IMPLEMENTING AN ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM

A Case Study of Environmental Training and Awareness at the Vancouver International Airport Authority

by

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Abstract

Improving the environmental performance of corporations is one way of limiting environmental damage. Environmental management systems (EMSs), such as ISO 14001, provide a framework for organizations that wish to effectively manage their environmental affairs. Implementing an EMS that conforms to the ISO 14001 standard may help businesses integrate environmental values into their operations.

This research helps bridge the gap between EMS theory and business practices. Its goals were to identify challenges associated with training and awareness components of an ISO-based EMS and to propose training initiatives that may help organizations achieve successful EMS implementation. These goals were fulfilled through a case study of Vancouver International Airport Authority.

The study identified developing a common vision of environmental performance as a key to successful EMS implementation. It also proposed an awareness-based approach to EMS that focuses on shared vision and feedback between different hierarchical levels within an organization. The recommendations of this study present detailed management processes and initiatives that could help the Airport Authority improve implementation of its "Air Quality Management Program," as well as its overall programs for "Environmental Training" and "Awareness and Communication."

An awareness-based approach may also help stakeholders monitor an organization's success with integrating environmental policies into its day-to-day operations. Although the ISO standard is useful as an EMS framework, meeting ISO 14001's minimum requirements will not necessarily improve a company's environmental performance. It is the commitment of an organization and its employees, driven by environmental regulations and pressure from stakeholders, which determines the extent to which an organization will achieve leading-edge environmental management.

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AQMP	Air Quality Management Program
Authority	Vancouver International Airport Authority
CCHREI	Canadian Council for Human Resources in the Environment Industry
CCME	Canadian Council of Ministers of Environment
CEAA	Canadian Environmental Auditing Association
CSA	Canadian Standards Association
EARP	Environmental Assessment Review Process
EMAS	European Union's *Eco-management and Audit Scheme*
EMP	Environmental Management Plan
EMS(s)	environmental management system(s)
EPA	United States' Environmental Protection Agency
GVRD	Greater Vancouver Regional District
ISO	International Organization for Standardization
LEAD	Committee on Leadership, Education, and Development
MORP	motivation, opportunities, resources, and processes
NEPA	United States' *National Environmental Policy Act*
SMEs	small- and medium-sized enterprises
TC 207	ISO technical committee on the development of ISO 14000 standards
TDM	transportation demand management
TQM	total quality management
TQEM	total quality environmental management
SCC	Standards Council of Canada
SWOT	strengths, weaknesses, opportunities, and threats
YVR	Vancouver International Airport

CHAPTER 1. INTRODUCTION

1.1. Study Overview

The rationale for this research is that by improving the environmental performance of corporations, the negative environmental effects of modern society can be reduced (Saxe 1990, Shrivastava 1995). To achieve more environmentally friendly business practices, organizations must develop internal management processes that integrate environmental objectives into their day-to-day operations (Boiral and Sala 1998, IW 1998, Lawrence and Morell 1995). This research focuses on environmental training, awareness, and communication processes as tools for achieving improved corporate environmental performance.

1.1.1. Background

The 1990s saw the development of environmental management systems (EMSs) designed to provide a framework for organizations that were trying to incorporate environmental objectives into their decision making (Boiral and Sala 1998, Green and LaFontaine 1996, Miller 1998, Porter and van der Linde 1995, Powers 1995). ISO 14001 is a standard for EMSs that has attracted global attention since its introduction in 1996. However, for the most part, decision makers in environmental management lack practical guidelines on the most effective ways of implementing the ISO 14001 standard (Cantin, *pers. comm.,* 1997; Kirkland and Thompson 1997). If the gap between EMS theory and practice can be bridged, and ISO 14001 becomes widely implemented, the standard could have a substantial impact on reducing the rate of environmental damage.

ISO 14001 is a voluntary standard that can be considered the carrot to go along with the stick of “command and control” environmental regulation (Cascio in Lewis

1997, 75). One requirement of the EMS standard is for the training of employees in areas related to environmental awareness and technical, environmental competence. Educating employees about environmental issues is one of the most promising contributions that ISO 14001 can make to the future of environmentally sustainable management practices. A key advisor in the development of the standard felt that "[command and control's] ultimate failure is that employees don't think of the environment as their responsibility" (Cascio in Lewis 1997, 75). Training and awareness programs are key strategies in the implementation of an integrated EMS and, hence, in improving corporate environmental performance (Ecotec 1992, IW 1998, Kirkland and Thompson 1997, Lawrence and Morell 1995).

1.2. Environmental Management at Airports

The aviation industry in North America has not seen heightened environmental scrutiny and regulation to the same degree that many other industries have experienced (Morrissette 1996, 23; NRDC 1996, 14, 40). This is due to a number of reasons, including: critical safety issues; the expense of aircraft technology; and the complexity of the global aviation industry, especially as related to the federal and international control of regulations (NRDC 1996, 14). It may also be due to a general reluctance to burden the industry with "expensive and time consuming environmental programs," because of the key role that aviation plays in the infrastructure of modern society (Morrissette 1996, 23). Also, the aviation industry has not had a critical environmental disaster such as the *Exxon Valdez* oil spill (Bowland and Giguere 1997, Lawrence and Morell 1995).

A factor relating to the regulation of air quality management, a focus of this research, is that the effects of airport operations on the environment tend to be

cumulative. For instance, if airports' aggregate emissions were released from smokestacks, many airports would be found to generate greater volumes of toxic pollutants, such as benzene and formaldehyde, than do manufacturing industries (NRDC 1996, 40). Yet, "smokestack" industries face regulatory requirements to report their toxic emissions, while airports and other non-point-source facilities do not (Lubka 1997, NPRI [1999]; NRDC 1996, 40).

Airports have considerable effects on the natural environment, and large numbers of people live in close proximity to airports. Airport operations can adversely affect their neighbouring communities with the generation of noise and air pollution as

Most large airports show some commitment to environmental management and also have some environmental experts on staff. In recent years airport managers have been considering whether to implement EMSs that would satisfy the specifications of ISO 14001 (Foster 1997; McGrath 1997; Norton, *pers. comm.*, 1998). This may be due to the increased presence of standards like ISO 14001 and the increased public and regulatory scrutiny that airports are beginning to receive.

In the early 1990s, an environmental impact assessment of a new runway and the transfer of the airport from the federal government to a local authority sparked public interest in environmental issues at YVR. Prior to the transfer, Transport Canada had an environmental management plan for the airport, but the creation of the Authority and the construction of its new runway focused attention on environmental management at YVR. Given the heightened scrutiny and the Authority's goal to be sensitive to public concerns, an ISO 14001 EMS could be a useful tool to help the Authority assess and manage its environmental effects. Environmental training and awareness initiatives should be a critical part of proactive environmental management strategies.

1.3. Introduction to ISO 14001

EMSs seek to integrate environmental considerations into every aspect of a company's operations and make caring for the environment the responsibility of each employee (Lewis 1997). Certification standards for EMSs are becoming increasingly common and, in September 1996, a voluntary, international standard for EMS was published by the International Organization for Standardization (ISO). The international standard and its guidelines are known as the ISO 14000 series. The specification standard of the series is titled *ISO 14001: Environmental management systems -*

Specifications with guidance for use. Organizations can declare compliance to ISO 14001, or become certified by a third-party auditor (CER&CN 1997a, Lamprecht 1997, Puri 1996, Wilson 1997). In addition to ISO 14001, four guidance standards that deal with implementation and auditing have been published (CER&CN 1997b, CSA [1998]). During 1997 and 1998, the Authority revised its EMS based on the structure of ISO 14001.

1.3.1. Training and environmental awareness

The component of "Training, awareness, and competence" may be the single requirement of ISO 14001 that goes farthest in separating an ISO 14001 EMS from any generic form of environmental management. It is relatively straightforward for an organization to write an environmental policy, thereby having a document said to represent an EMS. However, meeting the requirement for training, awareness, and competence requires that an organization extend environmental awareness and responsibility beyond the management and staff of its environment department to all its employees. Such an extension of environmental awareness and responsibility can be accomplished by implementing training, awareness, and communication initiatives that relate to environmental management issues.

1.4. Objectives of Research

This study has two goals. These are to:

1) identify challenges and strategies associated with the training and awareness components of implementing an ISO 14001 EMS; and

2) propose the content and structure of environmental training and awareness programs that the Authority could use in implementing its EMS.

This study evaluates ISO 14001's requirements concerning training, awareness, and competence in the context of YVR. Specifically, this study examines the Authority's "Air Quality Management Program" and its "Environmental Management Plan." This research will provide managers with some of the practical tools needed to guide the training and awareness aspects of implementing an EMS.

interested in achieving business practices that are more environmentally sustainable (Cotton and McKinnon 1993, Elkington 1994, Jose 1996, Miller 1998). The recommendations and conclusions of this research apply to organizations that are so inclined.

1.4.2. Research questions

The questions this research strives to answer are:

1) In relation to the challenges and strategies associated with implementing the ISO 14001 standard for EMSs, what are the roles of environmental training and awareness programs?; and

2) What are the preferred approaches to training and awareness that the Authority could use to support its environmental policies, strengthen its EMS, and extend environmental awareness throughout the organization?

1.5. Methods

The benefits, challenges, and strategies associated with implementing an integrated EMS were identified through a review of literature on environmental management. Bodies of literature reviewed in this context included: environmental law, total quality management (TQM), organizational change, strategic planning, environmental education, and the environmental impacts of aviation and airports. This literature review provided the context for reviewing the utility of EMS and ISO 14001 in the evolution of corporate environmental management. The review described the development of EMS and critiqued the ISO 14001 standard, identifying strengths, limitations, barriers, challenges, and implementation strategies.

In addition to the literature review on ISO 14001 and corporate environmental awareness and responsibility, the research included a case study. Founded on environmental management issues identified in the literature, the case study of YVR practices focused on the role of awareness programs as a key strategy for

implementing an ISO-compatible EMS. The case study involved the following research components: personal observation during a period of employment with the Authority's Environment Department; a content analysis of the Authority's EMS; and follow-up interviews with employees of the Authority, in order to ground-truth the observed and documented findings. This case study was designed to inform environment managers about effective training and awareness tools for implementing an EMS based on ISO 14001.

1.6. Organization of the Report

A literature review is presented in chapter 2, which discusses EMS and ISO 14001 in the context of corporate environmental responsibility. Determinants of leading-edge environmental management (sec. 2.3.3) are a key component of this discussion. The review introduces two models of the development of ISO 14001: due diligence and total quality management. In order to build a foundation for the case study of training and awareness in EMS implementation, later sections of the chapter provide detailed treatment of the ISO 14001 standard, including critiques (sec 2.9). Section 2.10 summarizes the development of ISO 14001 and its significance to this case study. The final two sections of chapter 2 discuss implementation barriers, pitfalls, and strategies associated with ISO 14001. Section 2.12 concentrates on their relationship to training, awareness, and communication initiatives that may help organizations successfully implement an ISO 14001 EMS.

Case study methods are presented in chapter 3. Specifically, the Authority's characteristics, including its motivating factors, are described with respect to this research. The research design of this case study, including discussion of validity, reliability, and application of results, is presented in section 3.3. The following section

describes this study's three phases of data collection: an on-site work term, secondary analyses of YVR documents, and interviews with Authority employees. Section 3.5 discusses an evaluation that verified this study's findings.

Chapter 4 presents the case study. Following a background section, the description of the study begins by introducing the Authority and its system of environmental management in sections 4.2 and 4.3, respectively. Case study findings about specific initiatives of the AQMP are discussed in section 4.4. Section 4.5 presents the findings related to the evaluation of the EMP's training, awareness, and communication programs. Findings are summarized in section 4.6, subdivided into sections on the AQMP and EMP. The final section of this chapter, 4.7, specifically addresses the results of employee interviews.

Chapter 5 discusses management implications of this research. Principles of the case study's findings are eventually drawn-upon to recommend management actions that may overcome implementation challenges associated with implementing an ISO 14001 EMS. First, however, section 5.1 presents an approach to environmental management that explicitly focuses on environmental awareness training. The remaining four sections of chapter 5 present detailed management recommendations. These are presented as relevant to either the AQMP, the EMP's "Environmental Training Program," its "Awareness and Communication program," or the use of ISO 14001.

This study of environmental training and awareness in EMS implementation concludes with chapter 6. This concluding section addresses: key strengths of the Authority's EMS, key weaknesses, ISO 14001, and the awareness-based approach to EMSs. Section 6.2 presents this study's summary conclusion. The final section of this report outlines suggestions for further research in EMS and corporate environmental

responsibility that may help to reduce to the rate of environmental degradation caused by modern society.

CHAPTER 2. REVIEW OF LITERATURE

2.1. Overview and Rationale

There is a shortage of industrial? and academic literature that critiques ISO 14001 or provides practical evaluations about the implementation of an EMS (Camarota [1998], Cantin, *pers. comm.,* 1997; Kirkland and Thompson 1997). Much of the existing literature on the ISO standard is of a descriptive nature. In their discussion of the gap between EMS theory and practice, Kirkland and Thompson (1997, 2) likened the ISO literature to the following cake recipe: "'Take eggs, milk, butter and flour and mix into a cake.'" The recipe comes with no instructions on how to blend the ingredients. To address this problem, this literature review describes ISO 14001 not only from a structural perspective, detailing its elements and components; but also from an operational perspective, including elements of organizational dynamics like change management and training programs (Kirkland and Thompson 1997, Yin 1993).

In this context, this literature review discusses EMS, corporate environmental responsibility, environmental law, and ISO 14001. It includes detailed treatment of these themes in order to give environment managers a rich understanding of ISO 14001 and the roles of environmental training and awareness initiatives in EMS implementation. This research assumes that an organization must have a complete understanding of the context of EMS and corporate environmental responsibility in order to achieve optimum environmental and economic performance.

2.1.1. Organization

The review begins in section 2.2 with an introduction to EMS concepts. Section 2.3 reviews corporate environmental awareness and responsibility, defines sustainable development, introduces the concept of the "green wall," and discusses a model of

prerequisite conditions for improving environmental performance. Environmental law, as it relates to EMS and environmental training, is reviewed in section 2.4. This section focuses on the legal defence of reasonable care in environmental offences and highlights the place of environmental training programs in the jurisprudence. It is followed by two sections which each present a model of EMS development. These segments address due diligence, and total quality management (TQM), respectively. A summary of the influences that have contributed to the development of EMS and ISO 14001 is provided in section 2.7. Section 2.8 lays out the background of the ISO 14001 standard for EMS. Building from the literature on the development of EMS, section 2.9 evaluates and critiques the theoretical benefits and limitations of the ISO standard. The development and theory of ISO 14001, and their relevance to this research, are summarized in section 2.10.

Section 2.11 describes implementation barriers and pitfalls, and presents strategies for overcoming these challenges. The role of training and awareness programs is highlighted at this stage of the literature review. The final section of this chapter, 2.12, discusses different applications of environmental training and awareness in the implementation of an EMS. This final section of the literature review sets up the case study of environmental awareness training as a strategy to improve the Authority's EMS.

2.2. EMS Concepts and ISO 14001

To crystallize the concept of an EMS, the following lists summarize several different definitions that have been used to describe EMSs (Abbott 1992, BSI 1992, CSA 1993, and Davies and Rusko 1993 in Todd 1994, 5). EMSs are:

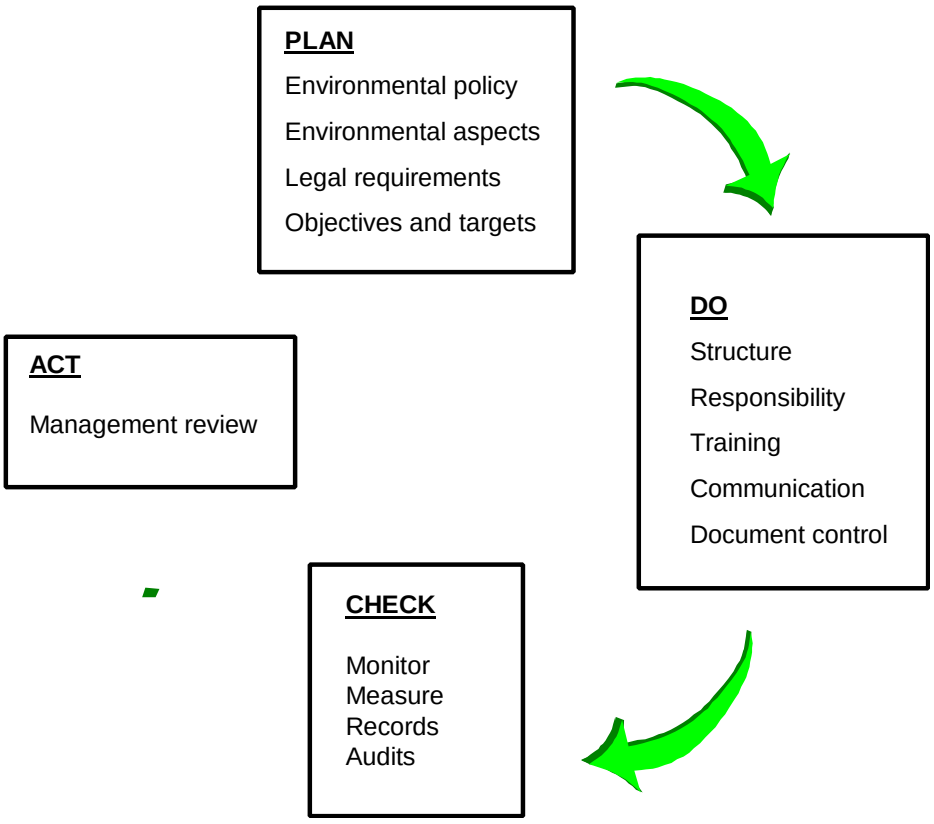
- an organizational rather than a technical approach to environmental management,
- a complement to government regulations,
- part of the larger management system of an organization, and
- formally structured and rigorous.

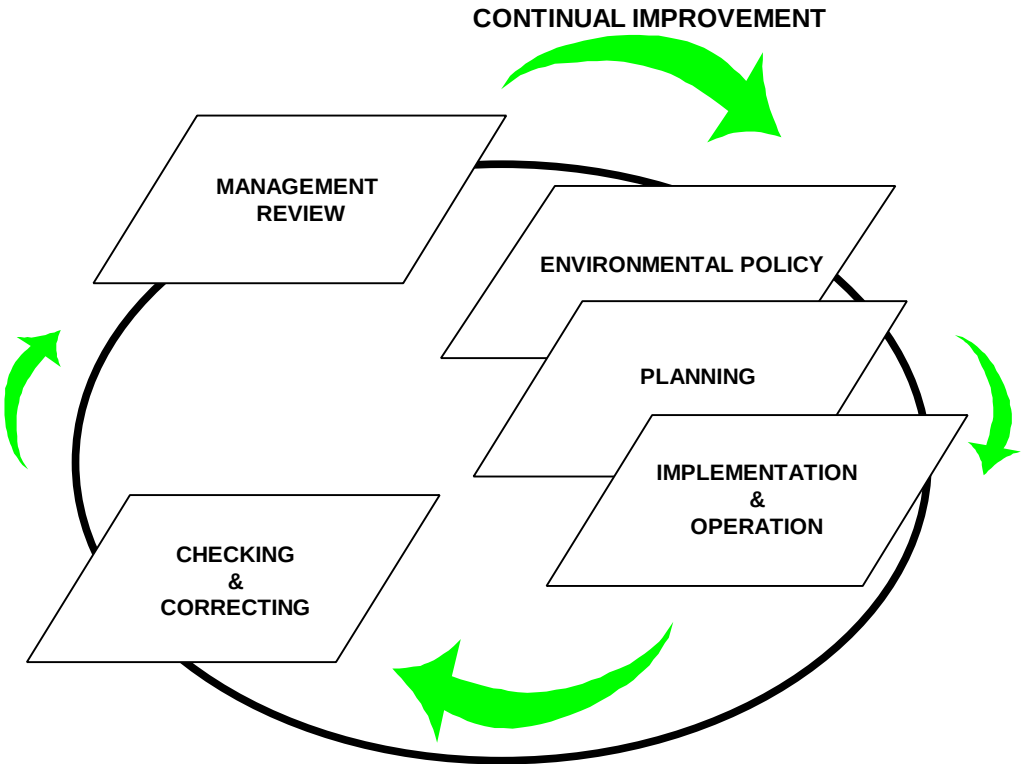
EMSs are concerned with:

- the environmental management of individual organizations, and
- an ongoing attempt to consistently achieve high standards of environmental performance and to improve upon them.

The conceptual framework of an EMS is often summarized by managers and consultants as: “Say what you do. Do what you say. Prove it.” This saying reflects traditional management principles that were developed in the early 1900s. Henri Fayol suggested that successful management needed to follow a system that involved these principles: plan, organize, command, coordinate, and control (in Boiral and Sala 1998, 61). A better-known model of management systems is called the Plan-Do-Check-Act Cycle developed in the 1930s by Dr. Walter Shewhart and sometimes referred to as the Demming Cycle since its reintroduction in the 1950s (fig. 1) (Sasseville et al. 1997, 64; Begley 1996; Welford 1996).

