

The University of Calgary

Environmental Reporting

by

Adrienne Lynne Schipperus

A Master's Degree Project Submitted To The Faculty of Environmental Design In
Partial Fulfilment of the Requirements for the Degree of Master of Environmental
Design (Environmental Science)

Calgary, Alberta, Canada

June 1995

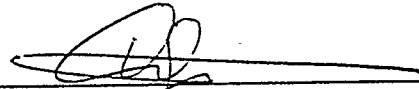
© 1995 Adrienne Lynne Schipperus

Reproduction of this document in whole or in part requires the permission of the author.

THE UNIVERSITY OF CALGARY

FACULTY OF ENVIRONMENTAL DESIGN

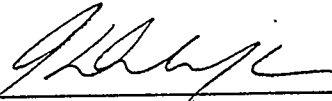
The undersigned certify that they have read, and recommend to the Faculty of Environmental Design for acceptance, a Master's Degree Project entitled ENVIRONMENTAL REPORTING submitted by Adrienne Schipperus in partial fulfilment of the requirements for the degree of Master of Environmental Design.



Supervisor: Dr. Dixon Thompson
Faculty of Environmental Design



Dr. Dean Neu
Faculty of Management



John Woodruffe



Dean's Appointee: Dr. Bill Ross
Faculty of Environmental Design

Date June 1995

ABSTRACT

Environmental Reporting

Adrienne Lynne Schipperus

June 1995

Prepared in partial fulfilment of the requirements for the degree of Master of Environmental Design (Environmental Science), in the Faculty of Environmental Design, The University of Calgary, Calgary, Alberta, Canada

Supervisor: Dr. Dixon Thompson

This project proposed criteria that should be included for developing effective stand-alone corporate environmental reports and government state of the environment reports. This was achieved in part through an iterative process of examining a sample of reports.

In this project a sample of 56 stand-alone corporate environmental reports from the period of 1992 to 1994 were examined. As well, 36 government state of the environment reports were analyzed. This project also involved a discussion of the uses and roles that corporate environmental reports and state of the environment reports can serve in environmental management and why corporations or governments should produce such reports.

The principal conclusions were: **(1)** good corporate environmental reports should possess three key attributes (i) commitment to environmental management, (ii) demonstrated environmental performance, and (iii) credibility. **(2)** The key criteria for a good state of the environment report (government) include: (i) environmental indicators, (ii) demonstrated trends, (iii) good news and bad news, (iv) management response to environmental problems. **(3)** Reporting in general is useful and necessary to increase accountability, transparency and in helping to determine where to allocate scarce resources.

Key Words: Environmental Reporting, State of the Environment Reporting, State of the Environment Report, Corporate Environmental Reporting, Corporate Environmental Reports, Environmental Performance, Environmental Management, Environmental Accountability.

Table of Contents

Approval Page	ii
Abstract	iii
List of Tables	vii
List of Figures	vii
 Introduction	 1
Methodology	5
Purpose	5
Objectives	5
Theoretical Framework	6
Methods	6
Literature Review	7
Collection of Environmental Reports	9
Government State of the Environment Reports	9
Corporate Environmental Reports	12
Environmental Report Examination and Analysis	14
Corporate Environmental Reports	14
Content Analysis	16
State of the environment reports	17
Limitations of the Research	18
 Background: State of the Environment Reports	 19
Background	19
History	21
SOER Types and Organization	26
Issues framework	27
Environmental Media framework	27
Resource Sector framework	27
Jurisdictional or Administrative framework	28
 Background: Corporate Environmental Reporting	 29
Background	29
Regulatory Sources of Environmental Reporting and Disclosure	32
United States	32
Media-specific laws	32
Industry Specific Laws	33
Release Reporting and Emergency Planning	33
Canada	33
Canadian Environmental Protection Act	33
U.S. Securities Regulation	34

Canadian Securities Regulations	35
Securities Regulations	36
Section 3060 Capital Assets: Future Removal and Site Restoration costs	36
Guidelines and Voluntary Codes of Conduct	37
General Call to Report	37
Agenda 21	37
International Chamber of Commerce (ICC)	38
Chemical Manufacturer's Association (CMA) Responsible Care	38
Mining Association of Canada	38
Specific Reporting Recommendations	39
Public Environmental Reporting Initiative (PERI)	39
Coalition for Environmentally Responsible Economies (CERES)	39
European Chemical Industry Council (CEFIC)	40
Other Reporting Initiatives	40
Corporate Initiative	41
Driving Forces Behind Corporate Environmental Reporting	42
Barriers to Environmental Reporting	44
Criteria For State of The Environment Reports	45
Environmental Indicators	50
Uses of Environmental Indicators	52
Pressure-State-Response Framework	55
Criteria for Indicator Selection	58
Need to Demonstrate Trends	62
Presentation of Good News and Bad News	64
Frequency of Environmental Reporting	70
Lighten Up	72
Humour	72
Photos	78
Criteria for Corporate Environmental Reports	81
Commitment to Environmental Management	97
Letter or foreword by Senior Management	97
Environmental Policy	98
Environmental Management Systems (EMS)	99
Management structure	100
Employee training and education	101
Emergency Response Planning	102
Risk Assessment	102
Objectives and Targets	102
Environmental Audits	105

Community Relations	107
Demonstrated Environmental Performance	109
Quantified Performance Data	109
Environmental Performance Indicators (EPIs)	110
Trends	114
Worker Health and Safety Information	115
Research & Development	116
Waste Minimization Initiatives and Results	116
Life Cycle Assessments (LCA)	117
Purchasing Guidelines	117
Other Environmental Initiatives and Results	118
Credibility	120
Overall Presentation	120
Length	120
Understandable	121
Dated	121
Not Public Relations Driven	122
Good News and Bad News	123
Request for Feedback	125
Fines, Exceedances, Compliance, Accidents or Spills	125
Environmental Issues Defined	128
External Validation	129
Uses and Roles of Environmental Reporting	131
State of the Environment Reporting	131
Integration with other environmental management tools	133
Management tool	135
Input Into Planning and Policy Development	138
Audience Considerations for SOERs	140
Corporate Environmental Reporting	142
Conclusions and Recommendations	145
Corporate Environmental Reports	145
State of the Environment Reports	152
Appendix 1: Criteria for Environmental Indicator Selection	159
Appendix 2: Addresses of Government Agencies contacted for State of the Environment Reports	161
Appendix 3: Addresses of Corporations Contacted for Reports	165
Bibliography	171

