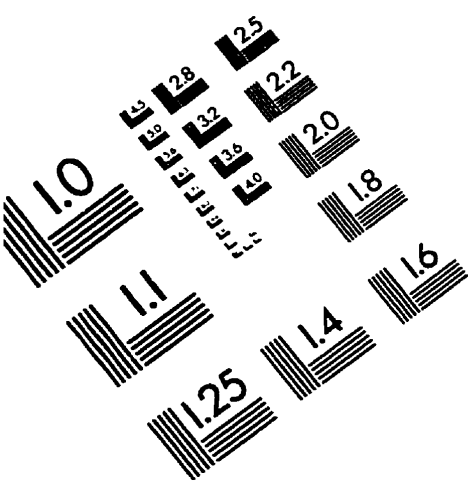
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IMAGE EVALUATION TEST TARGET (QA-3)



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