ISO 14001 refers to these management principles in the context of *continual improvement* (fig. 2) (CSA 1996, 1). The framework of ISO 14001 provides organizations some guidance, preventing them from feeling they have to reinvent the wheel (Green and LaFontaine 1996). The contents of ISO 14001, presenting the five core elements and all the required components of the specification standard, is listed in table 1.


PLAN
Environmental policy
Environmental aspects
Legal requirements
Objectives and targets
DO
Structure
Responsibility
Training
Communication
Document control
CHECK
Monitor
Measure
Records
Audits
ACT
Management review



(Source: CSA 1996, vi)

Figure 2. Continual improvement cycle of the 5 core elements of ISO 14001.

Table 1. Contents of the ISO 14001 specification standard for EMS.

ENVIRONMENTAL POLICY

PLANNING
- Environmental aspects
- Legal and other requirements
- Objectives and targets
- Environmental management program(s)

IMPLEMENTATION AND OPERATION
- Structure and responsibility
- Training, awareness, and competence
- Communication
- EMS documentation
- Document control
- Operational control
- Emergency preparedness and response

CHECKING AND CORRECTIVE ACTION
- Monitoring and measurement
- Nonconformance and corrective and preventive action
- Records
- EMS audit

MANAGEMENT REVIEW

(CSA 1996)

2.3. Corporate Environmental Awareness and Responsibility

Despite the contention that there is no such thing as an environmentally responsible corporation, many businesses claim to demonstrate environmental performance beyond what is legally required (Clarke 1997, Greider 1997, Welford 1996). Traditional corporate law discourages businesses from protecting "the commons," or the natural environment. The duty to maximize profits for shareholders

implies a duty on corporations to maximize their use of common resources such as air and water (Saxe 1990, 23). However given any number of companies, everything else being equal, some will achieve better environmental performance than others. ISO 14001 is a tool that can help companies that have a desire to practice proactive environmental management. The extension of environmental awareness and responsibility to all employees is an important step for organizations that wish to become leaders in environmentally sustainable management practices.

There are internal and external pressures for improving environmental performance, including: consumer demand, cost savings, legislation, and ethics (Welford 1996). Legislative and judicial law in Canada has been changing at an unprecedented rate. Business has traditionally reacted to such changes, but there is growing awareness in the corporate community that it is in their best interest to be forward-looking when it comes to environmental issues (Cotton and McKinnon 1993, Elkington 1994). Pressures that influence an organization's desire to implement an ISO 14001 EMS can be summarized into the following motivating factors, or drivers:

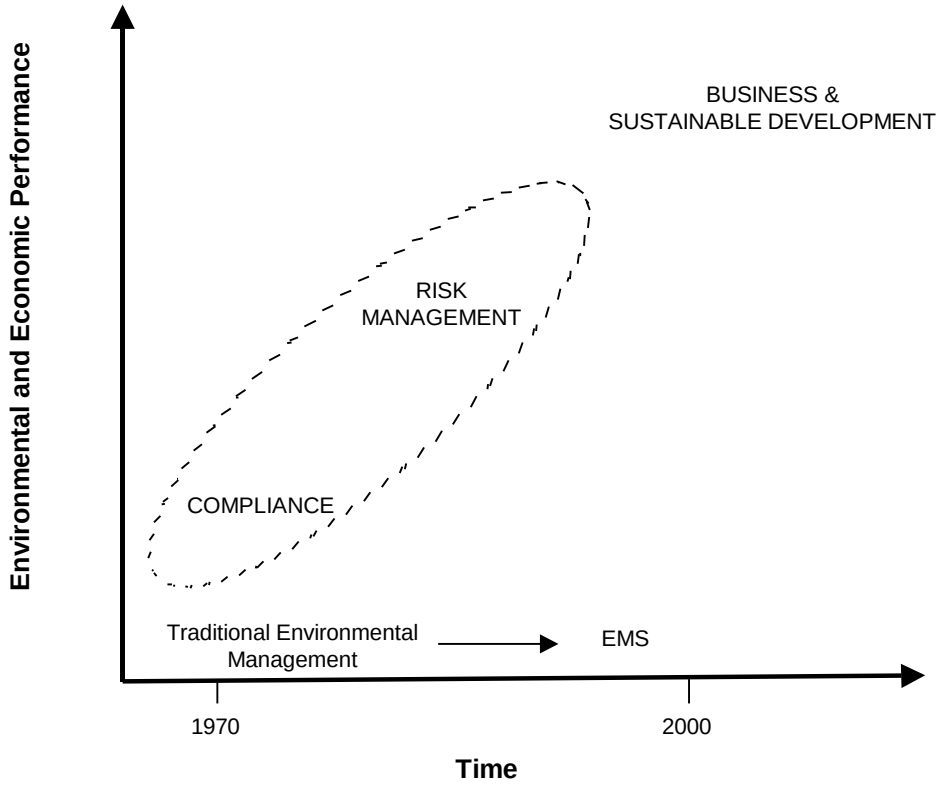
- competitive pressures, like access to markets;
- increased pressures from stakeholders such as consumers, investors, financial agencies, local communities, and employees;
- environmental regulations and the consequent potential for liabilities; and
- the recognition that environmental management can be implemented in an economically viable manner (Jose 1996).

Since the 1960s, interest in the environment, or at least the damage that has been caused to it, has been growing in Europe and North America (Welford 1996). Much of the literature on corporate responsibility cites Rachel Carson's 1962 book *Silent Spring* as the starting point of corporate environmental awareness. Significant environmental legislation includes the United States' *National Environmental Policy Act* (NEPA) of 1969 and the United States' *Endangered Species Act* of 1973 (IISD 1997).

The early 1970s marked a shift in corporate environmental management from a compliance-based approach to one based on internal policies for reducing environmental risks (Elkington 1994, Galimberti 1998, McGonagill and Kleiner 1994, Miller 1998, Snyder 1998). More recently, statutes have extended enforcement opportunities in environmental offences by explicitly lifting the corporate veil. These changes introduced the liability of directors, officers, and employees, and substantially increased fines for environmental offences (Bowland and Giguere 1997, Huestis 1993, Saxe 1990, 1993). In combination, these statutes have pointed the way toward increasing awareness of environmental responsibilities at all levels of corporations.

The "Brundtland Report," *Our Common Future*, of 1987 was a milestone for business and sustainable development. Some environmental policy analysts suggest that society is shifting from a resource and environmental management paradigm of resource management, characterized by static environmental impact assessments, to

Continuance of this progression depends on the integration of environmental stewardship into day-to-day operations and the commitment of all employees (Boiral and Sala 1998, Elkington 1994, IW 1998, Lawrence and Morell 1995, Miller 1998, Walley and Whitehead 1994).



(Adapted from: IISD 1997)

Figure 3. Business, environmental performance, and sustainability.

to resolve ecological problems (Saxe 1990, 23; Shrivastava 1995, 954). "In contrast to the anti-industry, anti-profit, and anti-growth orientation of early environmentalism, it has become increasingly clear that business must play a central role in achieving the goals of sustainable development strategies" (Elkington 1994, 91). As world population and standard of living continue to increase, society must continually improve its environmental performance in order to limit the amount of ecological damage. Green and LaFontaine (1996, 42) presented the following equation to express this relationship:

$$\text{harm to nature} = \frac{\text{population x consumption}}{\text{environmental performance}}$$

The ISO 14001 framework may help raise environmental awareness among businesses and aid the shift towards more environmentally sustainable forms of management. However, EMSs alone cannot solve our environmental problems:

> . . . we must of course remember that corporate environmental management is a necessary but not a sufficient condition for sustainable development. In concert with the greening of industry, there are other areas where action is required. Poverty alleviation, population control, health crises, regional conflicts, inequality, famine and starvation, consumerism, political structures, the power of transnational corporations and a multitude of other issues all need to be tackled (Welford 1996, 12).

2.3.2. The "green wall"

Over the past decade, companies have evolved through stages of environmental management from "grudging compliance" and "resistant adaptation" toward more environmentally sustainable management practices (figs. 4 and 5) (Elkington 1994, Fischer and Schot 1993, Galimberti 1998, Lawrence and Morell 1995, Miller 1998, Quigley 1997, Snyder 1998, Walley and Whitehead 1994). However, several recent surveys suggested that companies engaged in such evolution often "[had] bumped up against . . . the 'green wall', . . . a barrier that separates firms'

environmental good intentions from the realities of the bottom line" (Miller 1998, 58). Notwithstanding this challenge, many companies have gone through the first steps of change by putting in place an environmental management function, often together with health and safety (Shelton in IW 1998, 64). Environment managers are beginning to recognize that:

> most companies are struggling with a process problem. All companies are experimenting with ways they can change their structure so that the environment is a regular part of their decision-making (Buzzelli in IW 1998, 64).

Today, processes are needed to integrate environmental performance into business operations (Lawrence and Morell 1995, Walley and Whitehead 1994). In a study of the implementation of ISO 14001 at Alcan Smelters and Chemicals Ltd. (Boiral and Sala 1998, 59), it was reported that management recognized:

> . . . progress was to be achieved not only through investments in technology but also through de-centralized preventative measures and behavioral changes aimed at reducing pollution at its source. . . . [R]esponsibility for environmental efforts [was] no longer . . . assigned solely to technical departments.

As a result of this need for the extension of environmental awareness and responsibility throughout an organization, environment managers are paying greater attention to "new management approaches that focus on employee self-reliance, involvement, and participation" (Boiral and Sala 1998, 59). Many managers are looking to ISO 14001 as a framework that can help their organization make the required process changes and overcome the "green wall" (Boiral and Sala 1995, Green and LaFontaine 1996, Hamner 1996). Training and awareness programs have an important role to play in introducing behavioral change and decentralized measures for pollution prevention (Ecotec 1992, Senge et al. 1994).

2.3.3. Determinants of leading-edge environmental management

While the developmental stages of companies as they address environmental issues and strive to improve their environmental performance are well-defined, less is known about firms' motivations to achieve environmental excellence, or the actual methods they use to achieve it (Lawrence and Morell 1995, 101). During their study of progressive environmental management in California's "Silicon Valley" in Santa Clara County, Lawrence and Morell (1995) developed a model of "

Motivation was found to be a *necessary condition* for achieving excellent environmental performance: all eight firms in the case study were highly motivated. Companies were motivated by external and internal pressures. External motivating factors included government regulation, competitive advantage, and stakeholder pressures. Internal motivators were critical events and top management pressure (Lawrence and Morell 1995, 109).

Opportunity to achieve environmental goals was provided by occasions like the construction of a new facility, development of a new technology, or the introduction of a new product. These events provided managers with the chance to initiate environmental improvements (Lawrence and Morell 1995, 112). Opportunity was not evident at all of the firms in the study and was described as a *supportive condition* for leading-edge environmental management.

Resources were required to implement advanced environmental management practices. Resources included: “money, technical expertise, and information that support evolution toward environmental excellence” (Lawrence and Morell 1995, 112). Financial and human resources have been widely recognized as barriers to implementing a progressive EMS (Kirkland and Thompson 1997, Stapleton et al. 1996, Walley and Whitehead 1994, Wilson 1997). Information about relevant laws, technical information, and information about the actions of other firms was another key element in promoting leading-edge environmental management (Lawrence and Morell 1995, 113). Resources, like opportunities, were a supportive condition for environmental leadership.

All of the companies, regardless of how motivated they were or their level of opportunities or resources, needed internal management processes to achieve environmental excellence. Processes, like motivations, were found to be a necessary condition for a high level of achievement in environmental performance. Process factors identified in Lawrence and Morell's study (1995, 113-116) included: line manager involvement, cross-functional teams, TQM, environmental audits, and rewards for achievement.

To be effective, these processes require a high level of environmental

(82% of respondents) in the decision of whether or not to implement an EMS. This factor was cited well ahead of improved business performance (18%) (Ernst & Young 1997, 10). It appears that more companies will have a generic, "ISO-based" or "ISO-compatible" EMS in order to reduce environmental liability, than one that will be certified to the standard, to differentiate a company within its market. Environmental regulation, and hence liability, also have a strong influence on the content and scope of training and awareness programs in corporate environmental management (Ecotec 1992, 79-80). This section discusses how environmental law defines training and awareness programs as important components of a credible EMS.

2.4.1. Environmental offences

Environmental law is comprised of a body of statutory and common law. Over time, legislative law has enacted environmental statutes that effectively replace common law rights to protect property (Selick 1996). Typically, environmental statutes establish a regulatory regime consisting of a system of permits or licenses. Permits set out terms and conditions for operation with which a corporation must comply and they are supported by administrative powers in the regulations that allow for enforcement of the terms and conditions (Huestis 1993). The above-described system of environmental regulation is often described as "command and control," or "the right to pollute."

Environmental statutes are public welfare laws, and offences are considered regulatory or quasicriminal offences (Bisson 1995, 19; Cameron 1993; Saxe 1993). In order to get a conviction, the prosecution needs only to prove that an accused committed the acts that were alleged. In regulatory offences, there is no need to

establish *mens rea*, the mental element: that is to say, it does not matter whether the accused committed the acts “knowingly or with a guilty mind” (Cameron 1993, 107).

The majority of offences under environmental statutes are strict liability offences, based on a 130-year-old English tort (Huestis 1993, Swanson 1990). Strict liability, or the rule in *Rylands v. Fletcher*, is a common civil cause of action in environmental litigation (Cotton and McKinnon 1993, 13). The rationale behind strict liability is that someone who engages in risky, “non-natural,” activities for their own benefit should be held accountable for resultant damages (Swanson 1990). Liability under the rule in *Rylands v. Fletcher* was initially “absolute liability,” but has been altered in the jurisprudence to allow a defendant to explain an incident (Cotton and McKinnon 1993, 19; Swaigen 1993, 118).

2.4.2. Strict liability and the concept of due diligence

In strict liability offences, a defendant may be pardoned if it can be proven, on the balance of probabilities, that all reasonable care was taken to prevent acts that constitute an offence. Reasonable care is one defence, among others, including: legislative authority, sabotage, plaintiff’s consent, and an act of God (Cotton and McKinnon 1993, Swaigen 1993). The standard of care referred to borrows from the common law concept of a “reasonable person” in a negligence tort (Bisson 1995, 27). Demonstration of a standard of care that could be expected of a reasonable person is known as the defence of due diligence. “

due diligence. Prior to *Sault Ste. Marie,* there was a debate about whether *mens rea* (intent) had to be proved for regulatory offences and the standard of due diligence was believed to be nearly impossible to prove (Bisson 1995, 20; Swaigen 1993, 118).

In this case, the city was charged under the old *Ontario Water Resources Act* for polluting watercourses with garbage. In the unanimous decision, Judge Dickson wrote that, having reviewed the two available options for the offences, criminal and absolute liability, the court concluded that there were "compelling grounds for a third category of offenses labeled 'strict liability,' in which it would be open to the accused to prove a defense, on the balance of probabilities, that [he, she, or 'it'] exercised due diligence or reasonable care to prevent the offense" (in Cotton and McKinnon 1993, 19).

The *Sault Ste. Marie* decision placed an onus on the accused (the defendant) to

awareness programs. Italicized points identify those elements of existing legal cases which support the need for training and awareness programs in EMSs.

R. v. Sault Ste. Marie

In the *Sault Ste. Marie* decision, Judge Dickson wrote:

> Where an employer is charged in respect of an act committed by an employee acting in the course of employment, the question will be whether the act took place without the accused's direction or approval, thus negating willful involvement of the accused, and whether the accused exercised all reasonable care by establishing a proper system to prevent the commission of the offence and by taking reasonable steps to ensure the effective operation of the system (in Bisson 1995, 20).

This decision, as well as defining strict liability, referred to the use of a *system* to manage environmental affairs, including the maintenance of the system, as a requirement for exercising all reasonable care. It put an onus on the employer to establish an EMS and ensure that it remains effective. It also implied that to minimize liability, an employer needed to provide his or her employees with direction on how to prevent an offence. However, until the early 1990s there was no case law to determine what constitutes a "*system to prevent the commission of the offence*" (Bisson 1995, 21) [emphasis added].

R. v. Bata Industries

In 1992, *Bata* became the first case in Canada to define the standard of care that would apply to "a system" in the defence of due diligence. The *Bata* case is also, and not coincidentally, a significant case dealing with director and officer liability (Cameron 1993, Saxe 1993). Bata's president and member of the board of directors, chief executive officer, and the general manager of the plant were all charged under the *Ontario Water Resources Act* with permitting barrels and pails of toxic wastes to deteriorate and leak their contents, causing environmental damage (Kirby [1997]).

Judge Ormston, relying on the language of *Sault Ste. Marie* and the standard of care in evidence at a neighbouring industry, determined that a business should *have an environmental policy that addresses the prevention of pollution and that there should be a system in place to ensure compliance with the policy* (Bisson 1995, 22). Judge Ormston wrote that “one would hope to find remedial and contingency plans for spills, a system of ongoing environmental audit, *training programs*, sufficient authority to act

R. v. Courtlands Fibres Canada

The first defendant to successfully prove due diligence in this context was Courtlands Fibres in 1992. Courtlands was charged with a chemical spill into the St. Lawrence River and despite having a plant that was "so old that spills were almost inevitable," they were able to prove due diligence based on a system of environmental management (Bisson 1995, 23). This case provided meaningful guidance for what was necessary in an EMS to meet the due diligence standard of all reasonable care. The following elements of Courtlands Fibres' EMS were deemed significant:

- legislative or regulatory compliance,
- foreseeability of the offence,
- *industry standards,*
- character of the neighbourhood,
- *efforts to address the problem,*
- promptness of response and duration of attention to the problem,
- matters beyond the control of the defendant,
- *expected skill level,* and
- preventative systems (Bisson 1995, 25) [emphasis added].

R. v. Prospec Chemicals Limited

Charged with exceeding limits in an air emissions permit in 1995, Prospec Chemicals of Alberta was fined in 1996 and ordered by the court to become certified to ISO 14001 (draft at the time) by June 1998 (BATE 1998, 7). This order stemmed from a negotiated settlement with the prosecutor, who insisted on the ISO 14001 standard, and set a precedent for the use of the EMS standard by enforcement agencies (Abbott in BATE 1996a, 2). By naming the ISO 14001 standard, *Prospec* defined what is acceptable as a proper system more explicitly than previous decisions. This decision made ISO 14001 a benchmark for reasonable care in environmental management (BATE 1996a, Kulig 1996). The plant manager at Prospec Chemicals stated that the greatest benefit of ISO 14001 has been the heightened level of environmental awareness that is now evident on the plant floor and a part of the culture of the company (BATE 1998, 7).

2.4.4. *Caveat* to EMS and due diligence

The above cases do not make the point that ISO 14001, or any EMS, would necessarily satisfy the standard of all reasonable care (Bisson 1995). The courts were not looking for EMSs, *per se,* but for specific management procedures that were in place to prevent the commission of the relevant offending act. Frequently,

environmental training and awareness programs were cited as important parts of those management procedures. Since every case is different, "there is no specific set of rules a company can follow to ensure that it will meet the [due diligence] test in every circumstance" (Griffiths and Clairman 1996). Although an EMS could be in place but fail to adequately address the issue(s) at hand, environmental training and awareness programs have been recognized in the jurisprudence as an important way of demonstrating efforts to address environmental concerns.

The courts generally consider both broad and specific management actions of a company in determining whether it acted with reasonable care (Griffiths and Clairman 1996). Case law suggests that the use of a recognized EMS will be judged favourably by the courts, especially if the system could be considered to establish a benchmark as an industry standard and includes a relevant training component (Sasseville et al. 1997, 208; Kulig 1996). The assumption of ISO 14001 proponents is that a properly designed, implemented, and maintained EMS will identify the subject risk and ensure that appropriate preventative measures are in place and functioning (Voorhees and Woellner 1997).

2.4.5. Due diligence requirements of ISO 14001

This subsection of the paper draws on the above literature to introduce the components of ISO 14001 (table 1). It describes requirements of the standard that address legal matters most directly. ISO 14001 does not add any new regulatory requirements to a company that uses the standard, nor does it have any legal authority. ISO 14001 is voluntary standard and it is a *conformance* standard, not a *performance* standard. The focus is on process, not product (Gleckman 1996, Gleckman and Krut 1997). The requirements reviewed here represent basic components of ISO 14001 that

should be included in programs for environmental training, awareness, and communication.

Compliance with relevant legislation is the most fundamental requirement of ISO 14001. The environmental policy must include a commitment to "comply with relevant environmental legislation and regulations, and other requirements to which the organization subscribes" (CSA 1996, 2). The section on "Legal and other requirements" states that an organization must "establish and maintain a procedure to identify and have access to legal and other requirements . . . that are applicable to the environmental aspects of its activities, products or services" (CSA 1996, 3; Lamprecht 1997, 79, 55; Sasseville et al. 1997, 91). This requirement makes organizations responsible for being informed on regulatory issues, including industry standards. Staying informed about environmental regulations requires management processes that maintain high levels of awareness and communication. The other requirements that are referred to could include:

- industry codes of practice;
- criteria recommended by relevant trade groups;
- nonregulatory guidance issued by government;
- agreements with local authorities, neighbours, or interest groups; and
-

- actual or potential impacts of their duties,
- their role and responsibility in abiding by EMS procedures, and
- potential consequences of departing from specified operating procedures (Voorhees and Woellner 1998, 37).