List of Tables

Table 1: State of the Environment Reports Analyzed	10
Table 2: Corporate Environmental Reports Analyzed	13
Table 3: Comprehensive Provincial State of the Environment Reports Published to Date	24
Table 4: Characteristics of SOERs	46
Table 5: Summary of SOER Characteristics	49
Table 6: Criteria Used to Rate CERs	82
Table 7: Analysis of Corporate Environmental Reports	85
Table 8: Characteristics of Corporate Environmental Reports	90
Table 9: Summary of CER Characteristics	94
Table 10: Summary of top 25% of Corporate Environmental Reports Analyzed ..	95

List of Figures

Figure 1: Pressure-State-Response Framework	56
Figure 2: Example of Good News and Bad News in an SOER	66
Figure 3: Example of Good Humour	74
Figure 4: Example of Humour	75
Figure 5: Example of Humour	76
Figure 6: Example of Inappropriate Humour	77
Figure 7: Example of Effective Use of Photos	79
Figure 8: Example of Targets	104
Figure 9: Example of Reporting on Audit Findings	107
Figure 10: Relationship of EPIs to targets and reporting	111
Figure 11: Example of Open Disclosure on Spills	126
Figure 12: Example of Open Disclosure on Fines	127
Figure 13: Example of Issues Defined	129
Figure 14: Relationship of SOERs with other management tools	135

Acronyms:

CER: Corporate Environmental Report
 SOER: State of the Environment Report
 SOE: State of the Environment
 EPI: Environmental Performance Indicator
 EMS: Environmental Management System

Introduction

Environmental performance has become an increasingly important consideration for business (IISD, 1992) and government agencies. A number of different driving forces, such as stricter environmental legislation and regulation; investors' and financiers' requirements; and pressure from clients, consumers and the general public, are forcing corporations and governments to rapidly adopt environmental management strategies. Environmental reports, corporate environmental reports by companies and state of the environment reports by governments, are one of a number of emerging management tools to deal with environmental concerns and to increase accountability (Thompson, pers. comm., 1994).

A state of the environment report (SOER) involves the systematic acquisition, analysis and presentation of information on environmental conditions and trends within a defined area or on a specific resource or medium (State of the Environment Reporting Branch, 1989). A corporate environmental report (CER) is a comprehensive document itemizing environmental performance and the environmental protection activities of a firm. Performance measurement and reporting are considered to be fundamental to effective environmental management (IISD, 1992).

Environmental reporting, whether by corporations or by governments, enables managers and decision-makers to assess performance and to identify areas that require attention.

With the public demanding greater accountability and transparency on the part of government agencies and corporations, many of them are now producing regular reports on the environment. Regular reporting on environmental matters demonstrates openness, indicates that an organization or institution has a strong commitment to the environment, and suggests a high level of credibility. The long term goals of SOERs and CERs are to provide a systematic means for identifying and anticipating changes in the environment at an early stage in order to consider alternatives for action (State of the Environment Reporting Branch, 1989). The IISD (1992) indicates that "information is critical to bringing about change". Reporting on the environment is a means of conveying information that is crucial to achieving change and moving towards sustainability. In Canada, fewer than one in a hundred corporations are committed to releasing an annual environmental report and only seven in every hundred firms even report internally on a regular basis on environmental matters (Nitkin and Powell, 1993).

At present there is a great deal of experimentation with various approaches to reporting in corporate environmental reports and state of the environment reports and no formal or consistent framework exists for reporting. Therefore, in this project, an examination of reports was undertaken to determine, on a general level, an appropriate framework and important criteria in reporting.

The project is presented in the following format:

Introduction and Methods:

This section discusses the purpose, objectives and format of this project. As well, it presents the methodologies used.

Background on State of the Environment Reports:

This chapter consists of background information on state of the environment reporting and a brief overview of the history of state of the environment reports. As well, a brief discussion of the different types of SOERs is included.

Background on Corporate Environmental Reporting:

This section provides a discussion of the present state of corporate environmental reporting, the regulatory requirements of environmental reporting and disclosures, and an overview of existing guidelines for environmental reporting. Finally, there is a discussion of the driving forces for corporate environmental reporting.

Criteria for State of the Environment Reports:

This chapter examines a selected number of criteria considered to be important in SOERs. These include: environmental indicators; pressure-state-response framework; the need to demonstrate trends; good news and bad news; the frequency of reports and the possibility of using humour and photos to lighten the presentation and alleviate the occasional dull nature of SOERs.

Criteria for Corporate Environmental Reports:

This chapter examines the criteria for a good corporate environmental report. This analysis is limited to three main areas: (1) Showing a commitment to environmental management, (2) Demonstrating environmental performance, and (3) Credibility. As well, it includes a discussion of the elements that are used to convey the information needed in these three areas.

Uses and Roles of Environmental Reports:

This section consists of a discussion of the uses and roles that SOERs and CERs can play in environmental management.

Conclusions:

This chapter provides a synthesis of the preceding information in the form of conclusions and recommendations.

Methodology

Purpose

The purpose of the research is twofold. The first purpose is to determine the qualities of a good corporate environmental report (CER), primarily in terms of content and other general reporting considerations, and to a lesser extent, to determine the qualities of a good government state of the environment report (SOER). The research focus is the corporate environmental report and what elements constitute a good CER. The second purpose of the research is to examine the roles and uses that corporate environmental reports and state of the environment reports can play in environmental management.

Objectives

The objectives of this research project are listed as follows:

- to examine the current state of corporate environmental reporting and state of the environment reporting by governments
- to analyze stand-alone corporate environmental reports
- to analyze government state of the environment reports
- to take a broad look at the contents of corporate environmental reports in order to determine what makes a good corporate environmental report
- to determine the qualities of a good state of the environment report on a general level
- to define and describe the chosen criteria for effective reporting

- to look at the uses and roles that both CERs and SOERs serve and to discuss why environmental reporting is a necessary and important part of environmental management.

Theoretical Framework

The theoretical framework of this project is based on the idea that institutional learning requires memory and feedback and that the need for communication and credibility with various audiences or stakeholders involves accountability, demand for transparency and the need for self-policing rather than command and control (Dixon Thompson, pers. comm., 1995). As such, environmental reporting by corporations and institutions is necessary to achieve this and for continuous improvement.