Still under the heading of "Implementation and operation," the components addressing documentation and document control are also likely to play a role in any environmental prosecution of a corporation. Therefore, such requirements of an EMS should be thoroughly understood by the organization and all of its employees. The document control component requires a procedure to establish how documents are controlled, and the system must allow for the following:

- review and revision as necessary and by approved personnel,
- identification of the distribution of all up-to-date documents,
- removal of obsolete documents from all points of issue, and
- the identification of any obsolete documents retained for legal purposes or knowledge preservation (Lamprecht 1997, 59).

The "Checking and corrective action" element includes several sections that have legal implications. These sections of ISO 14001 address monitoring and measurement, nonconformance and corrective and preventative action, record keeping, and EMS audits. These procedural requirements demand that an organization track measurable environmental performance targets, investigate nonconformances and implement changes, maintain legible records, and assess the effectiveness of the system. The requirements for training and documentation apply to all these procedures.

2.4.6. Disclosure issues

Companies have concerns about their internal records being accessed by regulatory agencies or other third parties (Kirkland and Thompson 1997). Companies trying to improve their environmental performance by implementing ISO 14001 want the

ability to keep the information they collect confidential and unobtainable (Sasseville et al. 1997, 211). Most information collected for an ISO 14001 EMS is not intended for the purpose of obtaining legal advice, but for disseminating information within the company. Also, at least some external auditing of an EMS is normally conducted. Dissemination of information and third-party involvement do not conform to the criteria for attorney-client privilege or attorney work-product protection (Sasseville et al. 1997, 214). In many jurisdictions, collecting environmental records, when not done to obtain legal advice or in anticipation of litigation, and when not done confidentially and under the direction of an attorney, may expose an organization to liability (Sasseville et al. 1997). Therefore, disclosure issues may be a disincentive to organizations that are considering environmental training programs.

The Environmental Protection Agency in the United States (EPA) is working on privilege legislation that will protect EMS and environmental audit information that is reported voluntarily (Voorhees and Woellner 1998, 116; Sutherland [1998]). Several states have been investigating potential applications of the ISO standard and have enacted privilege legislation for EMS material (Beardsley et al. 1997; Begley 1996; 1997; Kirkland and Thompson 1997, 10).

2.4.7. Summary of ISO 14001 legal issues

ISO 14001 has no legal authority and does not require compliance beyond applicable regulations. ISO 14001 procedures are left flexible to account for different scales of operation and different environmental issues, thus using wording like *as necessary* and *periodically.*

Legal principles relevant to an ISO 14001 certified company are technically no different than those that apply to any organization with environmental issues or facing

an environmental offence. A significant practical difference, however, is that an organization using ISO 14001 has an explicit commitment that recognizes the importance of environmental issues. Training and awareness programs that support an organization's environmental policy are critical components of that commitment. Implementing ISO 14001, or an equivalent standard, may decrease an organization's potential liability, especially if the EMS could be considered an industry standard (Kulig 1996, Sasseville et al. 1997). However, implementing ISO 14001 and not living up to its commitments may be "a company's biggest mistake," increasing an organization's

applicable environmental regulations. Since the proliferation of environmental regulations in the 1970s, the increase in the severity of fines in the 1980s, the emergence of director and officer liability in the 1990s, and public image problems that result from noncompliance, business has become increasingly concerned with environmental liability (Saxe 1990; 1993; Lawrence and Morell 1995). In the United States, the introduction of NEPA in 1969 increased noncompliance costs to environmental offenders and led to a marked increase in environmental auditing (Todd 1994, 10). The concept of EMS grew, in part, from environmental auditing and was heavily influenced by environmental regulation.

Beyond compliance, an EMS designed for due diligence should cover aspects of environmental management, like training and document control, that will help a company prepare a defence if it is charged with an environmental offence, such as a spill. The due diligence model has led to training programs being adopted as an integral part of a complete system of environmental management. The employment of environmental experts, especially as managers or educators, helped organizations such as Courtlands Fibres to meet the reversed burden of proof and demonstrate an acceptable standard of care. In essence, the jurisprudence on environmental offences has allowed lawyers, consultants, and environment managers to compile checklists of what organizations should include in the structure of an EMS.

2.6. Total Quality Management Model of EMS

The TQM model of EMS differs from the due diligence model in that it is less of a checklist and more of a process (Bisson 1995, 48). The systems approach to EMS is

is not used in its conventional sense, but is defined more broadly to include judges, regulators, clients, neighbours, lenders, and other stakeholders, including employees and the general public (Bisson 1995, 50). In environmental literature, the term "stakeholder" is more commonly used than "customer," but should also carry the broadest possible definition (Azzone et al. 1997, Camarota [1998]). It has been suggested that the physical environment itself be considered a customer, or stakeholder (Spedding et al. 1993 in Todd 1994, 11). The balanced environmental scorecard is one TQM-like system that is gaining recognition: it is used to account for different management values and the diverse interests of various stakeholders (Camarota [1998]). Stakeholder, rather than customer, is the term used in this study.

The TQM model has provided the "change management" focus of an EMS that includes processes like training and awareness programs (Schonberger 1994). "Quality is about how well goods and services meet customer expectations;" in total quality environmental management, or TQEM, society at large is the stakeholder that defines the needs and expectations of an EMS (Wenmonth 1994, 15). In this sense, stakeholder satisfaction, including employees, is a key to understanding ISO 14001 (Azzone et al. 1997, Camarota [1998]). Applied to environmental training and awareness programs, employees should know what motivations underlay the environmental procedures that they follow. Also, employees should have the opportunity to offer input on the system and its processes. Stakeholders should feel their environmental concerns are taken seriously.

Potentially, all market-related factors, including public image, pressure from lenders, "green" markets, and cost savings, could be considered as separate models of EMS development. However, because all of these drivers are underlain by stakeholder satisfaction, they are included in the TQEM model. Because of the broad definition of

stakeholders, hard-to-measure drivers like corporate environmental ethics and individual sense of responsibility are also incorporated into the TQEM model (Wenmonth 1994).

2.7. Influences on ISO 14001

Many fields of expertise contributed to the development of ISO 14001 and these different areas will continue to influence its development and use (fig. 6). Though the development of ISO 14001 is sometimes credited to either due diligence or TQM, such a distinction is not necessary. The content-oriented due diligence model offers certain features and the process-oriented TQM (market driven) model provides other attributes. Both models support the inclusion of training and awareness programs in EMS.


ENVIRONMENTAL
MANAGEMENT

2.8. ISO 14001 Standard for Environmental Management Systems

2.8.1. Background to ISO 14001

The ISO 14001 international standard is, by definition, flexible. It was designed for international use and "to be applicable to all types and sizes of organizations and to accommodate diverse geographical, cultural and social conditions" (CSA 1996, v). One of the main goals of creating ISO 14001 was to standardize the many national frameworks that were emerging, in order to prevent the introduction of nontariff trade barriers (CSA [1998], Powers 1995). This issue was addressed at the Uruguay Round of negotiations on the *General Agreement of Tariffs and Trade* (GATT) in 1986 and at the Rio Earth Summit in 1992 (Boiral and Sala 1998, 58). Understanding the origins and development of ISO 14001 will foster appropriate expectations of an EMS and facilitate a common vision between corporate decision makers, line employees, and all stakeholders. An organization can use this understanding about its EMS as a building block for its environmental training and awareness programs.

Although no standardized framework has existed with respect to airports, neither EMSs nor training programs are new phenomena. Indeed, many companies have EMSs in place which may already meet or exceed ISO 14001 (Lamprecht 1997, 81; Lewis 1997; Griffiths and Clairman 1996; Begley 1996). ISO 14001 is one example of an EMS framework. It has been preceded by other national and regional standards. The best-known of these include the British Standards Association's *BS 7750:1992*, the first EMS standard; and the European Union's *Eco-management and Audit Scheme* (EMAS). Produced in 1993, EMAS is arguably the best model from an environmental performance perspective because of its reporting requirements (Bisson 1995, 149; Gleckman 1996). Reporting requirements contribute to environmental awareness and

make organizations more accountable to their stakeholders. Both *BS7750:1992* and EMAS are widely held as being more stringent than ISO 14001 (Stapleton et al. 1996).

2.8.2. International Organization for Standardization

The mission of ISO is to improve efficiency and reduce barriers to trade by harmonizing standards for manufacturing, communication, trade, and management systems. These voluntary standards are developed by consensus by ISO committees (CSA [1998], Stapleton et al. 1996). An ISO advisory committee began assessing the need for a harmonized environmental management standard in June 1991. In January 1993 ISO created Technical Committee 207 (TC 207) to develop the ISO 14000 series of standards. National advisory groups contribute to TC 207, which includes many working groups and subcommittees (CSA [1998], Stapleton et al. 1996).

management are the International Chamber of Commerce's 1991 *Business Charter for Sustainable Development* and *Agenda 21*, the primary policy document generated by the Rio Earth Summit in 1992. All of these initiatives identify policy recommendations for an integrated, systems approach to sustainable develo

2.9. Critical Evaluation of ISO 14001

Based on evaluations of EMS theory, many benefits have been cited for organizations that implement ISO 14001 (table 2). While designing and implementing an EMS, the airport, or any other organization, should know which benefits it expects to reap from using the standard. Studies have found that the expenditure of resources in an EMS do not always correspond with the objectives that an organization wished to achieve (Todd and Williams 1996, 167).

The literature reported that understanding and prioritizing the applicable benefits will help an organization achieve a higher level of focus for its EMS. Having this focus, in turn, allows an organization to better-design its training, awareness, and communication programs for its employees and other stakeholders. The following discussion of ISO 14001 emphasizes issues of debate that may require clarification in an organization's environmental training and awareness programs.

Table 2. Potential benefits of ISO 14001.

- demonstrating standard of care with respect to due diligence
- savings from reduced noncompliance with environmental regulations
- satisfying investors, public, and environmental groups
- heightening employee satisfaction and morale
- meeting modern environmental ethics
- facilitating access to capital and insurance
- forestalling external pressure from regulators and the public
- streamlining and reducing environmental assessments and audits
- increasing resource productivity (materials savings and waste reduction)

will help an organization to develop informed expectations of its EMS and to present the system with confidence to all stakeholders.

Table 3. Potential limitations of ISO 14001.

- ensuring consistency among ISO registrars will prove difficult
- interpreting terms such as “environmental aspects” and environmental aspects of a company “over which it can be expected to have an influence”
-

2.9.1. Critiques of ISO 14001

Benefits and limitations associated with implementing an ISO 14001 EMS can be linked to three overriding themes. These themes relate to the text of ISO 14001, inferences about the role of the standard, and real-world reactions to the standard since it was introduced. In many cases, the inferences that ISO 14001 is a vehicle for sustainable development, or that it necessarily improves environmental performance, are not borne out in the text of the standard (Gleckman 1996). A problem with many of the uncertainties surrounding ISO 14001 is that proponents offer exaggerated promises and opponents offer uninformed criticisms (Gleckman 1996, Bell 1997).

Criticisms of ISO 14001, normally in comparison to other standards like EMAS, have identified specific points related to the text of the standard itself. The following points represent substantive criticisms of ISO 14001:

- Many see ISO as a step back from more progressive initiatives that require public disclosure of environmental performance. The ISO standard requires only that an organization's environmental policy be made public (Begley 1996, 299A; Betts 1998a, 303A; Gleckman 1996, 4).

- Instead of using the term "continuous improvement," which, over a decade of TQM, has developed a performance-based meaning, ISO opted to use "continual improvement," a new term that has a vague interpretation (Gleckman 1996, 3).

- "Prevention of pollution" is used in the ISO standard, avoiding the "pollution prevention" language recognized in United States law to include waste management at source. The language of ISO 14001 includes end-of-pipe solutions (Gleckman 1996, 3; Begley 1996, 300A).

- By emphasizing the commitment of top management and not requiring employee input to EMS policies, ISO outlines a top-down, hierarchical management approach, which contradicts modern management trends (Boiral and Sala 1998, 61; Schonberger 1994; Senge et al. 1994).

- Giving multinational companies the option of complying with local laws instead of home country standards is seen as regressive, given commitments made by several industries and businesses to abide by local laws and the recommendations of principles like *Agenda 21* (Gleckman and Krut 1997, 48; Gleckman 1996, 2).

2.9.2. ISO 14001 in public policy

The possibility of ISO certified companies receiving regulatory relief has been one of the most publicized advantages of ISO 14001 (Begley 1996, 299A; Lewis 1997, 76). As discussed with respect to disclosure issues (sec. 2.4.6) and government initiatives (sec. 2.8.3), there are ongoing discussions and pilot projects about how regulators could employ ISO 14001 (Begley 1997, Sutherland [1998]). Several states and provinces are considering "accountable devolution" of regulatory, or command and control, authority. These regulators consider ISO 14001 a holistic approach to achieving environmental protection and helping the economy (Begley 1997, 365A). The argument for the use of voluntary initiatives in the regulatory regime is that if regulators use ISO 14001 to identify responsible companies, they can focus their limited resources on helping or scrutinizing those companies that have not made a commitment to a comprehensive environmental policy (Bisson 1998a). It is widely held that governments will continue to seek devolution of responsibilities as budgets continue to be reduced and government departments are downsized.

From the perspective of industry, the argument is that additional government-imposed regulations may be avoided if self-regulation can achieve acceptable environmental performance.

> If an entire industry could demonstrate an awareness of environmental concerns, there would be no need for governments to step in with their own lists of regulations - which, let's face it, fail to achieve their objectives. . . . Despite the extent of existing rules, there's no doubt that the regulatory web will get thicker if the transportation sector doesn't take it upon itself to act (Bowland and Giguere 1997, 29).

Industry is making the point that it understands its operations better than government and can use its resources in ways that would reach environmental goals more

efficiently and prevent pollution more effectively (Beardsley et al. 1997, Bisson 1998a, Bowland and Giguere 1997).

However, this argument is presented based on a general assumption that government is doing a satisfactory job of creating environmental policy. References to companies "fighting, ignoring, and hamstringing any and all environmental regulatory efforts" or "complaining loudly about heavy-handed government intrusiveness" are common (Walley and Whitehead 1994, 47; Miller 1998, 58). A policy network, or political structure, that gives corporate and labour elites direct access to decision makers, to the exclusion of environmental interests, means that the reason corporations exceed government standards may be because the corporations themselves force government to set the bar too low (Hessing and Howlett 1997). Political structures, as Welford (1996, 12) and others have articulated, are issues that must be addressed in concert with EMSs for the transition to sustainable development. In the case of airports, some perceive the current environmental regulatory system as unsatisfactory (sec. 1.2). Airports may draw relatively little environmental scrutiny from regulators because of the key role they play in the modern industrial infrastructure and their economic contribution to society (Morrissette 1996, 23: NRDC 1996, 14).

Critics are skeptical of using ISO 14001 as an indicator of environmental responsibility because there is no direct relationship between ISO 14001 and improved environmental performance (Gleckman 1996). ISO 14001 is not a performance standard, and the text of the standard makes explicit statements to that effect. Certification to ISO does not oblige a company to perform better on environmental protection than a noncertified company (Gleckman 1996, 3).

The only environmental training issues definitively required by ISO are those that relate to regulated issues. If YVR were to certify to ISO 14001, and Environment

Canada or the Department of Fisheries and Oceans were to grant the Authority freedom from regulatory requirements, the standard's specifications could not give stakeholders a minimum level of assurance about environmental protection for such things as spill control or habitat conservation. Since ISO's minimum requirement is legal compliance, any reduction in regulations reduces the incentives for an organization to provide environmental training to its employees. In turn, a reduced level of environmental awareness among employees limits the potential for improving environmental performance.

The fact that ISO 14001 is a not a performance standard, in and of itself, poses no real concern; however, problems arise when consideration is given to how the

In the United States, a Multi-State Working Group on EMS, working with the EPA, academics, and business, is evaluating the use of ISO 14001 in public policy (Begley 1997, Betts 1998a, Sutherland [1998]). The group has been working for two years on a way to enhance the credibility of ISO 14001 by including criteria for reporting environmental performance data (Begley 1997, Betts 1998a, Sutherland [1998]). The United Nations (UN) Commission on Sustainable Development is currently undertaking a similar review of voluntary initiatives (Betts 1998b). In Canada, the Canadian Council of Ministers of the Environment (CCME) is working to harmonize environmental regulation and policy. However, there are no clear signs about how ISO standards may, or may not, be adopted into federal-provincial programs (SCC [1998]; Altoft, *pers. comm.,* 1998).

2.9.3. Accountability and auditing

It has been argued that individual industries can design more aggressive standards that suit their environmental issues more precisely and use their resources more efficiently (Beardsley et al. 1997, Bisson 1998a, Bowland and Giguere 1997). However, what can be lost when using an industry-designed standard is accountability in the auditing process. Even though EMS audits are not necessarily compliance audits, and audit results need not be disclosed, auditing is a strength of the ISO 14001 standard (Johnson 1997). External audits are not required if an organization opts for self-declaration. If, however, a company is certified, it must be audited by an accredited third party. To meet this requirement, an EMS must be audited by an accredited *registrar* to ensure conformity to the elements of ISO 14001 (Kirby [1997]).

Canadian registrars for ISO 14001 must be accredited by the Standards Council of Canada (SCC) (Altoft, *pers. comm.,* 1998; SCC [1998]). Registrars are accountable

to SCC (*CAN-P-14: Criteria and procedures for accreditation of organizations registering environmental management systems*), based on the auditing guidance standards of ISO 14001 (ISO 14010-12) (SCC [1998]). Registrars only perform EMS audits for the purpose of certifying organizations to ISO 14001. To avoid conflict of interest they cannot provide environmental consulting services (Altoft, *pers. comm.,* 1998). Many believe that for an ISO 14001 EMS to be accepted as credible by suppliers, customers, and other parties, it will require verification by a registrar.

In addition to registrars, there are certified environmental auditors. SCC and the Canadian Council for Human Resources in the Environment Industry (CCHREI) have an agreement that empowers CCHREI to assess organizations that certify or train environmental auditors and wish to be accredited by SCC (Pawley, *pers. comm.,* 1998; Rowan 1997; SCC [1998]). The Canadian Environmental Auditing Association (CEAA) is the lead organization in Canada for certifying environmental auditors, and, therefore, cannot train its applicants (Pawley, *pers. comm.,* 1998). CEAA was audited in late August 1998 and was expecting to receive accreditation from SCC shortly thereafter (Pawley, *pers. comm.,* 1998). CEAA has its own standards for the qualifications of an environmental auditor that use *ISO 14012: Guidelines for environmental auditing - Qualification criteria for environmental auditors* as a minimum standard (CER&CN 1997a; Pawley, *pers. comm.,* 1998). In addition, due to competitive pricing and pressure from registrars and the SCC, CEAA will begin to certify ISO-EMS auditors based strictly on ISO 14012 (Pawley, *pers. comm.,* 1998).

For companies not seeking certification, the decision to use certified auditors to perform an EMS audit, or "gap analysis," is market driven, depending on stakeholder pressure. Companies not worried about the credibility of their EMS need not use a certified auditor (Altoft, *pers. comm.,* 1998; Bisson, *pers. comm.,* 1998b; Pawley, *pers.*

comm., 1998). A major focus of CEAA is "to promote the use of certified environmental auditors by governments, industries, and institutions. . . . [and] with the government interest in sustainability and self-regulation, some progress is being made" (Pawley, *pers. comm.,* 1998). While it is still too early to judge the effectiveness of auditing under ISO 14001, the idea of independent registrars, certified auditors, and accountability to an association is a step in the right direction by ISO.

In general, the relationships between ISO, SCC, registrars, CCHREI, CEAA, CCME, certified auditors, other environmental consultants, and internal auditors do not seem to be well-understood. This represents a significant shortcoming that could contribute to a lack of focus in the implementation of an EMS. Training and awareness programs of an EMS need to clarify an organizations' auditing processes.

2.10. Relevance of the Background of ISO 14001

The origins of ISO 14001, the relationship of ISO 14001 with other standards, and the relationships of ISO with other organizations, all help to define what an ISO-based EMS should be and what it can or cannot accomplish. The literature identified several benefits, limitations, and critiques of ISO 14001. A minimum degree of familiarity with the development of ISO 14001, its requirements, and common points of debate about EMSs will help an organization achieve a clear understanding of its EMS.

In order to implement what it intends to implement, and ensure that it reaps the desired benefits, an organization needs to be conscious of exaggerated promises about ISO 14001. Likewise, an organization should be able to defend its EMS from uninformed criticisms. Understanding the broad issues around EMSs, and incorporating them into training and awareness programs, allows an organization to

maintain a clear understanding among employees of what an ISO 14001 system is and why environmental management is a priority.

2.11. Implementation Barriers, Pitfalls, and Strategies

This section addresses practical observations about the implementation of ISO 14001. Examining the known barriers, pitfalls, and strategies that have been associated with implementation of ISO 14001 accentuated the role that training and awareness programs play in EMS. It also identified different levels of environmental awareness and competence to consider. Awareness requirements for senior management compared to those for line employees, and the difference between awareness training and competence training, are examples of different levels of training, awareness, and competence. These various levels have different roles in facilitating the implementation of an ISO-compatible EMS and are discussed in section 2.12 of this literature review.

In this review, barriers, pitfalls, and strategies of ISO 14001 implementation have been classified as relevant to one of: top management, the integration of environmental policies, or employee training and awareness. In tables 5, 6, and 7, the items identified as needing attention primarily at the senior management level are issues that involve broad, strategic, corporate decisions. Items listed as aiding with the integration of the environmental policy also depend heavily on the commitment of senior management, but could be addressed more effectively with the participation of all employees.

The employee training and awareness category in these tables lists barriers, pitfalls, and strategies that are directly related to understanding environmental issues, awareness about the EMS, and the roles and responsibilities of employees. These

training and awareness issues relate to “comprehension challenges” that impede the effective use of an ISO-compatible EMS. Although all of the barriers, pitfalls, and strategies have some relation to the ISO 14001 component of “Training, awareness and competence,” the comprehension challenges listed in the category of employee training and awareness have direct links with environmental training, awareness, and communication programs for employees.

Since integration depends on awareness, and awareness depends on the commitment of senior management, the previously-described classifications of barriers, pitfalls, and strategies are somewhat arbitrary. However, the distinction is useful because it identifies and separates narrow fields of potential research. Studies focusing on one “class” of these barriers, pitfalls, or strategies will help to define key relationships between the classes, thereby improving the capacity of organizations to improve their environmental performance (Kirkland and Thompson 1997, Lawrence and Morell 1995).

2.11.1. Barriers to implementation

Barriers to implementation are factors that can prevent an organization from implementing an ISO 14001 EMS. Like the progression of environmental management from ignorance (compliance) to integration (sustainable development) (fig. 3), there are stages of development in the introduction of an EMS (table 4) (Elkington 1994, 90).

Table 4. Stages of EMS introduction.

• developing awareness • obtaining and maintaining commitment

- designing an EMS
- implementing an EMS
- continual improvement

(Source: Kirkland and Thompson 1997, 6)

Specific barriers that affect an organization depend on the size of the organization, the company's corporate culture, management styles, and individuals involved in the process. Barriers also depend on the stage of EMS development that the organization is at (Kirkland and Thompson 1997, 6). The benchmarking survey of environmental management in British Columbia reported that different companies face unique challenges in using ISO 14001 (Ernst & Young 1997, 28). Based on Kirkland's (1997 in Kirkland and Thompson 1997) survey of 32 resource-based companies and the research of Kirkland and Thompson (1997), a comprehensive list of barriers to EMS implementation is presented in table 5.

Table 5. Barriers and constraints to EMS implementation.

Top management

- *denial:* organizations may choose to ignore certain issues or solutions, especially if they fall outside of the "focus of intention" of managers
- *concerns about legal issues:* organizations fear that EMS may raise issues with legal implications, such as noncompliance and confidentiality
- *lack of studies, examples, and explanations:* implementation studies are difficult to obtain, environment managers often work in isolation from other practitioners

- *reluctance to use external assistance:* organizations may not like the idea of depending on outside expertise and barriers may result from the client-consultant relationship

Integration of environmental policy

- *lack of recognition of the need for an EMS:* lack of awareness or concern; short-term vision allows for environmental issues to be dealt with on an "as-needed" basis

Table 5 – continued
Integration of env. policy – continued

- *perceived cost of an EMS and underestimation of benefits:* EMSs are generally perceived as expensive, costs need be amortized over long time frames, and benefits are often underestimated

- *resistance to complexity:* environmental concerns may be seen as unfamiliar and unwelcome management issues

- *inadequate resources:* personnel, money, and time requirements may not be recognized or provided

- *multiple stakeholders with conflicting interests:* community groups, environmental organizations, suppliers, contractors, regulators, and others

- *lack of skills, knowledge, and expertise:* those guiding EMS development may not have the necessary skills, especially in small firms where there are inadequate resources to hire a specialist

- *incompatibility with corporate culture:* radical shifts in organization behavior are difficult to achieve; prevailing attitudes take time to form and change

- *isolation of environmental issues from other aspects of operations:* to be most effective, EMS policies and practices need to be incorporated into all corporate activities

(Adapted from: Kirkland and Thompson 1997, 7-14)

The above list of barriers is extensive and is likely to grow as more implementation studies become available. Barriers are not

> distilled into a small number of key factors because (1) the relationships between the barriers are not well understood and (2) a comprehensive list of barriers is a useful reference for those encountering difficulties in introducing an EMS (Kirkland and Thompson 1997, 6).

The same argument could be made for lists of drivers, benefits, costs, theoretical limitations, implementation pitfalls, and strategies that pertain to implementing an EMS. Improving the understanding about how these barriers are interrelated is one objective of this research.

2.11.2. Implementation pitfalls

Organizations face many challenges when implementing an ISO 14001 EMS. Based on experience as an ISO 14001 consultant, Wilson (1997) produced a “

- *obtaining the commitment of senior management:* this must be evident early on, and made visible; it is necessary to ensure a steady flow of resources

- *conducting a gap analysis:* identifying deficiencies by comparing the existing system of environmental management to the proposed ISO 14001 format is a valuable start

Failures in the integration of environmental policy

- *defining realistic commitments:* environmental policies need to be concise and measurable; not obscure, but honorable

Table 6 – continued
Failures in integration – continued

- *identifying all environmental aspects:* the organization is in control of its EMS and should not fear identifying all of its activities, products, and services that interact with the environment

- *prioritizing improvements:* all identified aspects should be prioritized based on regulations, technology, policy, finances, objectives and targets; a company is not expected to tackle all of its aspects immediately

- *controlling documents:* documents must be available to relevant individuals, kept up-to-date, and obsolete documents must be replaced

- *validating corrective/preventative action:* objective evidence is required to validate the implementation and effectiveness of EMS actions

- *involving interested parties:* organizations should identify interested parties (neighbours, regulators, environmental organizations) early on and address their concerns

Failures in employee training and awareness (comprehension challenges)

- *securing employee buy-in:* employees must feel ownership of an EMS and understand the common vision for environmental improvement

- *integrating EMS into business plans:* an EMS is not a documentation exercise about procedural controls, it should be considered in the context of the firm's overall strategy and goals

2.11.3. Strategies to overcome barriers and implementation challenges

Practitioners, researchers, and consultants recommended a variety of implementation strategies and EMS "best practices" that can help an organization address common challenges of implementing ISO 14001. Strategies listed in table 7 were described in various implementation studies and critiques of the ISO standard. The strategies have been grouped and generalized, or "distilled," so that they do not reflect management imperatives of previously-studied industries or businesses.

Table 7. Strategies for successful EMS implementation.

Top management

- conduct a preliminary environmental review: assess facilities, processes, products, services, and stakeholders; a gap analysis should be conducted to measure existing practices against the new EMS, to help define objectives and targets. A life-cycle approach should be taken for these assessments (Boiral and Sala 1998, Green and LaFontaine 1996, Hamner 1996, IW 1998, Lawrence and Morell 1995)

- *assess the needs of an organization in terms of its motivating factors:* recognizing what forces are driving an EMS will help keep it focused (Boiral and Sala 1998, Ernst & Young 1997, Ecotec 1992, Hamner 1996, Kirkland and Thompson 1997, Lawrence and Morell 1995, Todd 1994)

- *undertake an assessment of risk:* the environmental review, gap analysis, and investigation of drivers should prioritize environmental aspects and define objectives and targets (Green and LaFontaine 1996, Hamner 1996)

operational data and describe objectives, targets, and results (IW 1998, Hamner 1996)

Integration of environmental policy

- *ensure the EMS fits with corporate culture, history, and habits:* an EMS must be aligned with other business aspects; an EMS needs to be phased-in according to the corporate culture, priorities, and objectives (Boiral and Sala 1998, Kirkland and Thompson 1997)

- *measure the costs and benefits:* especially the benefits from environmental improvements, and measure them over an appropriate timeframe (Ecotec 1992, Hamner 1996, IW 1998, Kirkland and Thompson 1997)

Table 7 – continued
Integration of env. policy - continued

- *identify the required resources:* failure to identify required resources, or an underestimation of the required resources, causes failure or delay; it is advantageous to share resources, including information, with other companies; it is also advantageous to have cross-functional teams working within an organization (Kirkland and Thompson 1997, Lawrence and Morell 1995)

- *focus on pollution prevention:* it is key to understand that prevention costs less than corrective measures and stakeholders are interested in what is being done to prevent pollution, not about what is being done to improve an EMS (Green and LaFontaine 1996, Hamner 1996)

- **Employee training and awareness (comprehension challenges)**

- *become familiar with EMS theory and the ISO standard:* if outside help is used, be sure to involve internal personnel (Boiral and Sala 1998, Hamner 1996, Green and LaFontaine 1996, Stapleton et al. 1996)

- *encourage employee acceptance of an EMS:* company personnel should be involved in all stages of the process, including before the decision is made to adopt the system; responsibilities for line managers are key (Boiral and Sala 1998, Green and LaFontaine 1996, IW 1998, Kirby [1997], Kirkland and Thompson 1997)

- *educate and train employees:* this involves developing a shared vision of environmental management and technical competence, training must include follow-up (Ecotec 1992, Green and LaFontaine 1996, IW 1998, Kirkland and Thompson 1997, Lawrence and Morell 1995)

- *reward environmental performance:*

2.12.1. Awareness training

In relation to the challenges and strategies related to implementing ISO 14001, the training, awareness, and competence component addresses the training needs of an organization, related to technical issues like targets for the prevention of pollution; and the education of employees, to reduce comprehension challenges and develop employee involvement. Though not explicit in ISO 14001, a distinction can be made between awareness training and competence training.

> Education is the development of understanding of general principles and basic concepts . . . . Seminars and workshops for employees can educate all employees about why environmental protection is important and how the company expects to benefit. Training is technique or technology-specific . . . . it is only needed by those employees doing a particular task (Kirkland and Thompson 1997, 15).

The success of an EMS can depend more on how it is implemented than the content of what is being implemented:

> [i]ncreasingly, organizational analysts identify implementation failure, not innovation failure, as the cause of many organizations' inability to achieve the intended benefits of the innovations they adopt (Klein and Sorra 1996 in Kirkland and Thompson 1997, 17).

The importance of people, change management, awareness education, and incentives for environmental performance are heavily emphasized by EMS practitioners (Balta 1998, E&Y 1996, Galimberti 1998, Hunt 1998, Snyder 1998, Washington 1998). Awareness training may be the most crucial strategy for the successful implementation of an EMS.

> Employee involvement is imperative in order for the EMS to work. If employees are convinced about the program, the program will virtually run itself. However, if they do not support it, the program will fail no matter how well other aspects have been adopted. The first step in ensuring employee involvement is to establish a training program (Davies and Rusko 1993 in Todd 1994, 66).

Management needs to emphasize that an EMS is not owned and operated by the corporation, but that “everyone owns the system and everyone must be held accountable and responsible for it” (Wilson 1997,43). Adequate awareness training, or education, is key to developing a common vision and having employees understand their roles and responsibilities (Wilson 1997, Kirby, [1997], Kirkland and Thompson

significant impact upon the environment, have received appropriate training" (CSA 1996, 3). However, technical training should follow awareness training, so that employees first understand the EMS, its benefits, and why it is important to the company (Kirkland and Thompson 1997, 15). Overall competence is a combination of knowledge, skills, and attitude (Ecotec 1992, 38).

2.12.3. Senior management education

When considering the potential success of implementing an ISO 14001 EMS, a parallel can be drawn between the need for corporate decision makers to be educated about the origins and capabilities of an EMS and environmental training that must be provided for line employees. Top management needs to demonstrate ongoing commitment and leadership. They must ensure a flow of resources and make the EMS part of the corporate culture (Wilson 1997). The literature consistently referred to the necessity of ongoing commitment from senior management. Although this top-level commitment was said to be imperative to a functional ISO-based EMS, neither awareness requirements nor technical expertise for directors and senior management have been addressed.

2.12.4. Summary of training, awareness, and competence

Based on the literature review, potential programs in training, awareness, and competence can be separated into three categories: awareness training, competence training, and senior management education. The literature was found to be lacking on the effect of EMS knowledge held by directors and senior managers. ISO 14001's requirement for training, awareness, and competence focuses on technical competence by referring to appropriate training for all personnel whose work may significantly affect the environment (CSA 1996, 3). Not providing more of a focus on

general awareness training may overlook the importance of developing an appropriate corporate culture that is a key part of overall environmental competence (Ecotec 1992, 38; Senge et al. 1994). Training about an organization's motivations, its environmental impacts, and the benefits of improved environmental performance are prerequisites for a positive response to corporate efforts to move towards sustainable development (Ecotec 1992, 8-9). The case study initiative of this research, therefore, concentrates on the role of awareness training.

Benefits, limitations, barriers, pitfalls, strategies, and their interrelationships, as well as awareness at different hierarchical levels within an organization, are all integrated into the analysis of this case study. However, it is the comprehension challenges that are critical to the focus and eventual recommendations of this study. In its 1998 EMP, the Authority made significant steps towards adopting ISO 14001 principles. Therefore, the Authority was considered to be in the implementation stage of EMS development (table 4). Based on that interpretation, design barriers to implementing an EMS (table 5) were not emphasized in this case study. Implementation challenges were the most relevant factors to the YVR case. Two implementation issues classified as comprehension challenges (table 6) were to:

- secure employee buy-in: employees must feel ownership of an EMS and understand the common vision for environmental improvement; and
- integrate EMS into business plans: an EMS is not a documentation exercise about procedural controls, it should be considered in the context of the firm's overall strategy and goals.

All of the comprehension strategies apply to overcoming these challenges (table 7), but the strategies emphasized in this case study were to:

- encourage employee acceptance of an EMS: personnel should be involved in all stages of the process, including before the decision is made to adopt the system; line managers' responsibilities are key (Boiral and

Sala 1998, Green and LaFontaine 1996, IW 1998, Kirby [1997], Kirkland and Thompson 1997); and

- educate and train employees: this involves developing a shared vision of environmental management and technical competence, training must include follow-up (Ecotec 1992, Green and LaFontaine 1996, IW 1998, Kirkland and Thompson 1997, Lawrence and Morell 1995).

CHAPTER 3. METHOD

This research used a case study approach to accomplish its objectives. Using elements of the preceding literature review as a framework, this study focused on environmental awareness training at YVR. This research represents an effort to aid the transition of EMS theory into environmental management practice. This case study examines training and awareness aspects of the Authority's "Air Quality Management Program" (AQMP) and its "Environmental Management Plan" (EMP). The literature review clearly indicated a need for the sharing of practical experience related to implementation of EMSs (Kirkland and Thompson 1997, 2, 10; Ulhoi 1995, 48). This chapter describes the objectives, design, and procedures used in this case study.

3.1. Objectives

The overriding goals of this research were to:

- identify challenges and strategies associated with the training and awareness components of implementing an ISO-based EMS; and
- propose the content and structure of environmental training and awareness programs that the Authority could use as implementation strategies.

Extending environmental awareness and responsibility throughout an organization was identified in the literature as an important step in implementing an integrated EMS. Findings about broad-level barriers to designing or implementing an EMS were reported in this research where they had implications for awareness training. This research was designed to inform the Authority about training and awareness tools that can help it implement a comprehensive EMS and improve its environmental performance.

3.2. Case Study Selection

The Authority was selected for the following reasons:

- it expressed interest in using ISO 14001, and had undergone an external EMS audit, including developing action plans related to meeting the standard;
- it had publicly committed to establishing certain environmental programs and updating its environmental management plan; and
- training, awareness, and communication were identified as weaknesses in the Authority's previous EMS.

The Authority was preparing a new management program for air quality and wanted to make that program compatible with ISO 14001 requirements. In addition, the Authority was using the ISO 14001 framework to update its EMP. The Authority was also interested in improving its environmental training and awareness programs.

Additional factors that are unique to the case of the airport were:

- the airport was located on federal land and, therefore, especially with respect to air quality regulations, the Authority had some freedom in determining its environmental management activities; and
- management of the airport was relatively isolated from market-driven incentives in terms of environmental management and, therefore, the Authority had flexibility in its use of the standard; and

These characteristics of the Authority need to be taken into account when considering the generalizability of this case study.

Previous research suggested that the ratio of environmental employees to total

the resources needed to implement a comprehensive EMS (Lawrence and Morell 1995, 112; YVRAA [1998]a).

3.2.1. Motivation of the Authority

The Authority wanted to demonstrate environmental leadership in the airport industry. In its previous (1994) EMP, letters from the Authority's top management stated the organization would: "strive to be a model of environmentally responsible airport operations and development," and "create a centre of excellence for environmental management" (YVRAA 1994; Ernst & Young 1997, 69). As well, at 1991 EARP hearings related to the proposed runway, the Authority committed to developing a program to address air quality concerns (YVRAA 1997, 7). More recently, management recognized an opportunity to assess the ISO 14001 standard. It decided to use the development of its air quality management program (AQMP) as a template for the next generation of environmental programs and the redrafting of its EMP (Murray, *pers. comm.*, 1998).

Several Canadian airport authorities have considered the use of an ISO 14001-compatible EMS (Norton, *pers. comm.*, 1998). The Environment Department of the Authority recognized ISO 14001 as the industry standard for environmental management. In the case of the Authority, corporate values established for customer service aligned well with the concepts of awareness and communication in ISO 14001. Through its balanced scorecard initiatives, which measure financial and nonfinancial progress of the organization, the Authority was actively working to promote and adhere to these balanced values. The Authority was also interested in participating in this study because it desired to develop an effective and credible EMS and to keep pace with the industry-wide interest in ISO 14001.

3.3. Research Design

A case study is “an in-depth, multifaceted investigation, using qualitative research methods, of a single social phenomenon” (Orum, Feagin, and Sjoberg 1991, 2). In this instance, the single social phenomenon is an organization, the Authority. A case study is an appropriate research approach when “how” and “why” questions are involved, when behavior control is not required, and when the research focuses on contemporary events (Yin 1994, 6).

This research was concerned with how the ISO 14001 standard was being used at YVR and how the role of training and awareness was included in this undertaking. In this context, there was no need to control the behaviour of the organization or its employees. In fact, it was desirable to evaluate the design and implementation of environmental management initiatives in a natural, nonexperimental, organizational setting. As such, the research dealt with a contemporary event: the day-to-day management of structuring and operating an ISO-compatible EMS.

This case study evaluated training and awareness programs associated with the implementation of an EMS based on the ISO 14001 standard. Using Yin’s terminology (1993, 56), the use of ISO 14001 represents an intervention, or demonstration project. The essence of a demonstration project is to show “an innovation operated at or near full-scale in a realistic environment” (Glennan et al. 1978 in Yin 1993, 56). As an evaluation research exercise, this case study contributes to a larger, cumulative body of knowledge on implementing an ISO 14001 EMS (Yin 1993, 27).

Case study research involves a broad and holistic approach, evaluating an issue as a “meaningful whole, not as the sum of lifeless quantitative units” (Sjoberg et al. 1991, 64). Experimental designs typically “control out” context to focus on a

phenomenon in isolation of its broader setting. Survey and experimental procedures require that individuals be treated as independent units; case studies recognize human agents as social beings and further recognize their interaction with organizational structures (Seidman 1998, 8; Sjoberg et al. 1991, 38).

The merits of case study research as an evaluation tool are especially high when the phenomenon being investigated (i.e., ISO 14001 at YVR) is not readily distinguishable from its context, such as other EMSs, organizational structure, and environmental priorities or issues (Yin 1993, 31). Evaluation studies of projects or programs also warrant the use of case studies when there is complex interaction between a phenomenon and its temporal context, as in determining when an activity started or ended (Yin 1993, 1). Because the phenomenon of ISO 14001 at YVR can be affected by other, concurrent variables, like federal regulations and public pressure, and cannot be clearly separated from a generic, non-ISO, EMS, or other corporate or social priorities, the investigation needs to cover both the phenomenon and the context. Yin (1993, 31) defined such a situation as one where "contextual variables are so numerous and rich that no experimental design can be applied."

A strength of the case study approach is that it relies on multiple sources of evidence converging on the same set of issues (Orum, Feagin, and Sjoberg 1991, 19; Yin 1993, 32, 39). Another strength of this approach is that its weaknesses are readily perceived (Sjoberg et al. 1991, 68). One such weakness stems from recognizing the whole as more than the sum of its parts: this requires theoretical construction of the whole that cannot be precisely replicated by other researchers (Sjoberg et al. 1991, 64). The role of researchers in a case study may be different from the role or judgments of subsequent researchers. Reliability in such instances is compromised by the "idiosyncratic biases of the investigator," especially when multiple observers or

comparative studies are not used and when there is no database of evidence (Orum, Feagin, and Sjoberg 1991, 18; Yin 1993, 40; 71).

Protocols for case study procedures, including the identification of interview respondents, and a database of notes and documents were used to increase the reliability of this study. Also the participation of the Authority, an "exemplary organization" in terms of environmental management, provided a form of replication (Hartley 1994, 214; Yin 1993, 12). Validity of observations was aided by using multiple sources of evidence, including personal observation, document analyses, and ground-truthing interviews that provided overlapping measures of the same phenomena (Snow

peculiarities of local, regional, or provincial priorities and the demographics of British Columbia (Lawrence and Morell 1995, 107).