Methods

The research methodology required to meet the stated objectives included:

- a literature review
- collection of corporate environmental reports and state of the environment reports
- an examination and analysis of the CERs and SOERs
- discussions with relevant industry and government representatives and academics.

This study is based on the review and analysis of corporate environmental reports (CERs) and government state of the environment reports (SOERs) at the four levels of government (municipal, provincial, national and international). As well, this study is

based on a review of business and practitioner studies and government documents concerning corporate environmental reporting and state of the environment reporting. The literature review and analysis were supplemented by discussions with government officials and representatives from academia, the private sector and non-governmental organizations (NGOs) through interviews. These were unstructured and informal interviews, such as those described by Robson (1993) where the interviewer has a general area of interest and concern but lets the conversation develop within this area. Additionally, experience and information were gained through participation and preparation of information on the Bow River State of the River Report (1994) for the Bow River Water Quality Council; preparation of information for a workshop on state of the environment reporting by the Canadian Council for Ministers of the Environment; and work on environmental performance indicators for HBT AGRA Environmental Services.

Literature Review

The purpose of the literature review was to: (1) familiarize the researcher with the current state of environmental reporting, (2) help in formulating a model and criteria for evaluating the collected environmental reports, and (3) to identify gaps in the literature that may be filled by the research. An initial literature search was carried out at the University of Calgary McKimmie Library using the Dobis on-line catalogue system and NOMADS government document index. Information on government SOERs was found using these systems. However, essentially no information on the subject of corporate environmental reporting was found, probably because environmental reporting is a

recent practice. A search on the ABI Inform and Canadian Business and Current Affairs databases on CD Rom, however, did produce some information on the topic. The key words searched were: environmental reporting, corporate environmental reporting, environmental reports, state of the environment reports, annual reports, green reporting and environmental or green accounting. In addition to this, the literature review was supplemented with general environmental management literature.

Because the traditional library search produced very little information on corporate environmental reports, additional sources of information were sought by contacting various industry associations such as the Canadian Chemical Producers Association (CCPA) and the Canadian Institute of Chartered Accountants (CICA). As well, environmental management organizations such as the Global Environmental Management Initiative (GEMI), the International Institute for Sustainable Development (IISD), the Business Council for Sustainable Development (BCSD), the Investor Responsible Research Centre (IRRC), the World Environment Centre, and the National Round Table on the Economy and the Environment (NRTEE) were referred to in the literature as having produced documents or information on corporate environmental reporting. These organizations were contacted to find any additional information on the subject of environmental reporting. These organizations and industry associations provided information on the most recent initiatives in corporate environmental reporting.

Collection of Environmental Reports

Environmental reports were collected from government agencies and corporations in the following ways:

Government State of the Environment Reports

State of the environment reports were collected for the local, provincial, national and international levels. The majority of these reports were provided by the supervisor of this project, Dixon Thompson. These were supplemented by other state of the environment reports which were found in the University of Calgary library collection and by contacting government departments referenced in the literature as having produced state of the environment reports. In all 36 reports were collected. See table 1 for a complete listing of government state of the environment reports reviewed.

Municipal SOERs

The State of the Environment Report for Burnaby, 1993
Toronto's First State of the City Report, June 1993
State of the Environment: Regional Municipality of Hamilton-Wentworth, 1990
State of the Environment Report; Regional Municipality of Ottawa-Carleton, 1991
State of the Environment Report: Waterloo Region, 1986
Preserving Our Lifeline: A Report of the State of the Bow River, 1994

Provincial SOERs

State of the Environment Report for British Columbia, 1993
Alberta's Comprehensive State of the Environment Report, 1994
Saskatchewan State of the Environment Report, 1991
Saskatchewan State of the Environment Report, 1992
Saskatchewan State of the Environment Report, 1995
State of the Environment Report for Manitoba, 1991
State of the Environment Report for Manitoba, 1993
Environmental Quality in the Atlantic Provinces, 1979
Environmental Quality in the Atlantic Region, 1985
State of the Environment in the Atlantic Region, 1994
Etat de l'Environnement au Quebec, 1992
New South Wales State of the Environment, 1993

National SOERs

State of the Environment in Australia, 1986 *
State of the Environment Report for Canada, 1986 *
The State of Canada's Environment, 1991 *
Canada Water Year Book, 1975-1985 *
The State of the Environment in Switzerland, Summary, 1990

International SOERs

Health of the Planet, 1992
The State of the Environment, 1986 (United Nations)
The State of the World, 1993 *
World Resources: A Guide to the Global Environment, 1992-1993
The State of the Environment, 1985 *, Organization for Economic Cooperation and Development
The State of the Environment, 1991 *, OECD

* part of a series

Table 1: State of the Environment Reports Analyzed

Issues Framework

A State of the Environment Report: Contaminants in Canadian Seabirds, 1990

A State of the Environment Report: Understanding Atmospheric Change, 1991

A State of the Environment Report: Pollutants in British Columbia's Marine Environment, 1989

A State of the Environment Report: State of the Environment for the Lower Fraser River Basin, 1992

A State of the Environment Report: Canadian Perspectives on Air Pollution, 1990

A State of the Environment Report: The State of Canada's Climate: Temperature Change in Canada, 1992

SOER Fact Sheets

A State of the Environment Fact Sheet: Environmental Implications of the Automobile, 1993

A State of the Environment Fact Sheet: Bringing the Bald Eagle back to Lake Erie, 1993

A State of the Environment Fact Sheet: Trends in Contaminants Levels in the Niagara River, 1993

A State of the Environment Fact Sheet: The Inuit Economy: Sustaining a Way of Life, 1994

A State of the Environment Fact Sheet: Contaminants in Canadian Sea Birds, 1990

A SOE Fact Sheet: Ground-level Ozone in Canada

A SOE Fact Sheet: Contaminants in Herring Gull Eggs from the Great Lakes, 1990

Table 1 (Continued): State of the Environment Reports Analyzed

Corporate Environmental Reports

One hundred corporations were contacted, informed of this project and asked to provide the following:

- a copy of their most recent environmental report;
- copies of previous environmental reports if they existed;
- a copy of their annual financial report, if no environmental report was produced; and
- general information about their environmental programs such as a copy of their environmental policy statement.

All of the corporations were contacted by letter. Corporate environmental reports were collected from organizations in Canada and the United States, and to a lesser extent in England and Europe. Of the organization's that were contacted, 75 of them responded. However, only 56 of those companies provided a copy of a separate environmental report. See table 2 for a complete listing of corporate environmental reports reviewed.