3.3.1. Application of research results

This is a single-case, evaluation study (Yin 1993, 5; 56). It is primarily exploratory and descriptive in nature. This research defines questions for subsequent studies and describes the use of training and awareness programs in the Authority's EMS. The study is intended for theory generation, not statistical generalization (Hartley 1994, 213; Orum, Feagin, and Sjoberg 1991, 15; Yin 1993, 5). Recommendations for training, awareness, and communication initiatives represent EMS implementation strategies that are worth exploring. However, based on this type of research, no correlation can be made between certain approaches to employee training about environmental issues and the overall success of an EMS, or the environmental performance of an organization. Training and awareness programs of an ISO 14001-based EMS cannot be separated from the overall context of numerous, concurrent management directives, or operational activities that affect environmental performance at YVR.

One of this study's focuses is air quality management. Different environmental management programs at YVR are at various stages of documentation and development. While the AQMP was documented to reflect ISO standards, it is a relatively new program; others, such as noise management and emergency spill response, may be at higher developmental stages in terms how their training and awareness processes function.

3.4. Collection of Evidence

3.4.1. Co-op work term

On-site data collection for this research occurred in two distinct phases. From 5 May 1997 through 25 August 1997 this researcher was employed in the Environment Department of the Authority. During that time, the department researched air quality issues and developed the Authority's AQMP. After the first phase of this work, on-site data collection continued from 5 September to 10 December 1997. This time was used to update the Authority's overall EMP.

During the on-site work term, data for this case study were derived from this author's personal observations and a review of relevant documentation. Observations of organizational structure, environmental policies and practices, and training and awareness initiatives were obtained via interactions with personnel in the Authority's Environment Department, as well as through feedback solicited from other Authority employees. Managers of departments that had been given responsibilities in the AQMP or EMP were forwarded draft documents and asked to give input. In cases where other departments had multiple areas of responsibility, those managers met with management and staff of the Environment Department. Documentation included internal memoranda; external consultants' reports; Authority publications, manuals, and reports; industry documents; and other material collected by the Authority, including legal and environmental reports and newsletters. In chapter 4, findings from the on-site work experience are reported in the context of barriers to program design.

3.4.2. Content analysis of Authority documents

A second component of data collection for this case study, carried out during August and September of 1998, was a secondary analysis of the AQMP, EMP, and

related documents. Content analyses of these documents were conducted to extract information relevant to environmental awareness training in the Authority's EMS. This research was based on principles identified in the literature review.

In *document analyses,* the AQMP and EMP were reviewed for relevance to the development and existence of environmental training and awareness initiatives as part of EMS implementation. Document analyses assessed what the Authority said it would do. The content analyses of these two documents also involved *progress analyses,* which consisted of reviewing related materials, including action plans and business plans. These progress assessments followed-up on commitments that were identified in the document analyses of the AQMP and EMP. The progress analyses assessed what the Authority can prove it has done. Together, these analyses ensured the content analyses were current with respect to ongoing initiatives at the airport.

3.4.3. Employee interviews

The final component of data collection for this research project involved interviews with Authority employees. From 20 to 28 October of 1998, corroborating interviews were conducted to confirm, clarify, and elaborate on the previous data collection; and to resolve differences of interpretation or emphasis (Todd 1994, 44; Lawrence and Morell 1995,106). These follow-up interviews were used to improve the

were identified in the literature review (tables 5, 6, and 7); and the content analyses of the AQMP and EMP. These different areas of inquiry identified employee buy-in and awareness of responsibilities as common themes in environmental training and awareness programs.

Prior to conducting interviews, staff of the Environment Department who had responsibilities for training and awareness, and the person from the Human Resources Department who oversees training, were given the opportunity to have input into the design of interview questions. These responses were used to modify the questionnaire, helping to validate interview questions. Employees of Environment were not asked to respond to the general section of the questionnaire because the focus of this study was on the extension of environmental awareness and responsibility beyond that department.

From the population of approximately 300 Authority employees, a total of 17 respondents were interviewed. Of the 17 interviews, four were conducted with members of the Environment Department to address specific issues of fact relevant to their job function. Therefore, 13 interviews involved the environmental training and awareness questionnaire. Of these 13 interviews, six respondents were managers of their departments and seven respondents were operational level employees.

Questionnaires were administered only to employees of the Authority because the ISO 14001 requirement for training, awareness, and competence is limited to employees. To trace the extension of environmental awareness and responsibility, respondents were selected through the document analyses: any position implicated in the AQMP or EMP as having a role in program implementation was included on an initial list of respondents. A “snowball” interviewing technique was employed from this point: respondents from the initial list identified other potential respondents having roles

in the AQMP or EMP (Hornby and Symon 1994, 169). Therefore, results of this case study apply directly to training and awareness initiatives of specific programs of the AQMP and the EMP. Interview findings do not represent statistically valid results in terms of generalizations about the Authority's other environmental management programs.

A common protocol for follow-up interviews was used to ensure voluntary participation and confidentiality. Respondents were directed to offer simple, concise answers; many questions required only yes or no responses. All participants' responses were recorded by the interviewer. Interviews lasted between 20 and 50 minutes. Appendix A includes a copy of the "Statement of Interview Introduction (Ethics Approval)" and a copy of the questionnaire.

3.5. Evaluation of Case Study

To validate conclusions of the case study, preliminary reports were provided to the manager of the Authority's Environment Department. In particular, the manager evaluated the case study to confirm facts and assess the study's relevance and usefulness. This review concerned validity and reliability, not content. The findings, recommendations, and conclusions of this study are solely those of this researcher.

CHAPTER 4. CASE STUDY

4.1. Rationale and Organization

The purpose of this case study was to identify challenges and strategies related to training and awareness in the implementation of an ISO-based EMS. More specifically, this study focused on identifying training and awareness strategies that could improve the EMS, and the environmental performance of the organization.

The first section of this chapter describes the Vancouver International Airport (YVR). Section 4.2 provides details on the Authority's management structure, its motivations with respect to leading-edge environmental management, and the scope of this case study. The next section describes environmental management and environmental training at YVR prior to the writing of the Authority's new AQMP and EMP. This part of the case study includes a secondary analysis of an independent EMS audit that the Authority had conducted in 1996. Sections 4.4 and 4.5 of the case study discuss the analyses of the AQMP and EMP, respectively. Section 4.6 summarizes the findings. Finally, section 4.7 discusses the results of the 13 employee interviews that were conducted with Authority employees from departments other than Environment.

4.1.1. Description of the Vancouver International Airport

YVR is Canada's second busiest airport handling about 350 000 take-offs or landings in 1997. This entails managing the movement of almost 15-million passengers and 261 000 tonnes of cargo (YVRAA [1998]a). Today the economy of the Pacific Rim and the popularity of British Columbia as a tourist destination have helped to make YVR a major hub for domestic, transborder (Canada - United States), and international air travel.

British Columbia is particularly dependent on the airport's ability to provide a high level of airport service (YVRAA 1996b, 2). The airport plays an important role as a major employment generator in British Columbia and as a key facilitator of provincial trade. The airport directly employs over 22 800 people. As an employer, YVR generates $650 million in wages annually (YVRAA [1998]a; 1996a, 2). In the past 3 years, YVR has added 6 384 jobs (YVRAA [1998]a). The airport also provides considerable indirect employment through various airline operations and work done

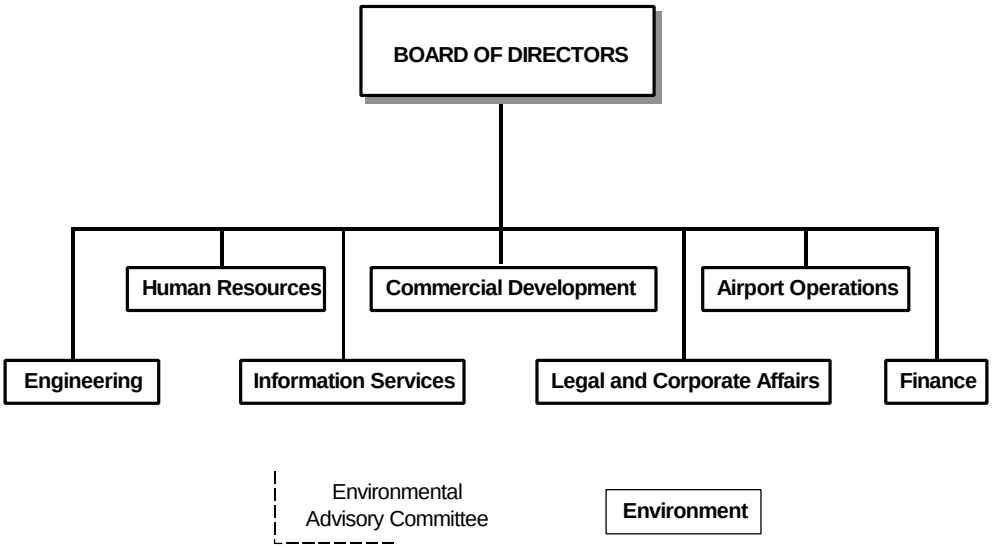
Society of BC, and Vancouver Board of Trade (YVRAA [1998]a). As directors of this corporation, all members have a fiduciary duty to act in the best interest of the Authority. Hence, no board members are said to represent special interests. However, the type of expertise on the board could be interpreted as reflecting the airport's technical nature and its commercial mandate. The Authority operates YVR under a 60-year ground lease with the Government of Canada, with the option to extend its tenure by 20 years. The Authority's purpose is to manage and operate YVR on behalf of, and in the best interests of, the region. It was also created to expand the contribution that YVR makes to local economic development (YVRAA [1998]a).

The Authority's mission is "to serve our community by building a better airport for the 21st century and by providing superior airport services to our customers" (YVRAA 1996a, b, 1998a). The values of the Authority include:

- being achievement-driven and proactive,
- providing leading-edge service,
- engendering loyalty and teamwork,
- fostering innovation and creativity,
- being responsible and sensitive, and

- developing YVR as the #2 Pacific gateway for North America,
- instilling a sense of community pride and ownership in YVR [respect for the public],
- being known as one of the top companies in Canada to work for [respect for employees], and
- establishing a group of profitable companies in airport-related businesses (YVRAA 1996c, 1).

The organization, which was recently restructured, has seven broad functional groups that are accountable to the board of directors via the president of the Authority (fig. 7).



Authority. The Environment Department is accountable to the vice-president of Legal and Corporate Affairs and, via the Authority's president, to the board of directors. The Environment Department is the only division that has an explicit mandate to address environmental concerns.

Authority tenants undertake many activities at YVR. The size and type of tenant operations vary widely. They include airline operations, aircraft maintenance, fueling companies, car rentals, cargo handlers, retailers, and food and beverage concessionaires. Each of these tenants and all of their suppliers may have their own environmental issues and priorities. This fact has repercussions for the Authority in terms of designing its EMS, including the scope of training and awareness programs.

4.2.1. Leading-edge potential of the Authority

The potential of the Authority to continue as a leader in environmental management and improve its environmental performance was assessed using the MORP model (fig. 5). Examining the Authority according to the determinants of this model (motivation, opportunities, resources, and processes) provided a good understanding of the setting of environmental management at YVR and helped to address the validity and reliability of this case study.

4.2.1.1. Motivation

The Authority had several motivating factors pushing proactive environmental management. Its desire to be proactive, provide leading-edge service, and to be sensitive to public concerns is made explicit in its customer service manual (YVRAA 1996a, 2). The stated values embrace teamwork, innovation and creativity, sensitivity to stakeholders, and flexibility and eagerness to change, an1.0 u

While immediate pressure from top management did not appear to be a factor during this research, the Authority was motivated to improve its environmental management activities. The principles of ISO 14001 in the Authority's new EMS fit closely with the organization's overall mission, vision, and values. Sea Island is well-used by area residents and there are residential neighbourhoods in close proximity to the airport. Consequently, the public exerts significant pressure on airport management to use effective environmental management approaches. The influence of the public on the Authority's programs is magnified by the frequency with which issues at the airport are carried by the local media.

Regulation was another powerful driver of environmental initiatives at YVR. If airports can self-regulate with respect to certain issues, especially emissions to air, they may be able to pre-empt intrusive forms of government regulation. At least two occurrences at YVR represent critical events that may have influenced the Authority's approach to environmental management. These events were: public hearings undertaken for YVR's new runway, which focused attention on airport-related environmental issues; and a class action law suit that was filed against the Authority in 1997 over aeronautical noise. Individual lawsuits stemming from the failed class action suit are still active. These events helped the Authority understand the importance of having a credible EMS in place. They also demonstrated the need to install systems that are designed to meet industry standards of reasonable care.

Competitive advantage is a final motivation that supported the potential of the Authority to achieve improved environmental performance. Although the Authority, *per se*, gains little advantage in terms of attracting airlines or passengers with its EMS, it has subsidiary companies that may gain competitive advantage in their markets. The Authority's private, for-profit subsidiaries, Airport Services and VISTAS, manage,

operate, and market other airports. Certifying to ISO 14001 may help these companies in their bids for contracts at other airports. In combination, these motivations are significant preconditions for proactive environmental management.

4.2.1.2. Opportunity

The establishment of new facilities represents potential for the improvement of environmental performance. The Authority's ten-year capital plan includes opening the runway, upgrading terminals, and building a new hotel. All of these developments offer opportunities to advance environmental management initiatives at YVR. The implementation of new processes or procedures also represents opportunities for improving environmental management practices. By using the writing of the AQMP to test the use of the ISO 14001 standard, the Authority was taking advantage of such an opportunity.

4.2.1.3. Resources

Although the Authority itself is not a large organization, employing approximately 300 people on a full-time, permanent basis, it appeared to have the resources to implement an EMS (YVRAA [1998]a). Its capital plan provided evidence that the Authority is able to finance EMS initiatives. However, financial resources may become more scarce in the future. Due to a fall in the Asian market in the last half of 1998, causing reduced duty-free sales, and as a result of escalating lease payments, the Authority anticipates a drop in revenue (Murray, *pers. comm.*, 1998).

The Authority's Environmental Department included 9 full-time employees, including 7 environment managers, specialists, or analysts. This was the largest environment department at any Canadian airport (E&Y 1996, 86). The Authority also used external expertise to guide its environmental projects. All of these indicators

suggested that appropriate funding, technical expertise, and information were available to support the Authority's environmental management initiatives.

4.2.1.4. Internal processes

The principles of ISO 14001 were used by the Authority to organize its environmental efforts. Since its inception in 1992, the Authority has used environmental assessment procedures, including environmental audits, to guide and monitor its operations. In addition to environmental programs, the Authority has been using TQM principles and processes to focus its customer service activities.

An example of such management technique is the balanced scorecard, which

processes. In addition, the Authority had opportunities for improvement and the resources to support such initiatives. As such, the Authority was well-suited to expand its activities in environmental training, awareness, and competence, and to improve its environmental performance.

4.2.2. Scope of the case study

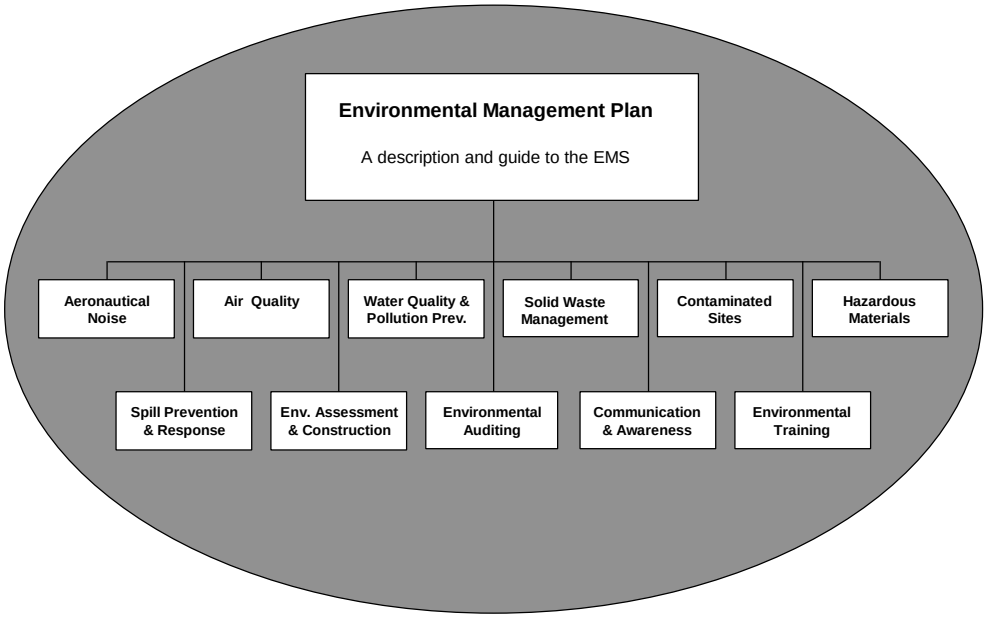
4.2.2.1. Environment Department

Although this case study pertained to the entire organization, its eventual management recommendations focus on the Environment Department. This department has been responsible for designing and implementing environmental programs at YVR and has links to all other divisions of the Authority. Because an EMS should be phased-in and should fit with the overall corporate culture of an organization, this study maintained the approach of the Environmental Department playing the central role in delivery of environmental programs.

4.2.2.2. Air Quality Management Program (AQMP)

The Environment Department has divided the Authority's environmental aspects into 11 program areas (fig. 8). These programs, described in the EMP, make up the Authority's EMS.

Air quality has been a growing concern in many large cities and the Greater Vancouver Region District (GVRD) is no exception. Air emissions from airports have begun to receive increased attention from regulators, most notably in California (CalEPA 1994, NRDC 1996). It is expected that air quality will become a major environmental issue for airports as air traffic continues to increase (Bowland and Giguere 1997, CalEPA 1994, Croker 1997, Morrissette 1997, NRDC 1996).



(Adapted from: YVRAA 1998b, 10)

Figure 8. Environmental management programs at YVR.

The purpose of analyzing the AQMP in this case study was to investigate the training and awareness challenges and strategies associated with operationalizing a specific management program within an EMS. The experience of establishing this program as compatible with ISO 14001 will allow the Authority, where appropriate, to use it as a template for other programs. The AQMP at YVR is a large, complex program that involves interaction with many other departments. It is also a recently developed program. Relative to other programs, such as solid waste management, the AQMP is quite centralized in the Environment Department. Although documentation of other programs, such as noise and spill response, may not be formatted to reflect the ISO standard, they may be at more advanced stages of implementation with respect to

training and awareness processes. Regardless, principles of the recommendations based on the AQMP should be transferable to other management programs.

4.2.2.3. The Environmental Management Plan (EMP)

The EMP itself was included in this case study for the following reasons:

- it describes the Authority's complete EMS;
- the EMP contains the organization's environmental policies, which drive all environmental programs; and
- it provides the rationale and general principles of the EMS and its management programs, the foundation of awareness training, and, therefore, the success of the EMS.

Evaluation of the EMP provided an opportunity to analyze general environmental training and awareness issues that apply to the implementation of the overall EMS.

4.2.2.4. Awareness training

This study focused on environmental awareness training as a strategy for overcoming challenges associated with implementing an ISO 14001 EMS. Three different types of training and awareness were identified from the literature review: awareness training, competence training, and the training of senior management (sec. 2.12). General awareness training, or education, is critical to involving the entire organization and integrating environmental goals into day-to-day business practices. Awareness training includes education about the EMS itself and about environmental issues.

Training also has direct ties to many other components and principles of the ISO standard, particularly communication and responsibilities. Therefore, training and awareness serves as a good focal point from which to address the improvement of corporate environmental performance. The ISO requirement for "Training, awareness and competence" necessitates the sharing of environmental knowledge within the

organization. Educational programs that support the extension of environmental awareness beyond the Environment Department are one component that distinguishes an integrated, comprehensive, ISO-compatible EMS from a generic one.

4.2.2.5. Findings

The case study results focused principally on the issues and challenges associated with general awareness training. Findings about broad-level barriers to designing or implementing the EMS were reported where they identified issues that should be included in awareness programs of an EMS. Otherwise, this study's findings concentrated on issues related to the extension of environmental knowledge and responsibility throughout the organization by means of environmental awareness training for employees.

4.3. Prestudy Environmental Management System

The Authority's previous (1994) EMP, like its new one, described the environmental mission and policies of the Authority*;* was reviewed and approved by the board of directors; and guided the actions of employees, managers, and leaseholders. The Environment Department had the lead role in developing environmental processes and programs, as it does under the new EMP.

The 1994 EMP contained minimal reference to environmental training and awareness. Environmental awareness training was not included as an independent item, either as a process or within environmental programs. However, two points in the

employees, tenants, customers, governments and the public on the environmental aspects of airport operations and development." In its "Environmental Management Systems" section, the 1994 EMP contained the following statement about environmental training and awareness:

> Environment Department staff participate in professional development programs to upgrade and update their technical and environmental management skills and expertise. In addition, the Environment Department provides training and information to Airport Authority managers, supervisors, tenants and employees on environmental issues. For example, the Environment Department issues educational bulletins on new legislation, holds workshops on environmental issues, and provides articles for the employee newsletter (YVRAA 1994, 14).

4.3.1. ISO 14001 EMS audit

In the 1994 EMP the Authority committed to reviewing the EMP annually and updating the document as required (YVRAA 1994, 1, 12). To obtain an external, independent evaluation of its EMS, the Authority had an EMS audit conducted in 1996. The audit was also conducted as a "gap analysis."