Canada: Abitibi-Price Inc. Amoco Canada Petroleum Ltd Bell Canada B.C. Hydro and Power Canadian Occidental Petroleum Canfor Corporation Celanese Canada Inc. Dofasco Inc. Dow Chemical Canada Inc. DuPont Canada Inc. E.B. Eddy Forest Products Imperial Oil Ltd. Lever MacMillan Bloedel Ltd. Mining Association of Canada Noranda Forest Inc. Noranda Minerals Inc. Northern Telecom Ltd. Ontario Hydro Petro Canada Shell Canada Ltd. Tembec International: Bayer AG The Body Shop International Plc. British Airways British Gas Corporation British Petroleum Co. British Telecommunications Ciba-Geigy Glaxo Holdings Plc. Henkel ICI National Westminster Bank Plc. Norsk Hydro Swiss Air Thorn EMI Plc.	United States: Ashland Oil Inc. AT & T Co. Baxter Healthcare Corporation Bristol - Myers Squibb Browning-Ferris Industries Inc. Duke Power Company Eastman Kodak Co. Johnson & Johnson Merck and Co. Inc. Monsanto Polaroid Co. Procter and Gamble Co. Rohm and Haas Company S.C. Johnson Wax The Southern Company Sun Company Toyota Motor Co. Union Carbide Volkswagen Volvo North America Corporation Waste Management Inc.
---	--

Table 2: Corporate Environmental Reports Analyzed

The selection of companies was based largely on the following sources:

1. A list of corporations which were said to produce environmental reports was provided by Stephen Barg of the International Institute of Sustainable Development (IISD) in Winnipeg.
2. The literature collected on the subject was scanned to see if corporations were listed as producing an environmental report. Any corporations listed were contacted.
3. Discussions with corporate or industry representatives resulted in their naming additional companies producing environmental reports.
4. Finally, additional reports were obtained for other corporations through Dixon Thompson and a fellow student, Chris Ryley whose work on environmental policy statements resulted in his receiving environmental reports.

Environmental Report Examination and Analysis

Corporate Environmental Reports

Accounting research has focused on environmental and social disclosures in annual financial reports. Although little guidance exists in terms of accounting for environmental issues in annual reports, these annual financial reports are still governed by generally accepted accounting principles (GAAP). As well, many of these research studies (for example, Wiseman, 1982; Neu and Powrie, 1994) focus on the relationship between companies that disclose information on environmental performance and actual environmental performance by comparing what is disclosed to some form of publicly

available information such as the Council for Economic Priorities or Fortune Magazine surveys of corporate performance (Wiseman, 1982; Herremans, 1993). Alternatively, accounting research has focused on reasons for social (including environmental) disclosures such as Herremans et al. (1993) who found that a good reputation for corporate social responsibility and higher reported profitability are strongly related and that a good reputation for corporate social responsibility is strongly associated with lower total firm risk. Another researcher, Patten (1991), found that social disclosures are used to address the exposure that firms face with regard to the social environment and are tied to public pressures. It is important to note as well that the time period for most of the samples used in these studies was from the 1970's and the 1980's.

This research project differs from such studies in that it has focused on stand-alone environmental reports which have only emerged in the last several years (since approximately 1989). The sample used in this study ranges from 1992-1994. Secondly, stand-alone environmental reporting is not governed by any guidelines such as GAAP and there is no consensus as to what constitutes a standardized format for a company to describe its environmental progress. This is due, in part, to the voluntary nature of corporate environmental reports. Moreover, no method for analyzing these reports has been established in the literature. Because no criteria for environmental reporting were noted in the literature this methodology was somewhat iterative where criteria for effective reporting were selected based on an initial assessment of the reports. The reports were then re-examined to see how well they met the developed criteria and how

well the criteria fit the reports. The criteria were defined and described. This was achieved in part by the literature search, previous course work and discussions with knowledgeable people. This iterative process is described below in more detail.

Content Analysis

A detailed content analysis was not performed on the environmental reports because they contain widely diverse information. Although this could have been done on a limited number of reports it might not have served any purpose in terms of developing general conclusions as to a good environmental report. Further, such an analysis was considered to be beyond the scope of this project. Such an analysis may have been possible if the examination was restricted to one industry sector in the case of corporate environmental reports or an analysis of the treatment of one or more environmental media in the case of SOERs. The purpose of this project, however, was to look at a broad spectrum of reports to develop general criteria of a good report regardless of industry sector. Therefore a broad based content analysis was performed. The analysis of reports was designed to explore what makes a good corporate environmental report or state of the environment report. A model of a good corporate environmental report was described by synthesizing information obtained from the literature review, through discussions with the committee members of this project and through an initial examination of the reports. The corporate environmental reports were not examined for content beyond looking at three broad areas. These included:

1. A commitment to environmental management

2. Demonstrated environmental performance
3. Credibility and presentation issues.

Once this model was developed, the CERs were examined again to develop a limited number of criteria which were used to assess and define the three components of the model. The number of criteria were kept relatively small in order to keep the project manageable. These criteria were then used to examine the reports again to perform a comparative analysis of the reports to see how well they met the developed criteria. The final criteria were chosen because of: (1) the researcher's and the project committees' perception of their importance, (2) ease of comparison and measurement within reports, and (3) how well the criteria covered each of the three established categories of the model. A procedure similar to the one described by Wiseman (1982) in her analysis of environmental disclosures in financial reports was used to perform the comparative review of the CERs and to evaluate their contents in order to discuss the criteria. Rating of the criteria was broadly based on the presence or absence and the degree of specificity of each of the criteria. (For the detailed criteria see table 6). The reports were rated to see how well they achieved the criteria and in order to describe the best examples of corporate environmental reporting.

State of the environment reports

A similar process was used to analyze and discuss the SOERs but the reports were not rated nor were they analyzed on the same level of detail as the CERs because the

variation between the contents of SOERs is even greater than those of CERs due in part to the wide range of jurisdictions covered by these reports.

As well, the SOERs were not examined in as much detail because the main focus of this project was corporate environmental reports.

Some issues surrounding SOE Reporting which were felt to be important by the researcher and supervisor of the project were discussed. These were: environmental indicators; a pressure-state-response framework; trends; frequency; presentation of good news and bad news; and the use of humour and photos.