The audit made several recommendations related to training and awareness. In particular, the audit identified the need for "an overall training plan to ensure that employees and tenants are provided with the knowledge and skills to achieve environmental objectives and targets" (E&Y 1996, x). Examples of audit findings that related to environmental training and awareness in the EMS included:

- Employees and tenants, in general, are not familiar with the environmental policy;
- The Airport Authority goals and objectives document does not include objectives and targets for departments other than Environment;
- The roles of individuals in achieving environmental objectives and targets are not documented;
- The EMS is not fully integrated with the Airport Authority reward and appraisal system and other performance enablers;
- Employees are not sufficiently aware of the Airport Authority's commitment to environmental stewardship;

with respect to air quality management noted that the program objectives for vehicular emissions and ozone-depleting substances were not being achieved. As well, some stated objectives for air quality management were not in accordance with the overall EMS objectives (E&Y 1996, 16). Audit findings about the EMS, in general, made it clear that employees and tenants were unaware of the Authority's environmental policies. Unfortunately, the audit made no direct links between the substantive shortcomings of air quality management and the lack of cross-functional, environmental training and awareness programs. It was recognized, however, that failing to meet specific objectives may be a symptom of broader, systematic problems in the EMS.

Insufficient environmental training, awareness, and communication may have contributed to the operational failings identified by the audit. For instance, to effectively control the purchase of items that are not environmentally friendly, purchasing officers needed to be aware of the Authority's environmental policies, and educated about the environmental significance of relevant issues, such as ozone depletion. Similarly, a policy to control taxi emissions would have required balancing priorities between the Environment Department and the Ground Transportation Department. To develop and implement successful policies, the Authority needed to overcome comprehension challenges by ensuring that mutual understanding existed between departments. Such policy development would have required the clear designation of responsibilities, interdepartmental communication, and education about cross-functional mandates and values.

4.4.1. Design of the AQMP

Based on the audit recommendations and commitments made during the impact assessment for the parallel runway project, the Authority undertook the development of

a new, separate AQMP. As a stand-alone document, the introduction of the AQMP includes a description of the relationships between ISO 14001, the EMS, the EMP, and its management programs. The AQMP (YVRAA 1997 [not published]) was the first program that the Authority prepared and documented with ISO 14001 principles in mind. Findings about the design of this management program were based primarily on data that were collected during the co-op work term.

The premise used to guide the design of the AQMP, as a program that would meet the specifications of ISO 14001, was to ensure that the program could easily be audited with reference to the standard. For each program area of the AQMP, the following four subheadings were used to summarize the information that would be needed to compare the program to ISO 14001 requirements:

- Application and objectives,
-

of the AQMP can be derived most readily from the statement on roles and responsibilities. Links to other management programs are also mentioned under this subheading. The “

Aviation Organization. In addition, the potential reduction of emissions from aircraft queuing must be traded off against the temporal distribution of aeronautical noise from take-offs and landings. This lack of immediate control means that awareness and communication programs play significant roles in improving environmental performance at YVR.

Vehicles, including non-YVR traffic, were the biggest source of air pollutants on Sea Island, accounting for approximately 55% of emissions (TC 1990; YVRAA 1997, 4; 14). Emissions from aircraft accounted for approximately 36% of Sea Island air emissions and just over 1% of air pollutants for the GVRD as a whole (GVRD 1994; TC 1990; YVRAA 1997, 14). The Authority could have argued that the transportation decisions of its employees, or especially of its customers and the employees of its tenants, were beyond the scope of its EMS. However, the view that an institution that has influence over such a concentration of vehicle trips has a moral obligation to minimize air pollution and raise awareness about air quality problems was accepted. ISO 14001 states that an organization's EMS should apply "to those environmental aspects over which [the organization] can be expected to have an influence" and says that the scope of its application depends on the nature of an organization's activities and the conditions in which it operates (CSA 1996,1).

If air quality in the Lower Mainland is not to worsen, GVRD needs the cooperation of the airport and other commuter destinations, such as universities,

Local by-laws

Federal laws are the only regulations that the Authority is required to meet. The use of ISO 14001 does not alter that requirement. However, air quality is an issue controlled by provincial laws. In British Columbia, the *Waste Management Act* gives the regional government, the GVRD, authority over air quality (YVRAA 1997, 9). The GVRD has by-laws that pertain to emissions to air.

The Authority would like to comply with GVRD by-laws, which are more relevant to the airport's contribution to air quality problems in the Lower Mainland than are federal laws. The position of the Authority is that it will meet the spirit and intent of local by-laws (YVRAA 1997, 10). However, the Authority is uncertain about the technical, legal, and resource implications that would be required to formally take on permitting functions related to such by-laws. To meet the spirit and intent of local by-laws, employees beyond the Environment Department will need to be aware of this aspect of the AQMP.

Priority of air quality issues

Different stakeholders have conflicting ideas about which environmental issues the Authority should address. For example, the public associates the airport with concerns about emissions from aircraft, but the Authority may be able to have a greater influence on reducing air pollution by targeting emissions from cars, trucks, and buses. In addition, stakeholders sometimes send conflicting messages to the Authority. Similar to the trade-off between air quality and the distribution of noise, customers may be concerned about air quality, yet they continue to demand cheap parking close to the terminals. Cheap, convenient parking encourages the use of private vehicles, which generates significant emissions. These conflicting priorities all originate from a desire

to achieve stakeholder satisfaction, and the conflicts create barriers to the successful implementation of environmental programs.

Stakeholders need to be educated about the trade-offs involved in environmental management at the airport. Departments of the Authority that may have conflicting mandates need to develop policies with consistent objectives. For example, the job of the Parking Department is to provide convenient, competitively-priced parking for customers, but the job of the Environment Department is to discourage the excessive use of vehicles. Without direction from senior management, effective awareness training, and interdepartmental communication, implementation of the AQMP faces significant comprehension challenges.

Cross-functional requirements

From an operational perspective, the challenge of involving other departments in the AQMP was most significant. Virtually all commitments that the Environment Department made in the management programs of the AQMP have implications for other departments, such as Parking, Ground Transportation, Purchasing, Leasing, Airside Operations, or Engineering. Of the broad-level barriers, cross-functional requirements are most relevant to training, awareness, and the extension of environmental responsibility. Many of the training and awareness challenges encountered in implementing the AQMP relate to cross-functional requirements. Also, the processes needed to identify training needs for cross-functional teams draws attention to the human and time resources required to implement the AQMP.

4.4.2. Awareness training in AQMP implementation

This subsection presents findings of the case study that are based on the content analyses of EMS documents. The review of the AQMP is described as the

document analysis. Other documents relating to training and awareness commitments made in the AQMP are referred to in the progress analysis.

Document analysis

Awareness of responsibilities

Training and awareness are not identified explicitly in the AQMP's table of contents. In its objectives section, only one point touches on an awareness issue: "to communicate information about air quality conditions at the airport and throughout the Lower Mainland to Airport Authority employees, tenants and the general public" (YVRAA 1997, 2).

Training and awareness issues of the AQMP are implied, not stated directly, in the detailed descriptions of its management programs. In the AQMP's descriptions, training and awareness requirements for the program are addressed under "Roles and responsibilities" and "Documents and communication." The descriptions may assign certain responsibilities by department or job function, but types or levels of training needs are not stipulated. Three outstanding examples of this situation follow:

- A program to minimize idling along the curbside describes the following responsibilities: "Commissionaires will be the direct contact with drivers, advising them of the Airport Authority's operating procedures and monitoring driver behaviour. It is the responsibility of Ground Transportation managers to ensure commissionaires are aware of operating procedures and the AQMP" (YVRAA 1997, 27);

- A program to reduce dust emissions states: "Airfield Maintenance is responsible for operating the sweeping equipment and the turf management equipment. Airfield Maintenance is provided with a copy of the EMP and AQMP and is responsible for being familiar with the programs" (YVRAA 1997, 32); and

- To limit the use of ozone-depleting substances, the AQMP says: "It is Purchasing's responsibility to ensure policies that prevent the Airport Authority from unnecessarily purchasing ozone-depleting substances are in place" (YVRAA 1997, 34).

These descriptions of cross-functional responsibilities do not indicate whether any training should be provided in support of the stated responsibilities, or who would conduct such training. For example, if the machine operators are responsible for being familiar with the AQMP's program requirements, what processes exist to make the operators aware of these policies? It is unclear whether the Environment Department is obligated to provide awareness training to machine operators, or whether supervisors of airfield maintenance are responsible for training their employees. As personnel whose work activities have the potential to negatively affect the environment, these employees should be receiving structured, documented, environmental training.

It can be interpreted from the EMP that the Environment Department is responsible for providing specific training to other departments, but this is not reiterated in the AQMP. Interviews supported the role of Environment in providing training to other departments. Managers and operational staff alike frequently identified Environment's role as "the experts" and preferred that Environment be involved in training efforts. However, one employee had a preference for awareness training from external experts, such as Environment Canada, because they would not have the image of the Authority to protect.

Departmental managers also have a key role in awareness training, despite the preference for training from the Environment Department. When asked where they would go for information on their environmental responsibilities, line employees often responded that they would go to their supervisors, within their departments, and not necessarily to Environment staff. In keeping with this model, it was suggested that the Environment Department is responsible for initial awareness training, but that other departments had to be responsible for "downstream compliance."

Management relationships

Follow-up interviews indicated that communication about environmental management objectives takes place predominantly at a management level. Departmental managers tend to be involved with the Environment Department on committees or projects, or otherwise contribute to environmental policies and targets. Managers, even if they had not read the AQMP and felt the Authority does a poor job of communicating its EMS, said they had a strong link to the Environment Department in terms of knowing where to get information.

Managers prefer face-to-face interaction with the Environment Department, though some mentioned the need for written material to bring them up-to-speed and set an agenda for proposed meetings or seminars. Most managers that were interviewed stated that they confer with environment staff on an as-needed basis. On the other hand, operational level employees, even if they were aware of relevant operating procedures, were seldom familiar with the AQMP's environmental objectives. Several line employees responded that they have received no environmental training and indicated they were not aware that the Authority had an EMS.

External awareness

Due to the fact that, as a "landlord," the Authority has no direct control over many sources of air pollutants on Sea Island, extending awareness of management programs is crucial to the success of the AQMP. In fact, there are several examples of

communicating the program intentions (to discourage the use of [single-occupant vehicles]) to the tenants" (YVRAA 1997, 18); and

- A similar situation applies to aircraft management programs: "Promotion of this program to the airlines and encouragement for compliance will be the responsibility of Environment and Airside Operations" (YVRAA 1997, 29).

Job descriptions and training needs

Many program areas of the AQMP rely on the manager of air quality for tasks such as data collection, communication, and reporting. Presumably, it is also this manager who should identify training needs and see that members of cross-functional teams receive awareness training. However, the Authority does not have a job description for the manager of air quality to reflect such responsibilities. Employees directly involved with the extension of environmental awareness cited this lack of accountability as a major limitation to achieving greater environmental awareness throughout the organization.

Work priorities are driven by the demands of senior management, based on stakeholder concerns. While Environment's employees who were assigned responsibilities related to air quality management were familiar with their roles, following-up on those commitments was not been a priority. Therefore, it is reasonable to assume that other departments and individuals who should be receiving awareness training about the AQMP may not be getting the support they need. It was agreed that there are targets in the AQMP that have not been met, and that it should be Environment's responsibility to follow-up on progress towards these targets.

The program manager for the AQMP was also responsible for the program on aeronautical noise management. It was estimated that approximately 95 percent of that manager's time was allocated to noise issues. Given that distribution of effort, the manager of air quality may not have enough time to properly carry out the

responsibilities of the position. Environment Department employees were not required to record the amount of time they devote to different tasks. However, an initiative to keep timesheets was proposed for 1999.

Progress analysis

Pay-on-foot parkade machines

The AQMP states that signs promoting the environmental benefits of pay-on-foot machines in the parkades, such as reduced emissions from idling vehicles, would be in place by the end of 1997. This target was the responsibility of the Parking Department (*Parking*), and was not met. However, if this training requirement was not identified by the manager of the AQMP, and proper awareness training was not provided to the management and staff of the Parking Department, Parking may not have been aware of this commitment. Even though the Parking manager had read the relevant sections of the AQMP, provided feedback, and met with Environment staff, the task of following-up on specific commitments was not recognized as a responsibility of the Parking Department. As a result, no action has been taken with respect to promoting the environmental benefits of the pay-on-foot machines.

Interviews confirmed that neither the Environment nor Parking Departments had given awareness training to Parking employees concerning the AQMP. Environment's 1999 business plan, formerly "action plans," based on the 1996 gap analysis, does not include information about signs for the parkades. Items in Environment's business plan that relate to air quality focus more on data collection and emissions-monitoring research and less on operational accomplishments. However, the awareness capacity to carry out operational commitments has not been established in other departments. The Parking Department was unaware of its obligation to put signs in place.

From the perspective of cross-functional teams and shared objectives, pay-on-foot machines are a success story that has not been celebrated. The time required to exit the parkades is, on average, six times less using a pay-on-foot machine instead of a cashier. Reduced idling time for vehicles generates fewer emissions, so customer service and environmental objectives have been achieved simultaneously. Parking's targets of 65 to 80 percent for pay-on-foot use, depending on the parkade, are quickly being met. Parking's cashiers have been handing out brochures to promote the use of pay-on-foot machines. Pay-on-foot parking rates ($2.00/half hour) are lower than those for cashier payment ($2.50/half hour). Such efforts should be documented in the AQMP. An October 1998 article in an airport newspaper, *YVR Skytalk*, presented the customer service benefits of pay-on-foot parking machines, but the opportunity to raise environmental awareness was missed. Likewise, in describing its parking services, the Authority's recorded telephone message fails to mention that the use of pay-on-foot machines reduce emissions. It is clear that the environmental objectives of the AQMP have not been integrated into the day-to-day operational thinking of the Parking Department. Conversely, positive steps that Parking has taken, such has establishing differential rates and providing brochures, have not been acknowledged by Environment.

Transportation demand management

Two of the most significant recommendations of the AQMP are the consideration of creating a position for an "employee transportation administrator," and transferring the entire responsibility for transportation demand management (TDM) to the Ground Transportation Department (*Ground Transportation*) (YVRAA 1997, 15). It is unclear who would have the responsibility of identifying training and awareness needs to facilitate the implementation of these recommendations. Environment has not

ensured that the appropriate personnel in Ground Transportation are, in fact, aware of and in agreement with commitments that have been made. Although employee transportation was “a priority for the Authority for 1997-1998” (YVRAA 1997, 15), neither Ground Transportation nor Environment made steps to advance the program significantly. As with the commitments for signage in the parkades, no mention of implementing TDM plans, creating a position for a transportation administrator, or facilitating the transfer of this program to Ground Transportation appears in Environment’s current business plan. Neither Ground Transportation nor Environment have included funding for these initiatives in their 1999 budgets and there was no evidence these recommendations have been considered.

Alternative fuel buses

An objective of the fuel initiatives is “to integrate financial and environmental considerations in fleet management decisions and to formalize co-operation between Environment and other departments” (YVRAA 1997, 20). Although the recent purchase of two diesel-fueled buses by the Ground Transportation Department meets the

fuel, Ground Transportation did not feel that Environment would recognize this environmental improvement.

This is a case where two departments with different management imperatives need to each be educated about the other's objectives. When two departments have significant cross-functional requirements, a high level of understanding and strong channels of communication will be required to achieve a common understanding of the EMS and the role of environmental objectives. This is also a case where clearly stated priorities of senior management could improve the working relationship between departments. It was put forward by one respondent that, in the long-run, corporate environment departments, in general, will be most influential if their arguments are well-researched at an on-the-ground level. This type of research and co-operation would help an environment department to build credibility with other departments and senior management. The need for such relationships emphasizes the two-way training and awareness that is required in cross-functional partnerships. Such co-operation is important because, in cases such as TDM, alternative fuels, and initiatives related to parking fees, inaction on the part of the Authority creates an impediment for it to influence tenants, suppliers, and the public about behaviors that cause environmental damage.

Curbside operating procedures and dust control

Based on this researcher'

viewed as environmental rights of the employees, the right to work in clean, nonpolluted areas, rather than responsibilities of their work activity.

Similarly, some employees indicated that financially efficient operations were all that matters to the Authority. For example, a machine operator pointed out that operating procedures to minimize dust may be perceived by management as too costly and time consuming. Employees were unaware of the commitments that exist in the AQMP and EMP to reduce emissions and be sensitive to the needs of the public. Even though public complaints about dust appear in the Authority's operations log, which report on virtually all activities that take place at the airport, the Authority's truck drivers were not aware of dust as a environmental or public relations issue. However, drivers were aware that there have been concerns about generating so much dust that it could affect visibility and hence, the ability of aircraft to land. Like commissionaires concerned about vehicle fumes, one driver mentioned the health risks of working in a dusty environment. Clearly there is a need to link employees' rights regarding environmental health with their workplace responsibilities about environmental management.

4.5. Analyses of the Environmental Management Plan

The Authority defines its EMS as:

> all the policies, statements, commitments, actions and records of the Airport Authority that pertain to managing the effects of airport operations and development on the surrounding communities and the environment in general (YVRAA 1998b, 5).

Policies documented in the EMP are the engines that drive the EMS. Objectives in the EMP underlay all of the management programs of the EMS. The EMP of the Authority (*Environmental management plan: A description and guide to the*

environmental management system) describes the contents and structure of the Authority's EMS. The relationship between the EMS, EMP, and management programs is illustrated in figure 9.

ENVIRONMENTAL MANAGEMENT PLAN

- Introduces environmental issues relating to airport operations and the means of identifying, managing, and monitoring issues
- Describes the overall EMS, including the environmental mission and policies
- Describes the role of management programs within the EMS framework
- Does not include management details or specific targets

MANAGEMENT PROGRAMS & DOCUMENTATION

4.5.1. Design of the EMP

The EMP was written as a guidance document, describing the EMS of the Authority. The EMP introduces the environmental management setting at YVR, explains the EMS, and presents the Authority's environmental mission and policy, which include references to training and communication. It then describes components of the EMS, following the exact contents of the ISO 14001 standard (table 1). Findings about the design of the EMP are based primarily on observations that were made during this study's co-op work term.

Using the ISO 14001 framework to guide the revision of the EMP was intended by the Authority to facilitate EMS auditing and to take advantage of the standard's potential recognizability among stakeholders. In the EMP, each management program of the EMS is described in terms of "Program Description" and "Program Management." The Authority's *e*nvironmental management programs are introduced in the EMP, but not described in detail.

Environmental training and awareness is included in the policy statement and is explicitly addressed in two of the EMP's comprehensive management programs: "Environmental Training" and "Awareness and Communications." These "comprehensive programs," unlike aspect-specific ones, such as contaminated sites or air quality, apply to all the EMS' management programs.

4.5.1.1. Barriers to the design of the EMP

Fewer barriers were identified while designing the format and content of the EMP, in comparison to the AQMP. Because it is more general in nature than a management program, the EMP involves fewer detailed commitments. Scoping and

application were the only issues that presented logistical dilemmas that could create challenges to understanding and implementing an EMS.

Scoping and application

The issue of scoping and application is addressed in the EMP with the following statement: “the policy and programs of the EMS apply to all activities undertaken by Authority staff and, where possible, as indicated in the program documents, to operators, contractors, agents and tenants” (YVRAA 1998b, 5). Therefore, strictly speaking, the Authority is only responsible for providing environmental training and awareness programs to its staff, unless training and awareness requirements for others are identified in program documents. The environmental policy of the Authority includes this commitment about communication:

- communicate openly with employees, tenants, customers, governments and the public, maintaining a high profile for environmental issues (YVRAA 1998b, 7).

However, the policy statement referring to training only specifies the training of personnel:

- encourage personnel to be aware of and meet their responsibility for environmental protection, providing training and other support or resources where necessary (YVRAA 1998b, 7).

Neither of these policy statements changed significantly from those in the 1994 EMP. The phrases “*maintaining a high profile for environmental issues*” and “[the provision of] training and *other support or resources* where necessary” are the only modifications affecting training, awareness, and competence.

To meet its policy statement about training its staff, the Authority has an orientation session for new employees as the foundation of its EMS’s training program. The environmental training program also mentions “specific training sessions for other departments and specific environmental issues,” and “training of tenants for such

issues as recycling and emergency response" (YVRAA 1998b, 18). Presumably, the specific training for other departments and the training for tenants that are mentioned refer to training needs that would be identified in separate management programs, such as waste management or emergency spill response.

Another significant, broad-level decision that was made during the revision of the EMP was the separation of the ISO's training requirement into two management programs at the Authority: "Environmental Training" and "Awareness and Communication." These two comprehensive management programs of the EMS are assessed in the following sections. The former addresses the ISO concept of environmental training and awareness, with an emphasis on technical, competence training. However, communication processes are also crucial to the promotion of environmental awareness among employees. Awareness and communication programs are critical to overcoming challenges associated with implementing an EMS.

4.5.2. Awareness training in EMP implementation

This subsection presents findings based on the content analysis of the EMP. To date, neither environmental training nor awareness and communication exist as formal guidance documents in the Authority's EMS. However, training initiatives have been carried out within specific management programs, such as emergency spill response. The document analyses of "Environmental Training" and "Awareness and Communication" refer to the EMP's descriptions of these programs. Other planning documents relating to these comprehensive training and awareness programs are assessed in the progress analyses.