Limitations of the Research

The rating of the reports is subject to criticisms of a certain amount of subjectivity. Where this is concerned, it is important to note the difference between a subjective assessment which is completely arbitrary and a professional judgement which is based on knowledge, education and critical thinking. The nature of these ratings are more professional judgements than subjective and arbitrary decisions. It is also assumed that all of the criteria are of equal weight in their potential to determine the best qualities and attributes of an environmental report. This is not necessarily correct. Nevertheless, because of the exploratory nature of the project the researcher of this project feels that the analysis has provided useful insights into the development of a good environmental report and in providing examples of the best efforts.

Background: State of the Environment Reports

Background

State of the environment reporting by governments is defined as the "systematic acquisition, analysis and presentation of information on environmental conditions and trends within a defined area or on a specific resource or medium" (State of the Environment Reporting Branch, 1989).

The goal of Canada's state of the environment program is to provide objective, scientifically based information on environmental conditions and trends from an integrated and holistic perspective (Simpson-Lewis, 1994). One of the essential features of SOE reporting is that it must identify pressures from human activities that alter the state of the environment components (air, land, water, biota). As such, one of the primary themes of SOE publications is the link between human activities and environmental change. One of the long term goals of doing an SOER is to provide a systematic means for identifying and anticipating changes in the environment at an early stage in order to consider alternatives for action (State of the Environment Reporting Branch, 1988).

In doing an SOER, it is not a question of gathering new data from primary environmental monitoring. The object is to collect together in one place, all the information that is already known about the areas, but which is currently held by many public and private

bodies (Jacob, 1992). On some occasions, however, information and knowledge gaps are identified and monitoring requirements may need to be established.

According to the State of the Environment Reporting branch of Canada (1989) the four long term goals of state of the environment reporting are:

1. to increase awareness and understanding among diverse audiences about the state of the environment and its implications,
2. to provide a systematic means for identifying and anticipating changes in the environment at an early stage in order to consider alternatives for action,
3. to provide tools for evaluating, from an environmental perspective, the effectiveness of policies and practices of government, industry, consumers and the public,
4. to provide a basis for improved decision-making and for encouraging sustainable use of the environment and natural resources.

Gelinas and Slaats (1989) identify the main components of a state of the environment report as:

State: Inventory of environmental quality and assets for one point in time. This is a snapshot of the environment.

Trends: A measure of environmental change over time and space designed to gauge deterioration, improvements or stability.

Explanation: Why has the trend occurred? This is necessary for proactive environmental planning and management.

Management Response: Based on knowledge of environmental change, trends and an understanding of why these have occurred, what actions or measures can be taken to improve the situation? Are existing policies and responses adequate?

History

Prior to the 1960s, SOE reports were virtually non-existent: Japan and the United States were the pioneers in this area, producing reports annually since 1969 and 1970 respectively. Interest in state of the environment reporting first appeared in the United States following the National Environmental Protection Act (NEPA) in 1969 which required the Council of Environmental Quality to produce annual statements on the quality of the environment (Elkin, 1990). Since this time state of the environment reports have been implemented at international, national, regional and local scales. In 1979, the Organization for Economic Cooperation and Development (OECD) produced the first international SOE report (State of the Environment Reporting Branch, 1989). In the same year the Environment Ministers of the OECD countries recommended that each member country periodically publish a state of the environment report (State of the Environment Reporting Branch, 1989). Since that time there has been an increasing awareness for the need for state of the environment reports. The Worldwatch Institute has prepared an annual state of the world report since 1986. The second state of the environment report

put out by the OECD indicated that 16 out of the 25 countries in the OECD had drawn up at least one such report (OECD, 1985). By the early 1980s, SOE programs had been established in a number of countries. Alternatively, some countries merely publish national year books of environmental statistics. For instance, in Canada there is Human Activity and the Environment (Statistics Canada and Environment Canada, 1986; 1994) and the Canada Year Book (1994). Another example is the Canada Water Year Book which was published annually from 1975 to 1985, at which time it appears to have been discontinued. This series of publications brought together many widely dispersed water statistics and focused on many different aspects of Canada's fresh water resources. These reports were descriptive, factual and statistical.

Canada and other countries have recognized the need to compile information on environmental quality and report on the state of their environment (Eaton et al., 1994). In Canada, reports exist at the national and provincial levels and for some urban and regional municipalities. The audiences for these reports are primarily members of the general public who are concerned about the environment and eager for information on its condition or state. The audience does not necessarily have a background in science. The audience, however, is not always carefully defined and sometimes the reports imply more than one type of audience.

The first state of the environment report in Canada was produced in the Atlantic Region in the late 1970's (Eaton et al., 1979). Even before this, information on the state of the

environment was included in The Canada Handbook (Statistics Canada, 1976). The first reports were developed in response to a need for the public to be better informed on environmental issues and on the quality of their surrounding environment (Eaton et al., 1994). A regional survey of public opinion on environmental matters in the late 1970's revealed that there were serious gaps in people's environmental knowledge and understanding (Eaton et al, 1994). The 1980 Environmental Quality in the Atlantic Provinces (Eaton, 1979) was aimed at filling that gap. Although reports on environmental quality had been produced in the United States since the early 1970's, and by other countries, it was not until 1980, when Environmental Quality in the Atlantic Provinces (1979) was published, that this kind of reporting was started in Canada.

Canada produced its first National SOE report in 1986 (Bird and Rapport, 1986) which brought together many sets of data on the environment. In the same year Statistics Canada published Human Activity and the Environment: A Compendium of Environmental Statistics to accompany this first state of the environment report. At the time of this publication, there was no established system for continuous environmental reporting in the country (Simpson-Lewis, 1994). This document provides comprehensive and up-to-date environmental statistics on population, economic activities and the environment. Later in 1986, in response to continued public demand for this kind of environmental information, the federal cabinet authorized the establishment of an ongoing SOER system. In 1988, the Canadian Environmental Protection Act (CEPA) gave SOE reporting its legislative mandate:

Part 1: Environmental Quality Objectives, Guidelines and Codes of Practice,
Environmental Data and Research

Section 2 (f) "The Government of Canada shall... provide information to the people of Canada on the State of the Canadian environment".

Section 7 (1): Monitoring, research and publication. The Minister may:

(f) publish or otherwise distribute or arrange for the publication or distribution of:

(i) pertinent information to inform the public in respect of all aspects of the quality of the environment, including the control and abatement of environmental pollution, and

(ii) a report on the state of the Canadian environment to be prepared on a periodic basis. (CEPA, 1988).