4.5.2.1. Environmental training program

Document analysis

As described in the EMP, the Authority's management program for environmental training addresses the following commitments:

- new employee orientation,
- professional development training for Environment staff,
- task-specific training for employees from other departments,
- topic-specific training for appropriate personnel, and
- training of tenants about certain programs or issues (YVRAA 1998b, 18).

Only the first of these components is an awareness training strategy for employees that is designed specifically to overcome challenges of EMS implementation. Professional development training for staff of the Environment Department is an important part of the training program and the EMS. However, it does not necessarily contribute to the extension of environmental awareness throughout the organization. The next two components relate more to technical, competence training that deals with specific environmental issues. The final initiative pertains to tenants and, though it is imperative to improving environmental performance at YVR, it is not directed at employee awareness. Neither is the training of tenants a requirement of ISO 14001 or the Authority's environmental policy as stated in the EMP.

Progress analysis

New employee orientation

A three-day orientation session for new employees has been in operation since 1996. This orientation is the Authority's primary method of conducting environmental awareness training. The Authority's Human Resources Department (*Human Resources*) organizes the orientation program. Beginning in 1999, the new employee orientation program is designed to ensure timely training by scheduling sessions every two months. In the past, it has been delivered for as few as two and as many as 20 new hires. The following description of the orientation program appears in the EMP:

> The objective [of Environment's training session] is to inform new employees about the EMS and about the environmental setting and environmental issues at Vancouver International Airport. Employees should leave the training session with an overall understanding of the relationship between airport operations, the natural environment and the neighbouring communities. They will also have the opportunity to learn about environmental responsibilities specific to their departments and their individual jobs (YVRAA 1998b, 18).

The manager of Environment, or her designate, is responsible for conducting the orientation session on environmental issues at YVR. Human Resources maintains records of the employees who have received environmental training through the orientation session. The session introduces environmental issues at YVR and the Authority's EMS. However, interviews indicated that Environment's orientation session may not serve the purpose of teaching employees about the environmental significance of their individual, job-specific activities. For instance, with respect to individual responsibilities in the AQMP, no new employees have requested job-specific training as a result of the orientation session.

A representative of the Human Resources Department estimated that 75 employees have received environmental awareness training through the orientation session for new employees. This represents approximately 25 percent of the Authority's full-time complement of employees. Human Resources reported that no "old" (pre-1996 hires) employees have attended the orientation session. However, some long-time employees would like the opportunity to attend the orientation program: several people that deliver training sessions as part of the program indicated they would like to experience the program themselves.

Of the 13 non-Environment employees that were interviewed about their training preferences, 11 (84.6%) wanted to receive more environmental awareness training. Most of those preferred training to be of a general nature, about the Authority's overall environmental commitments and programs. Most respondents also preferred that

training be conducted in the format of a scheduled seminar. It seems, therefore, that if Environment's orientation session for new employees could be expanded to accommodate other employees, it would be well-received. The Environment Department does not have records of any feedback on its session, but interviews indicated that the session appears to meet the needs of employees for general environmental awareness training.

programs does not include records of individuals who have requested specific environmental training.

In the summer of 1998, the Authority re-established a Committee for Leadership, Education, and Development (LEAD). The role of LEAD is to advise Human Resources on the training needs of different departments and provide feedback on the overall training and development programs. As stated in the committee newsletter, the mission of the LEAD Committee is "to ensure that YVRAA provides superior training, development, and recognition opportunities to its employees." The Environment Department is represented on this committee. By having different departments assess their own training needs and report to Human Resources through LEAD, the committee may improve procedures for identifying training needs and clarify different roles for record keeping.

4.5.2.2. Awareness and communication program

Document analysis

With respect to environmental awareness training for employees, the awareness and communication program described in the EMP includes two initiatives:

- providing two-way communication between the Authority and employees by establishing an "electronic suggestion box;" and
- raising environmental awareness by publishing environmental education bulletins at least two times per year (YVRAA 1998b, 19).

Because they provide continuity to environmental training and awareness, these two programs are critical to the success of the Authority's EMS. Such opportunities to maintain a high profile for environmental issues at YVR are important in terms of sending a consistent message to employees. These efforts reinforce the Authority's environmental policy commitments. Aside from program-specific training for select

employees, the suggestion box and education bulletins are the only programs that provide follow-up to the orientation session.

Descriptions of these initiatives, however, do not specify how suggestions will be handled, or how education bulletins will be distributed. The success of these programs in raising environmental awareness, involving employees, and thereby improving environmental performance, will depend on how well the Environment Department is able to promote and manage the programs.

In addition to its accomplishments related to the environmental awareness of its

The suggestion box, in particular, has potential to build the employees' feelings of ownership toward the EMS. One employee that was interviewed stated that he/she made suggestions about improving environmental programs in the past, but received no response and saw no action taken. The suggestions were made to his/her own

several other departments and subsidiary companies. Several more meetings were scheduled throughout October and November of 1998. The invitation was extended again, in the first edition of a newsletter, *LEAD Today,*

indicated that they did not have any environmental targets or measures in their business plans. The four departments that responded affirmatively were not asked to specify the type of measure or target they believed to be relevant. At least one of the departments without any environmental targets has significant responsibilities in implementing the AQMP and EMP.

Interdepartmental kick-off meetings

An initiative that a manager in the Environment Department identified as being effective with respect to cross-functional training is "kick-off meetings." These sessions are part of the Authority's Facility Alteration Permit Process, part of its Environmental Assessment and Construction Monitoring Program. Discussion at kick-off meetings includes the potential environmental impacts and relevant mitigation strategies associated with a given project. These "kick-off meetings" are held prior to the start of a proposed project, such as a construction project. Environment representatives participate in these meetings, providing expert guidance if necessary, but allow the other employees to identify relevant environmental issues. The environmental component of such a kick-off meeting was likened to a brainstorming session where participants identify foreseeable environmental issues and suggest appropriate mitigation strategies. The employees have access to the member of Environment

person communication between employees at an operational level appears to increase the comfort level that employees in other departments have with environmental objectives. Awareness-related challenges that impede the effectiveness of environmental programs may be reduced if line employees with environmental responsibilities, such as machine operators, know the employees of Environment who have corresponding responsibilities. For example, the environmental significance of policies about dust control may be understood more effectively if truck drivers have some personal, operational, informal contact with a member of the Environment Department who is responsible for implementing air quality programs.

4.5.2.3. Work plan for 1999

In addition to the progress analysis of existing programs that relate to the EMP, an examination of Environment's strategic planning documents helped to assess the departments approach to environmental training and awareness initiatives. Environment's 1999 business plan demonstrated a high level of priority to environmental training, awareness, and communication. This level of commitment supports the statements that exist in the EMP. The continuation of such commitment indicated that environmental performance considerations are being integrated into the "planning, design, construction and operation of airport facilities" (YVRAA 1998b, 7).

Integration of environmental objectives is recognized as a key strategy for successful implementation of an EMS, and is the foremost environmental policy statement in the Authority's EMP. The EMP states that "the main objectives of the EMS . . . are to integrate environmental protection into all stages of airport operations and extend environmental awareness and responsibility to all employees, tenants and service providers" (YVRAA 1998b, 9).

For 1999, Environment's draft budget, business plan, and supporting work plans and analyses contained numerous training and awareness initiatives. Many proposed initiatives focused on cross-functional arrangements and demonstrated that Environment is attempting to narrow the gap between EMS theory and practice. For example, one important initiative was to "develop specific environmental objectives and targets for all Airport Authority departments." To develop their annual business plans, departments conduct an analysis of their strengths, weaknesses, opportunities, and threats (SWOT). All departments must also tie their plan and budget to the initiatives of the balanced scorecard, which include nonfinancial goals. The categories of the Authority's balanced scorecard are: financial performance, customer service, internal business processes, and learning and innovation. The SWOT analysis in Environment's 1999 business plan listed the following opportunities for the department to develop over the year:

- Improve environmental management system to meet international standards (ISO 14000),
- Increase Airport Authority's staffs' understanding of their environmental responsibilities through training and awareness,
- Assist other departments in integrating environmental management into their business (e.g. environmental management is everyone's responsibility - similar to safety),
- Raise awareness and educate community groups,
- Develop the role of the department as a resource for other business units, and
- Reduce costs of procurement/storage/disposal of hazardous materials through pollution prevention.

The first five of these six opportunities are geared towards the extension of environmental awareness and responsibility. Likewise, the weaknesses that Environment recognized focused on improving working relationships with other departments, time management, the setting of priorities, and proactive environmental management. The business plan made it clear that "integration of environmental

management into the business plans of all Airport Authority departments is critical to meeting [Environment's] mission" and will be a key initiative for the department in 1999.

4.6. Summary of Findings

4.6.1. Air Quality Management Program

Barriers to the design of the AQMP were found to be both unique to air quality issues, like the application of local by-laws and permitting, and more general in nature, such as scoping the program and facilitating cross-functional teams. In the AQMP document, relationships that involved for cross-functional management of environmental aspects were described in terms of roles and responsibilities. However, interviews confirmed that there are significant shortcomings in the implementation of such interdepartmental requirements.

The text of the AQMP related well to the theory of cross-functional teams in an EMS. In practice, however, the Authority lacked the human resources, with respect to time, and the internal processes required to identify training needs and deliver appropriate awareness training. Generally, communication of environmental objectives was effective between managers. Line employees, however, even if they were aware of relevant operating procedures, did not relate their work activities to objectives of environmental programs. In some cases, employees that were given explicit roles in the AQMP were not aware that the Authority had any environmental programs.

Environmental awareness programs did not appear to achieve a high level of impact on employees. Managers were normally familiar with the general contents of relevant environmental programs and had strong links to the Environment Department when needed. Typically, employees were aware of the existence of environmental

programs, in a general sense, but unaware of their responsibilities to ensure the success of specific initiatives. Possible reasons for the incomplete extension of environmental awareness and responsibilities included: the absence of job descriptions, uncertain support from senior or departmental management, time constraints on the staff of Environment, lack of processes for identifying training and awareness needs, lack of processes for delivering recurrent training and awareness seminars or meetings, and conflicting mandates of different departments. The Authority's ability to improve its performance in air quality management was restricted by these awareness-related implementation challenges.

4.6.2. Environmental Management Plan

Compared to plans for program management, like the AQMP, the EMP identified few responsibilities that related to specific work activities. For example, the AQMP identified roles of certain employees, whereas the EMP presented policies and described programs generally. The official policy on training applied only to the Authority's personnel. However, the EMP offered extension of these programs to other stakeholders, where possible, as indicated in management programs.

The Authority's strong overall training and development program provided a good base for environmental training and awareness initiatives. Recent developments, such as the reconstitution of the LEAD Committee, negotiations with the union about job descriptions and appraisal systems, and the use of the balanced scorecard approach in business planning, all indicated the Authority was following through with its mission "to build a better airport."

The main weakness of the environmental training program was that Environment's orientation session may not meet its objective of training employees

about environmental issues that are specific to their work activities. Although, the sessions can be adapted to reflect the interests of attending employees, interviews revealed a desire for an on-the-ground, what-does-it-mean-to-me approach to job-related environmental competence training.

The awareness and communication program was able to meet its targets: the on-line, environmental suggestion box is operating, and education bulletins are scheduled for publication. Despite these successes, there are still employees who are unaware of the Authority's EMS.

Analysis of various publications and planning documents indicated that the Authority's commitment to stakeholder satisfaction is supported throughout different programs and different departments. Less directly, most of the Authority's documents also included commitments to learning, innovation, and employee education. In particular, the 1999 business plan of the Environment Department demonstrated strong support for cross-functional teams and integrated management.

4.7. Interview Results

This section presents the results of the 13 interviews that were conducted with employees from departments other than Environment. Interviews are directly relevant to management initiatives of the AQMP and to the "Environmental Training" and "Awareness and Communication" programs of the EMP. Generalizations, especially about other program areas, are not statistically valid conclusions, but identify management principles that may apply to improving training and awareness in the EMS. Results are presented beginning with overall ratings of communication of the EMS. The results progressively address more specific findings about training and

awareness requirements that were identified by the employees. Six of the 13 respondents were managers; seven were operational employees.

Overall, eight of 13 respondents (61.5%) thought that, in general, employees were aware of the Authority's environmental programs. The remaining five participants (38.5%) felt that employees were not aware of the environmental programs.

Even though five respondents (38.5%) felt that employees were not aware of the organization's environmental commitments, one manager felt that the Authority does not need to improve its environmental training and awareness programs. This particular respondent rated the communication of the EMS as satisfactory, not excellent. This combination of responses indicated that environmental commitments, in the opinion of one respondent, are not a top priority for the Authority.

No line employees rated the communication of the EMS as excellent. Of six line

Environment Department and to senior management that there is room for improvement, even at the management level.

Nine of 12 respondents (75%) thought that employees could use more environmental training. One line employee did not feel qualified to provide a response to this question. Of the three respondents (25%) who indicated that, in general, employees do not need more environmental training, all were managers. Therefore, six out of six of line employees (100%) felt they could use more training, while only three of six managers (50%) responded that employees need more training. This result supports the finding that managers may perceive an EMS to be more widely understood than do line employees. No respondents answered that they are receiving more environmental training than they would like.

When asked about their personal feelings about receiving more training on the Authority's environmental commitments and programs, 11 of 13 respondents (84.6%) indicated that they would like to receive more training. Participants who felt that they did not need more environmental training (15.4% of total) were both managers. Of the 11 respondents who wanted more training, seven (63.6%) preferred that it be of a general nature, about the policies of the EMS and the Authority's overall approach to environmental management. The four managers all preferred such general training. Employees with responsibilities at an on-the-ground level, such as operating a machine or dealing with the public, were more likely to state that both general and specific training were necessary.

Line employees sometimes cited personal health and safety issues and on-the-ground compliance as reasons why they needed specific environmental training. Although health and safety training are the responsibility of Human Resources, such concerns, like inhaling vehicle exhaust, are addressed indirectly by the EMS. Some

managers agreed that employees needed more training about compliance-based issues, such as spill response or the handling of dangerous goods. These managers felt that even employees who were aware of operating procedures that relate to environmental performance, such as the optimal application of de-icing chemicals, may not know how the procedures are linked to the EMS.

Furthermore, several managers commented that it is unrealistic and impractical to expect anyone to be familiar with the text of entire documents. Managers receive so many procedural manuals that time does not allow them to read all of the AQMP and EMP. Generally, managers felt that most of the text of the complete documents was not relevant to line employees. One manager suggested that Environment should hold quarterly, perhaps seasonal, meetings with departments that are potentially involved with environmental compliance issues. Changing environmental regulations were cited as one factor that necessitates recurrent training. Another manager suggested that employees of operational-based departments, such as Airfield Maintenance and Airside Operations, be issued key-chain-type cards for quick reference. These cards could contain point-form information that would tell employees “what does this mean to me?”.

4.7.1. Summary of interview findings

Interviews confirmed that, with respect to the AQMP and EMP, there was a need for improved environmental training, awareness, and communication programs. In total, 11 of 13 employees (84.6%) responded that they would like to receive more training about the Authority’s environmental commitments and programs. Only one respondent (7.7% of total), a manager, felt the Authority does not need to improve the communication of its EMS.

Most respondents indicated that additional environmental training should be general in nature. The general training would address overall environmental policies and commitments and the structure of the EMS. Those departments or employees that identified a need for specific training had concerns about either personal health or legal compliance. A preference for seminar-type (verbal) training came across in the interviews. There was little support for computer-based training and awareness methods.

Interview results supported the observation that the extension of environmental awareness and responsibility was more complete at a management level than among line employees. Results also indicated that there needed to be stronger links between operating procedures and environmental policies. This supports the observation that communicating operational responsibilities identified in management programs, such as the AQMP, is a challenge to successful EMS implementation.

CHAPTER 5. MANAGEMENT RECOMMENDATIONS

This research identified challenges and strategies associated with the implementation of an ISO-compatible EMS. Specifically, it examined the role of training, awareness, and communication initiatives in a case study of the Vancouver International Airport Authority. The analyses of the Authority's "Air Quality Management Program" and "Environmental Management Plan" identified environmental training and awareness processes that may improve the Authority's capacity to reduce its negative environmental effects. Furthermore, this research proposes an awareness-based approach to EMS (sec. 5.1) that frames this study's recommendations.

Recommendations of this study present microlevel, internal business processes to help the Authority overcome comprehension challenges and improve its environmental performance. Detailed process recommendations for the extension of environmental awareness and responsibility are made with respect to the AQMP, the EMP's "Environmental Training Program", the EMP's "Awareness and Communication Program," and the use of ISO 14001.

5.1. Awareness-based Environmental Management

The idea of extending environmental awareness and responsibility throughout an organization is one that may help managers conceptualize a new approach to progressive environmental management and environmentally sustainable development. A systems approach based on extending awareness and developing a common vision may be what is required to help companies overcome the "green wall." Such a focus on environmental training, awareness, and communication gives new perspective to other frameworks of environmental management.

Paying specific attention to the extension of environmental awareness and responsibility presents EMS as having three levels: an overall, policy framework; micro-processes of planning, management, and communication; and on-the-ground commitment and implementation (fig. 10). Successful extension of environmental responsibilities occurs as awareness percolates from top management to operational departments and individual employees. Directors and senior managers must commit to improving the organization's environmental performance by establishing a policy framework for environmental management. By understanding EMS concepts, the organization's motivations, and by knowing their stakeholders, management should be able to form a clear environmental mission. Successful development of a common vision depends on communication of organizations' policies, motivations, opportunities, and mission to all employees.

Within the context of corporate policies and the environmental mission, the environment department takes on an environmental planning function. This includes the establishment of the necessary training and communication processes to facilitate the extension of environmental awareness. Such an approach to environmental management highlights an environment department's role as a resource for other departments. Management's support and the details of EMS processes should reach operational employees, making their responsibilities for EMS implementation clear. When developing or communicating EMS policies or processes, senior management and the environment department should solicit input from line employees. Effective planning of resource allocation and process design depends on input from other operational departments.

TOP MANAGEMENT

Motivation &
Opportunity

Technical Processes
& Resources

ENVIRONMENT
STAFF

Awareness,
Communication,

OPERATIONAL
DEPARTMENTS

In this sense, an awareness-based approach to EMS may identify the level of environmental awareness as an indicator of successful EMS implementation. The degree to which environmental awareness has penetrated an organization may be a

environment department can be thought of as liaison between managers and line employees, or as a facilitator between policy and action.

Another advantage of an EMS approach that focuses on common vision and feedback opportunities, is that it may offer an organization increased flexibility. The ISO model (fig. 2) presents EMS as progressing through a full cycle, from policy development to management review, before the EMS is revised. An awareness-based approach focuses more on ongoing feedback than on complete cycles, and more on the commitment of employees than that of senior management. The emphasis on feedback from operational departments and employees is more dynamic. It allows departments to assess relevant environmental programs and issues independent of the EMS as a whole.

In keeping with this environmental awareness model, the following management recommendations address the extension of environmental awareness and

5.2.1. Participation of program managers and employees

A. All management programs of the EMS should have clearly assigned responsibilities and priorities. Within the Environment Department, there has been a lack of clarity about the assignment of responsibilities related to environmental training and awareness and communication. Arrangements and initiatives that have recently been established may help in this regard. However, each employee needs clearly defined responsibilities about the requirements for documentation and follow-up actions.

B. Responsibilities should be documented in job descriptions. Employees having environmental responsibilities should be made accountable for those specific

5.2.2. Commitment, resources, and processes

A. Priorities of senior management should match the level of commitment reflected by the program documents. Senior management and the board have approved the AQMP, yet several high priority issues, such as transportation demand management (TDM), have been largely ignored in favour of other priorities. In cases where mandates of different departments are in conflict, senior management may have to explicitly assert its priorities.

B. Environment needs to ensure that managers have time to fulfill the duties that have been assigned to them. The employee responsible for air quality management is overwhelmed by other responsibilities. If progress is not satisfactory in a program, Environment needs to realign its existing human resources, include a request for more personnel in its budget, or enlist the help of other departments.

C. Program managers need to develop processes for identifying training needs and providing awareness training. The responsible managers should assess new program documents for training and awareness needs. It was unrealistic to expect that line employees would read management program documents. Program managers should develop specific presentations and materials for all other departments implicated in a management program. The manager should deliver awareness training and make educational resources accessible to relevant staff through their managers, departmental libraries, or designated contact people. An example of materials that should be prepared and circulated would be brochures that summarize a management program with respect to individual departments. For example, the air quality manager should prepare a handout for the Purchasing Department that isolates that

departments' responsibilities, saying: "wherever possible, purchasing officers should avoid buying products that use ozone-depleting substances."

D. Human Resources should identify environmental stewardship as one of the desirable "corporate capabilities" in the Authority's hiring procedures. The organization's ability to achieve its environmental mission will be limited if environmental awareness is not considered in the selection of new employees.

E. The Authority should obtain outside expertise to help it establish its TDM programs. Organizations such as the Greater Vancouver Regional District and Better Environmentally Sound Transportation offer resources for organizations that are implementing TDM initiatives. Ground transportation is concerned about the costs of being a leader in programs like car pooling, but could take advantage of such expertise and learn from the collective wisdom on implementing such programs.