In 1990, Canada's Green Plan reiterated the government of Canada's commitment to environmental information as a strategy for achieving sustainable development (Government of Canada, 1990). Since that time the provinces of British Columbia, Saskatchewan, Manitoba and Quebec, plus Atlantic Canada covering four additional provinces, have produced comprehensive environmental reports (see table 3).

Atlantic	1979	1985	1993
Quebec	1988	1992	
Manitoba	1991	1993	
Saskatchewan	1991	1992	1995
British Columbia	1993		
Alberta	1994		
Canada	1986	1991	

Table 3: Comprehensive Provincial State of the Environment Reports Published to Date

The four provincial governments in Atlantic Canada are in transition, having determined to take over the task of comprehensive SOE reports within their boundaries from Environment Canada Atlantic Region (Bayswater Consulting Group, 1994). The jurisdictions of Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick and the North West Territories plan to devote their resources to topical, sectoral or issue-oriented reporting on the state of the environment, although all are studying the possibility of preparing a comprehensive report (Bayswater Consulting Group, 1994). Ontario and Alberta have initiated reporting programs, both of which are in the process of preparing their first state of the environment reports.

Many provincial jurisdictions have developed and are producing other SOE publications, including fact sheets, summaries of comprehensive SOE reports and issue briefs. Some large municipalities have also issued their own state of the environment reports, for example, Hamilton-Wentworth (1990), Waterloo (1986), Ottawa-Carleton (1991), Toronto (1993), Montreal and Burnaby (1992).

North American Free Trade Agreement (NAFTA)

NAFTA acknowledged links between trade and environment issues and committed the partners to what is basically a process of continuous improvement. There are implicit requirements for indicators to measure that improvement (North American Agreement on Environmental Cooperation, 1993). In the parallel environmental accord to NAFTA,

The North American Agreement on Environmental Cooperation, environmental SOERs and indicators are referred to explicitly or implicitly in several sections:

Article 1: The objectives of this agreement are to:

- (i) promote economically efficient and effective environmental measures

Article 2,1: Each Party shall, with respect to its territory:

- (a) periodically prepare and make available reports on the state of the environment;
- and

Article 5,1: With the aim of achieving high levels of environmental protection and compliance with its environmental laws and regulations each Party shall effectively enforce its environmental laws and regulations through appropriate governmental action, such as:

- (g): requiring record keeping and reporting

Article 10,2: The Council may consider, and develop recommendations regarding:

- (c) approaches and common indicators for reporting on the state of the environment

SOER Types and Organization:

State of the environment reports can be organized in several different ways:

Issues framework

The issue framework involves selecting and reporting on environmental problems or controversies. The issues considered will change over time, and there is usually not an emphasis on developing statistical time series (VHB Research and Consulting Inc, 1989). Examples of the issues framework include Contaminants in Canadian Seabirds (Noble, 1990), Pollutants in British Columbia's Marine Environment (Kay, 1989), and Understanding Atmospheric Change (Hengeveld, 1991).

Environmental Media framework

The environment can be divided according to environmental media such as air, land, water and biotic resources. The downside of this type of state of the environment report is that it fails to convey the integrated nature of environmental components. (VHB Research and Consulting Inc., 1989). An example of environmental media framework is Preserving Our Lifeline: A Report on the State of the Bow River (Bow River Water Quality Council, 1994).

Resource Sector framework

This approach reports on the conditions and trends of natural resources, in particular, resource sectors such as forestry, agriculture, energy, etc. (Sheey, 1989). Examples of this kind of SOE report include the State of the Old Growth Forest (in progress) (Smith, pers. comm., 1994).

Jurisdictional or Administrative framework

Information is compiled and presented by geographic units based on jurisdictional boundaries such as provincial or local boundaries (Sheey, 1989). Examples include the State of the Environment Report for Canada (1991), State of the Environment Report for Saskatchewan (1991; 1992), and State of the Environment Report for Toronto (1993).

Background: Corporate Environmental Reporting

Background

Society is currently placing more emphasis on the importance of the environment and managing the environment in a more responsible manner. As environmental issues started to register on the public consciousness, it was to be expected that this would be reflected in companies' reporting practices (Gray, 1993a). The result has been the emergence of voluntary and experimental reporting since approximately 1988 and 1989. With environmental issues now a permanent fixture on business and political agendas there is increasing interest in, and demand for, companies in many countries to make public more information on their environmental performance, and specifically to produce an external environmental report. Corporate environmental reporting may become a routine part of world-wide organizational disclosure, which is, itself, reflected in the proposals for environmental reporting frameworks from groups as diverse as industry representative bodies, professional accountancy bodies and even the United Nations (Gray, 1993a). (See section on Voluntary Reporting Initiatives, p.37).

With the increased recognition of industry's role as a partner in sustainable development, there is rising public demand for fuller accountability by industry, which must display proof of responsible environmental stewardship. One way in which this is being achieved is through environmental reporting. The Canadian Chamber of Commerce defines an environmental report as "a comprehensive document itemizing environmental performance and the environmental protection activities of a firm. It is analogous to

industry-wide financial reporting practices but for environmental measures instead" (CCC, 1992).

Corporate environmental reporting has gained significant acceptance in Canada, the United States and Europe. Initial efforts involved corporations devoting a page or two in their annual financial reports to environmental issues. Considerable research has been conducted on environmental disclosures in annual financial reports (eg. Wiseman, 1982; Neu and Powrie, 1994). Some of this research focuses on social disclosure which includes, environmental performance as one aspect of social disclosure. Wiseman (1982) examined the quality and accuracy of disclosures made in corporate annual reports. Wiseman's study tested the relationship between disclosure contents and environmental performance from a sample of reports from the 1970's. The results indicated that corporate environmental disclosures are incomplete and are not related to actual performance. A more recent study (Neu and Powrie, 1994) examined the association between social performance and social disclosures in annual financial reports. The authors proposed that social disclosures were a form of "impression management" to efface poor social performance. In their study, social performance was measured by the presence and magnitude of environmental fines levied by federal and provincial governments. The results suggest that environmental disclosures in annual reports are a poor substitute for environmental performance. The conclusions of the study by Neu and Powrie suggest that poor environmental performers are more likely to be associated with high quality environmental disclosures and that such disclosures are used both to

minimize the probability of being discovered and to minimize the stigma associated with discovery. Similar conclusions are noted in other research such as Patten (1992) who notes that environmental disclosures of petroleum companies increased after the Exxon oil spill. Patten explains this increase as corporate reaction to the negative public response to the increased environmental concerns resulting from the 1989 Alaskan oil spill. Essentially he concludes that external events can and do affect disclosures.

More recently, however, a growing number of companies, mostly from high profile sectors, such as chemicals and natural resources, have begun to publish their first stand alone environmental annual reports (Elkington, 1993). Although some of these documents may in fact be used for PR management, it is not the focus of this research project to explore if good environmental reports correlate to good environmental performance. Environmental reporting continues to grow and is becoming an increasingly valuable aspect of an organization's environmental management system. This trend has resulted in many voluntary measures aimed at improving the quantity and quality of environmental information reported by companies (see section on Voluntary Reporting Initiatives, p.37).

Producing comprehensive, readable, balanced information on environmental performance is not an easy, straightforward exercise. Amongst those companies who do report on the environment, the practice varies from general statements of good intent, through to more precise objectives and performance information (Hundred Group of

Finance Directors, 1992). Nowhere does there appear to be a coherent and consistent framework for environmental reporting. For the time being, there exists no explicit obligation either in North America or in Europe for widescale public reporting on corporate environmental performance. Currently, the majority of examples of environmental reporting are the result of voluntary disclosure initiated by the reporting entity (Gray, 1993b). It should be noted that although there is no formal framework at present, there does appear to be a framework evolving in a number of CERs.

Regulatory Sources of Environmental Reporting and Disclosure

Some environmental disclosure and reporting requirements do exist as a result of environmental laws and regulations. Environmental laws, commercial and securities regulations impose significant environmental reporting and disclosure obligations (Brownwell, 1994).

United States

Media-specific laws - The U.S. Congress has enacted detailed legislation addressing each of the environmental media - air, water and waste. The U.S. Environmental Protection Agency has struggled with how to structure monitoring and reporting requirements (Brownwell, 1994). Monitoring and reporting requirements apply, however, to discharges under the Clean Air Act and the Clean Water Act in order to ensure compliance with standards.

Industry Specific Laws - Besides monitoring and reporting requirements that apply to specific waste streams, U.S. legislation imposes environmental reporting obligations on specific industries. For example, the Toxic Substances Control Act requires specific disclosures for new chemicals and significant new uses of existing chemicals.

Release Reporting and Emergency Planning - Over the past several decades, public concern with releases of hazardous substances has given rise to a variety of additional reporting and disclosure requirements, to address both routine and emergency releases of hazardous substances. The best known of these programs is the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Also, the U.S. Toxic Release Inventory (TRI) is an example of increasing regulatory requirements. Under the 1986 Emergency Planning and Community Right-to-Know Act, industry is required to develop annual emission data for over 300 chemicals (U.S. EPA, 1992).

Canada

Canadian Environmental Protection Act

The Canadian Environmental Protection Act (CEPA) consolidates in one statute the Canadian legislation addressing air, water, waste, and hazardous chemicals (CEPA, 1985). CEPA authorizes the federal government to establish national air quality objectives and emission standards, and to establish principles for water resource management. Implementation of the regulatory programs for the individual environmental media is the responsibility of the provinces, however. The result has been a more flexible and goal

oriented approach to environmental disclosure, involving negotiation between industry and government officials at provincial and local levels, and less standardized environmental monitoring and reporting requirements across the country (Brownwell, 1994).

U.S. Securities Regulation

In the U.S. there are regulatory requirements to pressure companies to address the whole issue of environmental reporting. These requirements generally stem from specific accounting requirements. The requirements set out by the Securities Exchange Commission (SEC), however, are very broad in scope compared with what is seen in some self-initiated CERs produced today and are not the driving force behind stand-alone environmental reports.

In the U.S. the Securities and Exchange Commission requires disclosures of environmental contingencies and liabilities (KPMG, 1993b). Companies with publicly-traded securities in the U.S. owe an initial and continuing obligation to disclose information that has a material effect on the financial condition of a company. This disclosure obligation is found initially in the general materiality standard of the Securities and Exchange Act. Under this standard, a company must furnish information about material legal proceedings arising under environmental laws, and about material effects that compliance with such regulations might have on capital expenditures, earnings or business operations. The basic purpose of the federal securities laws is to ensure that

companies disclose material information so that investors can make informed decisions (Murphy, 1993).

The Securities Exchange Commission (SEC) regulations also address three areas where discussion of environmental issues may be required in periodic reports:

1. In describing the company's business, the SEC requires disclosure of the costs of environmental compliance, to the extent that environmental laws may necessitate material capital expenditures, materially effect the earnings of the business or change the financial condition of the company.
2. The SEC requires disclosures of legal proceedings in which the company is involved
3. The SEC has required that, as part of management's discussion and analysis, in periodic corporate reports, management must include a narrative discussion of any material events or uncertainties that would cause reported information not to be indicative of future operating results of financial conditions.

Canadian Securities Regulations

At the present time, there are few specific requirements for entities to account for, or even disclose, measures that should be undertaken or planned for in respect of avoiding or reversing any negative impacts of the environment (past, present, future) arising from their operations (CICA, 1993b). Two exceptions in Canada exist:

Securities Regulations

The obligation to disclose environmental developments likely to have a material impact on the value of a company also applies in Canada. The requirements of the Ontario Securities Commission and the Regulations to the Quebec Securities Act require a company to report the effect of environmental protection requirements on capital expenditures. In addition, environmental risks or uncertainties or unusual or infrequent environmental events materially affecting income must be disclosed (CICA, 1993).

In terms of financial reporting, environmental disclosure as part of the corporate reporting cycle has not received the degree of regulatory and enforcement scrutiny as it has in the U.S. (Brownwell, 1994). The topic is, however, beginning to receive more attention. For example, the Canadian Institute of Chartered Accountants has produced a document on environmental reporting (CICA, 1993a).

Section 3060 Capital Assets: Future Removal and Site Restoration costs

The requirement in the CICA Handbook Section 3060 "Capital Assets" states that when reasonably determinable, provisions should be made for future removal and site restoration costs.

Similar to the requirements of the U.S. SEC, disclosure requirements are considerably limited in scope in comparison to some of the voluntary initiatives seen in many corporate environmental reports today.

Guidelines and Voluntary Codes of Conduct

Along with greater recognition of the public's "right to know", reflected in the growing number of regulatory mechanisms aimed at increasing corporate environmental disclosure and accountability, efforts by companies are also expanding to establish open, effective dialogue with the public on environmental issues. Within the current climate of voluntary initiatives, a number of companies have begun to produce free-standing environmental reports or to feature certain environmental information in their annual reports.