F. Commitment, resources, and processes at individual airports should be linked to the federal government. Although Transport Canada is not in the business of managing large airports, it could facilitate, and provide incentives for, EMS implementation. Transport Canada should incorporate environmental performance incentives into the structure of airports' lease payments. For example, if YVR is successful in reducing the number of vehicle trips, thereby reducing air pollution, the Authority should be rewarded with reduced lease payments. This could provide significant motivation to airport authorities and substantial environmental benefits.

5.2.3. Cross-functional requirements

A. Other departments must explicitly be made aware of their environmental responsibilities. This research indicates that the current practice of inviting comments from managers of other departments on draft documents is insufficient to ensure lasting commitment to environmental objectives. Where appropriate, the Authority should consider decentralizing some environmental management responsibilities. This could be done within the existing framework; through heightened, departmental-specific environmental training; or, through shared employees and explicit job descriptions.

B. The Environment Department should develop procedures to ensure that all Authority departments are provided with environmental awareness training. Environment should take advantage of seasonal operations, new projects, or new programs to schedule mandatory awareness training. Glycol training is an existing example of this approach. Project-related kick-off meetings are another example. Environment should host more "brainstorming" awareness meetings related to upcoming projects. The need for recurrent, task-related, "what-does-it-mean-to-me?" training was articulated frequently during ground-truthing interviews.

C. Operational departments should be responsible for downstream environmental awareness. Environment staff should be available as a training and technical resource, but departmental managers and supervisors should be responsible for maintaining environmental awareness within their departments. Operational employees should know that their supervisors expect conformance to environmental policies and objectives. Material on environmental programs should be accessible to all employees, through a departmental library and designated resource people. Other

departments should also be invited to write articles for Environment's education bulletins.

D. Human Resources should be responsible for coordinating and documenting technical training requirements that have been identified by Environment or the Leadership, Education, and Development Committee. If a program manager identifies technical training needs, that training should be brought to the attention of Human Resources. The Human Resources Department should coordinate and document competence training that is required by environmental management programs. As it stands now, what Environment is responsible for recording as an awareness or communication initiative, and what Human Resources should record as a training program, are vague.

E. Environment and Ground Transportation should share an employee. The Ground Transportation Department should hire an environmental planner to oversee the environmental objectives of that department. This employee should report first to a manager in Ground Transportation, and also be included as a staff member of Environment, working closely with the manager of the AQMP. This would fulfill AQMP

document only makes a commitment to communicating air quality conditions. The strong position on training in other documents is undermined by the absence of similar, upfront objectives in management program documents.

B. Management programs should include measurable targets for training and awareness. The AQMP addresses training requirements under roles and responsibilities and communication and documentation, but setting targets for training would solidify the commitment. For example, “Environment’s manager of air quality will conduct a seminar for the Parking and Ground Transportation Departments once a year,” or “100 percent of commissionaires will be informed of the curbside operating

the EMS and the environmental issues with which the airport is faced. To improve the environmental training component of its EMS, the Authority should: expand its existing programs, identify new procedures, and measure the progress of extending environmental awareness and responsibility.

A. The orientation for new employees should be opened up to other employees. As well as new hires to the Authority, any employee who has not received Environment's orientation session should be required to attend. For example, employees that change departments or take on new job functions should attend the session. Employees that are given responsibilities in an environmental management program, especially supervisors who will be responsible for awareness training within their department, should also attend Environment's awareness session.

B. Environment should collect feedback on its presentation to the employee orientation program. This program has the potential to be Environment's largest vehicle for the extension of environmental awareness and responsibility to employees. At the end of each presentation the department should survey the participants. Survey results would help Environment to ensure a high level of relevance and understanding. The staff person responsible for maintaining records of the environmental training program should monitor the feedback and suggest amendments to the presentation content or format, as required.

C. Environment should discontinue the claim that the orientation session provides employees with an opportunity to learn about environmental responsibilities specific to their individual jobs. Interviews confirmed that employees are not using the orientation program to learn about their own work activities. The orientation is most effective as an a general overview of environmental

management at the airport. Other processes are recommended for identifying and delivering specific training requirements.

D. The environmental training program should include training for the board of directors and senior management. The commitment of senior management is critical to the success of an EMS, yet the system does not include educational programs about environmental issues, EMS, or ISO 14001 for senior managers. The Authority should consider providing training on public policy issues, EMS auditing, and the measurement of environmental benefits. If necessary, the Authority should retain an outside expert for this training. Such training would improve management's ability to prioritize its objectives and guide different departments in integrating their objectives. It would also allow them to make optimal use of ISO 14001 in terms of its applications to due diligence and stakeholder satisfaction. Such knowledge is necessary to account for environmental benefits that the EMS can achieve. It would also help the Authority to make a decision on whether to seek certification to ISO 14001. In addition, senior managers and board members should be invited to attend Environment's new employee awareness session, departmental meetings, and project-specific training and awareness initiatives. This is especially important considering the boards' lack of environmental expertise.

E. Targets should be set for Environment's orientation session to strive for continual improvement. The Environment Department should set a goal for increasing the number of employees that have attended this session. It should also consider setting goals that are specific to certain job functions. For example, "100 percent of Airfield Maintenance employees will attend the environmental awareness session."

5.4. Awareness and Communication Program

Generally, the awareness and communication program appears to be meeting its existing commitments. There are also several recent developments that may improve the organization and delivery of this program. However, the following recommendations provide additional measures that should be taken to improve implementation of the EMS.

To achieve a shared vision of the objectives of its EMS, the Authority should make optimal use of all initiatives under this program. All environmental awareness training that employees receive needs follow-up strategies to ensure the Authority is developing a common vision and delivering a consistent message. Follow-up should include opportunities for two-way communication. With a clear understanding of its EMS and the participation of all employees, the Authority could make better use of the knowledge and priorities that are held by its employees. A shared vision and open lines of communication would ensure an efficient expenditure of resources and lasting commitment to environmental objectives.

A.

B. Environment should continue to use kick-off meetings to identify environmental issues associated with specific projects. Kick-off meetings are documented as a part of the Facility Alteration Permit process. These meetings should be included in the EMP as an environmental training initiative. At these meetings, Environment's representative should clearly link issues and strategies that are identified during brainstorming sessions to the appropriate EMS programs.

C. The Environmental Advisory Committee should be used as an environmental awareness tool. To reinforce the tie to the public and the importance of environmental management, employees from outside the Environment Department who have roles in the EMS should be invited to selected meetings of the Environmental Advisory Committee. Conversely, the Authority should invite committee members to internal business functions that are relevant to their concerns. Such functions might include a staff meeting with the Environment Department, a kick-off meeting, an employee orientation session, or inviting a committee member to write an article for the education bulletin.

D. Environment should take an inventory of awareness and communication tools that other departments have in place. Other departments may have effective means of communicating the Authority's policies to specific user groups. Environment may be unaware of these processes, or not using them to their full potential. For example, the Airside Operations Department uses the *YVR Flyer* newsletter to communicate with pilots and airline crews, and Parking's cashiers promote the use of pay-on-foot machines. Such initiatives should be presented to Environment as opportunities, and, where appropriate, listed in program management documents like the AQMP.

E. The Authority should increase the attention it gives to the activities of its tenants and suppliers. Non-Authority activities represent significant opportunities for environmental improvements at YVR. The Environment Department should continue to scope its programs to include all stakeholders. In this regard, it should also ensure a consistent policy between the EMP and its management programs. One manager that was interviewed felt the Authority needs to provide more direct support to tenants and suppliers, and avoid "sitting on the fence."

5.5. The Use of ISO 14001

In order to guide the Authority in its use of ISO 14001, this section presents recommendations that are specific to EMS theory and the ISO standard. Improvements to the Authority's EMS are evident when comparing the 1994 EMP to the environmental programs of 1997, 1998, and the business plan for 1999. It appears that the 1996

with minimal input (table 4). This study suggests that early involvement of unions could be beneficial.

B. The Authority should prioritize the benefits it expects to receive from using ISO 14001. Understanding its drivers for an EMS would facilitate a common understanding of the EMS' goals. It may also influence senior management's decision about whether to seek certification to ISO 14001. The commitments of the current EMS include a significant focus on stakeholder satisfaction, but the level of awareness among line employees relates more closely to compliance issues.

C. The Authority should continue to exceed ISO 14001's minimum requirements. Adhering strictly to the requirements of ISO 14001, a public environmental policy and legal compliance, would represent a significant step backwards for the Authority. In the opinion of this researcher, ISO's focus on legal requirements and competence training for personnel of an organization are not appropriate to the nature and conditions of YVR's operations. For example, progressive initiatives such as publishing an environmental progress report are not required by ISO 14001.

D. The Authority should present a complete, balanced set of critiques of ISO 14001 in its environmental awareness programs. If employees are well-informed about the strengths, weaknesses, barriers, pitfalls, and strategies of EMS, provided they have the opportunity to offer feedback, integration of environmental objectives into all areas of airport operations may be improved. Staff of the Environment Department, as resource people to other departments, should be clear on what the EMS of the Authority is intended to achieve.

E. The measurement of environmental objectives should be integrated into existing frameworks for strategic planning at the airport. The Authority's balanced scorecard and budget process present an ideal opportunity for the organization to integrate environmental measures into the planning of all its departments. Based on interviews, any consolidation of paperwork and reading material that managers face will improve the EMS's success. If ISO 14001 is presented as a grand, new, stand-alone program, it may overwhelm employees. Employees should be involved in the decision of how to implement the EMS, and implementation needs to be recognized as a gradual process of continual improvement.

F. The Authority should work with CSA, Transport Canada, and other airports to develop a guidance document for EMS that is relevant to airport operations. Although the framework of ISO 14001 appears to be helpful, use of the standard alone is not likely to be consistent between different airports, meet the demands of the public, or sufficiently educate employees or other stakeholders. The scope of an EMS that is appropriate to the nature and scale of airport operations should be defined by such a guidance document.

CHAPTER 6. CONCLUSION

6.1. General

6.1.1. Key strengths of EMS implementation at YVR

Based on an analysis of the Authority's motivations, opportunities, resources, and processes, the organization has the potential to improve its environmental performance. In addition, the corporate values and strategic planning processes of the Authority are well-suited to the use of an EMS based on the principles of ISO 14001. Therefore, ISO 14001 appears to be an EMS framework that the Authority should use to guide its environmental management efforts. In this context, environmental training and awareness programs have significant potential to help the Authority achieve improved environmental performance.

The main strength of the airport's EMS is Environment's commitment to proactive environmental management. The direction that the Environment Department has charted for the EMS in 1999 includes improving working relationships with other departments, establishing environmental objectives with other departments, and developing the role of Environment as a resource for environmental management. The focus that ISO 14001 places on continual improvement and the measurement of change appears to work well with the objectives the Authority and the Environment Department. Training, awareness, and communication initiatives that the Environment Department has planned, and the recommendations of this case study, may help the Authority to achieve integration of its environmental objectives into the day-to-day operating procedures of all its departments.

6.1.2. Key weaknesses of EMS implementation at YVR

In relation to the EMP and AQMP, the Authority's greatest weakness in implementing its EMS is the identification and delivery of training and awareness programs. Employees, especially at an operational level, are generally not aware of environmental responsibilities that relate to their work activities. The Authority needs to develop procedures for identifying environmental training needs.

Efficient and effective delivery of environmental training and awareness programs requires Environment to have the support of other departments. Operational departments, such as Airfield Maintenance and Ground Transportation, need to take on the responsibility for recurrent environmental awareness training within their own departments. The Environment Department needs to present on-the-ground research and respect the economic mandates of other departments. Factors that restricted the development of such procedures included time limitations of Environment'

Weaknesses of ISO 14001 that are relevant to training, awareness, and communication challenges in the Authority's EMS include: the focus on compliance

6.2. Summary Conclusion

Environmental training and awareness programs are a key strategy for the Authority to achieve continual improvement of its EMS. This is especially true if the Authority expects to integrate environmental objectives and targets into the management of all its departments. In order to fully achieve its environmental objectives, the Authority needs to educate all of its employees about the importance of its EMS and the significant impact the airport could have on minimizing local, regional, and global environmental degradation. The principles of ISO 14001 and the use of training, awareness, and communication strategies could help the Authority ensure that all of its departments, managers, supervisors, employees, and other stakeholders are working towards common goals.

Motivations of a corporation and the cyclical nature of EMS processes are driven by pressure from regulators, environmentalists, neighbours, employees, industry associations, and all stakeholders. The commitment of an organization and its

EMSs, and corporate environmental responsibility may make significant contributions to minimizing environmental degradation.

Specific suggestions for research that can build on this study include:

- Comparative studies on the implementation challenges associated with ISO 14001 would increase the utility of this type of research in terms of its use for generalization. A larger sample size of case studies would allow researchers to isolate phenomena such as training programs, or ISO 14001 certification, as factors that affect environmental performance.

- Combined with a larger sample of case studies, quantitative environmental data that measure change in environmental quality are essential to identifying cause and effect relationships between EMS processes and environmental performance.

- Research on corporate environmental responsibility should continue to focus on crucial determinants of organizations' potential. Recognizing determinants for leading-edge environmental performance has significant implications for researchers, managers, environmentalists, and policy makers. Understanding interactions among motivation, opportunities, resources, and processes, such as training and communication, could help accelerate the improvement of corporate environmental performance.

- Research on EMS frameworks should focus on how feedback loops between line employees and management affect the cycle of continual environmental improvement in organizations. Employee awareness may be a useful indicator of successful EMS implementation.

- Research on ISO 14001 should continue to identify implementation barriers, challenges, and strategies, so as to improve understanding of the relationships between different types of impediments to improved environmental performance. Understanding these relationships could help organizations to align their business processes most effectively.

- EMS research should focus on training requirements for all levels of management, including directors and senior management, not just line employees.

performance may be a significant motivator for individuals, departments, and organizations.

- Research should investigate public opinion about ISO 14001, self-regulation in public environmental policy, and corporate environmental responsibility. Such a measure of public opinion would be helpful in defining requirements for future EMS standards and for more general, public environmental awareness needs.

Appendix A

Questionnaire.

Interview Questionnaire

Respondent: Department:

Position/responsibility: Phone:

Date & time:

Consent to identify by position: YES NO Signature:

General (awareness training)

Respondents are each asked to participate on a voluntary basis, verbally introduced to the interview protocol, and given a handout identifying the research. The handout contains the phone number and address of Dr. Ron Marteniuk as a contact person.

Respondents are asked to give simple, concise answers and told that "yes" or "no" will often be sufficient. All answers are recorded by the interviewer. They are assured the objective of the interview is to further inform environmental awareness training, not performance evaluation.

Are you aware that the Authority has an environmental management system? **Y N**
If so, did you have an opportunity to offer your input? **Y N**

Are you familiar with the policies and objectives of the EMP and/or AQMP *[circle which]* ? **Y N**
If so, how did you become aware of the policies/program(s)?

Have you read the EMP/AQMP *[circle which]* ? **Y N**

Do you know where you can obtain a copy of the document(s)? **Y N**
If so, where *[indicate which document]* ?

Do you believe that, in general, most employees are aware of the Authority's environmental programs? **Y N**

Do you know of any specific responsibilities in the document(s) that relate to your job? **Y N**

If so, how did you become of aware of those responsibilities?

Have you received any environmental training from the Authority? **Y N**
If so, who conducted the training?

Was it about the company/EMS as a whole, or specific to your job?

Where would you go/who would you go to if you needed information about any environmental responsibilities that you might have *[indicate for which document]* ?

If you were to receive awareness training about the Authority's environmental policies and programs, how would you like to receive it? *[do not read/show list]*

Informally from your supervisor(s) __
As needed/requested (informally) from the environment department __
Training seminars from within your own department __
Through normally scheduled departmental meetings __
Training seminars from the staff of the environment department __
By attending departmental meetings of Environment __
Training seminars provided by external experts __
Through "Building a Better Airport"/"Balanced Scorecard" initiatives __
Training seminars specific to your department/job __
Company-wide training seminars __
Through brochures provided by the Authority __
Over the computer network __
Through education bulletins __
Other ____
Comments:

Do feel that, in general, employees need more environmental training? **Y** **N**
If so, what kind (general or specific; seminars or documents *[offer if asked]*)?

Do you feel that you would like to receive more training about the Authority's environmental commitments/programs? **Y** **N**
If so, what kind (general or specific; seminars or documents *[offer if asked]*)?

Do you feel that you receive more environmental training than you would like? **Y** **N**

Do you think the Authority does a (excellent/satisfactory/poor *[offer]*) job of communicating its EMS to its employees? *[circle response]*

Do you feel the Authority needs to improve its EMS? **Y** **N**
Do you feel the Authority needs to improve its environmental training and awareness programs? **Y** **N**

Do you feel a part of the Authority'

Do you know about Human Resources' "LEAD' committee on education? **Y N**
Do you have an assigned representative? **Y N**
If not, why?

Do you know who your departmental contact is for the "Balanced Scorecard"? **Y N**

Has your department included environmental targets or measures in its 1999 business plan? **Y N**

Do you have any suggestions for improving environmental awareness at the airport?

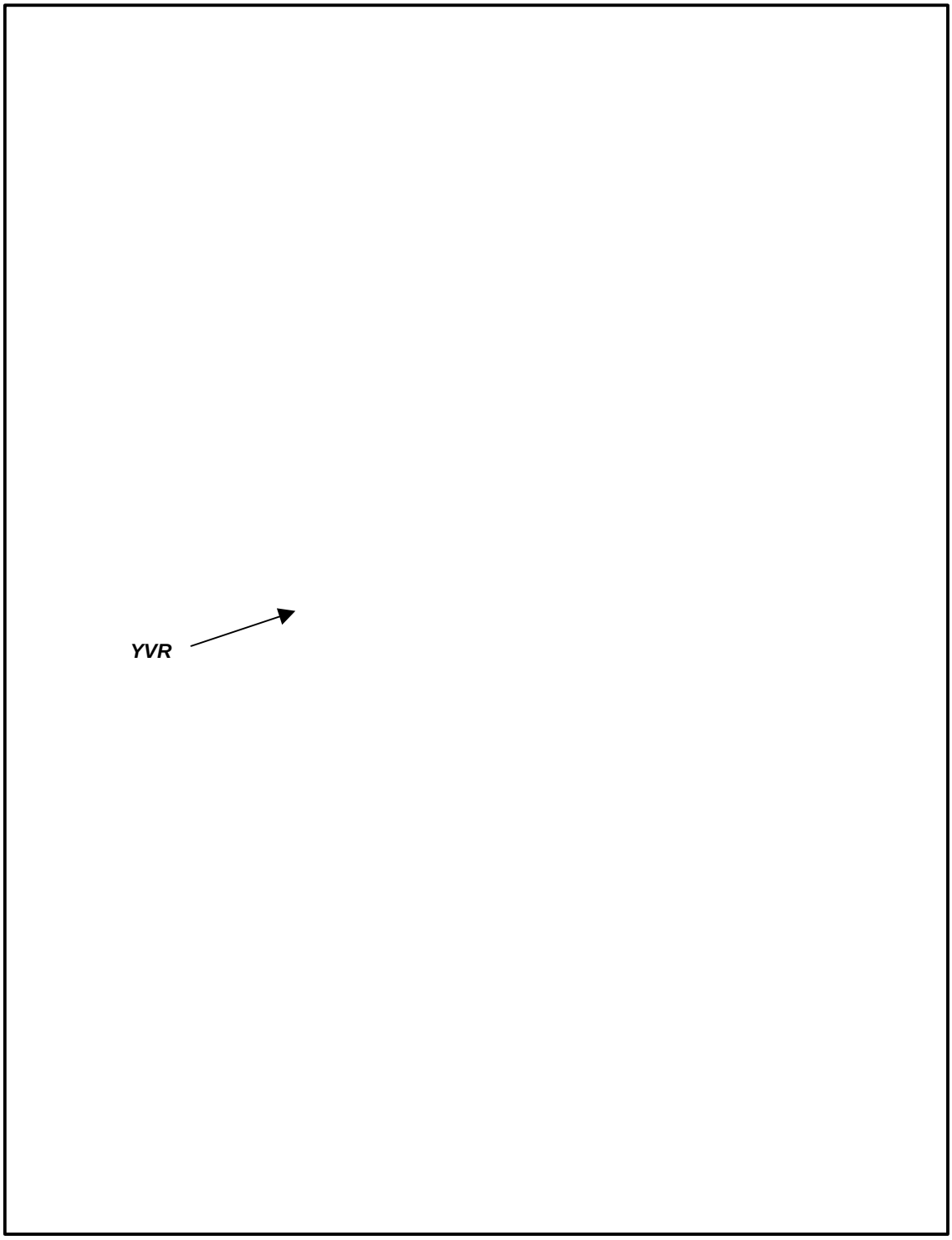
Tailored for subject (ground-truthing)

After responding to the general interview questions, respondents will be asked to confirm or disconfirm specific observations made during the case study. These questions relate to their knowledge of roles or responsibilities that were designated to them, directly or indirectly, in either the EMP or AQMP. These responses are a method of ground-truthing the findings of the case study.

Field notes/comments about respondent/interview:
[include identification of other potential respondents]

Appendix B

Map of YVR and surrounding area.


YVR

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