The general trend towards greater corporate environmental disclosure is reflected in the many new guidelines and initiatives relating to environmental reporting which have emerged. Voluntary initiatives are both in the form of general calls to report and specific recommendations.

General Call to Report

General calls to report on environmental performance include the following:

Agenda 21

Business and industry, including transnational corporations, should be encouraged to report annually on their environmental records, as well as on their use of energy and natural resources (United Nations, 1992).

International Chamber of Commerce (ICC)

The ICC calls for companies to measure environmental performance, to conduct regular environmental audits and assessments of compliance with company requirements, legal requirements and these principles, and periodically to provide appropriate information to the Board of Directors, shareholders, employees, the authorities and the public.

Chemical Manufacturer's Association (CMA) Responsible Care

The CMA states that companies should report promptly to officials, employees, customers and the public, information on chemical related health or environmental hazards and to recommend protective measures (Chemical Manufacturers Association, 1992).

Mining Association of Canada

The Mining Association of Canada recently produced a report that summarizes the progress of 13 mining companies who have made voluntary commitments to reduce their emissions to the environment through their participation in the accelerated reduction and elimination of toxics initiative. The report covers progress to reduce the discharges of 12 major substances (Mining Association of Canada, 1995).

Specific Reporting Recommendations

In addition to the general call to report, many new guidelines and initiatives relating to environmental reporting have emerged and the number of organizations offering guidance on content is also growing. Some of the specific reporting recommendations include the following:

Public Environmental Reporting Initiative (PERI)

PERI was established in 1993 by a group of nine international companies. PERI issued reporting guidelines to assist companies and other organizations in improving environmental reporting. PERI guidelines were developed by a number of companies from different industry sectors, with input from various stakeholders. The objective in issuing these guidelines is to provide a tool for organizations to produce a balanced perspective on their environmental policies, practices and performance (Cogan and Fenn, 1993).

Coalition for Environmentally Responsible Economies (CERES)

CERES was formed to promote environmentally responsible behaviour in the U.S. CERES developed a comprehensive corporate environmental reporting format to enhance reporting and help investors make informed decisions about which companies to invest in - those that demonstrate both good economic and environmental performance. The CERES principles call on signatory companies to complete a standardized annual report on their environmental performance (CERES, 1994).

European Chemical Industry Council (CEFIC)

In Europe, the new European Chemical Industry Council (CEFIC) sectoral environmental reporting guidelines, in the future are likely to be followed by the majority of chemical companies producing reports (European Chemical Industry Council, 1993).

Other Reporting Initiatives

Other guidelines developed by industry groups include national industry associations such as the Confederation of British Industry (CBI) have also produced guidelines for public disclosure on environmental information (Confederation of British Industry, no date). In addition, a "Statement of Good Practice For Environmental Reporting in Annual Reports" was produced by the Hundred Group of Finance directors which encourages companies to report on the environmental impact of operations and on their environmental policy and organization (Hundred Group of Finance Directors, 1992). Guidelines are also being developed by the UK-based Chartered Association of Certified Accountants (ACCA), which runs an annual environmental reporting award (Gray and Owen, 1993; 1994). A similar award scheme is run in Canada by the Financial Post (Billing and Scott, 1993). The Financial Post has encouraged comprehensive disclosure of information by presenting awards to companies whose annual reports epitomize excellence. The Financial Post in association with the CICA has taken the program a step further by adding a new category to recognize excellence in environmental reporting.

Four industry categories were judged: Mining; Oil and Gas; Paper and Forest Products; and Primary Manufacturing (Noakes, 1993).

It should be noted that many of these guidelines or codes emerged at the same time or after many companies had already produced self-initiated environmental reports. These initiatives, therefore, are not seen as the driving forces behind reporting. They are a reflection of what is happening with corporate environmental reporting but are not leading the efforts in reporting.

Corporate Initiative

The corporate response, along with the government and industry guidelines, has been that highly diversified voluntary environmental reports are emerging with varying levels of disclosure. With the many reporting guidelines and formats, the information reported by companies is still largely not standardized nor is it comparable. At present there is considerable experimentation taking place with respect to reporting styles and content (Jenkins, pers: comm., 1995).

For the present, however, there exists no explicit obligation, either in North America or in the European Union, for widescale public reporting on corporate environmental performance. In the longer term, environmental reporting may become a necessity - this is the idea behind the European Community's Eco-Management and Audit Scheme

(EMAS) for which reporting is a key requirement for registration. EMAS requires companies that participate in this voluntary scheme to make an environmental statement that can be independently validated (KPMG, 1993b; Chemical Week, 1993).

In spite of these efforts there continues to be considerable variability in the quality and quantity of environmental information disclosed by companies. Reporting remains essentially restricted to large firms and tends to be concentrated around specific industrial sectors (Spencer-Cooke, 1993). There are no standards for environmental reporting practices and report content can vary depending on a company's environmental strategies, audiences for environmental information and availability of information (Billing and Scott, 1993).

Driving Forces Behind Corporate Environmental Reporting

There are various forces driving higher levels of disclosure and improved knowledge and reporting of environmental issues. Some of the key reasons why a company should produce a CER include:

- Reporting demonstrates a broader industry commitment to the environment and sets the record straight by showing the progress companies are making.
- Reporting is symbolic of a general societal trend towards greater transparency, accountability and environmental awareness.

- Reporting is now seen as a vital tool in building trust and earning a continued licence to operate existing facilities and to set up new operations (Spencer-Cooke, 1993).
- Stakeholders have a right to information on how well the organization has met its environmental responsibilities.
- obtaining financing or insurance at a reasonable cost (Ernst and Young, 1994a),
- continue to compete effectively (Ernst and Young, 1994a),
- compliance with regulations (Deloitte and Touche, 1993),
- public pressure (Deloitte and Touche, 1993),
- environmental groups (Deloitte and Touche, 1993),
- help motivate organizations to improve performance (CICA, 1993b), and
- Due Diligence:

Environmental reporting becomes an important part of a corporate environmental management system with director liability for corporate environmental misdeeds and the magnitude of environmental penalties (Billing and Scott, 1993). Directors and officers should understand the organization's environmental issues and ensure the organization can demonstrate it has maintained an effective environmental management system. Director's and officer's defence against strict liability is demonstrating due diligence in overseeing the management process for environmental stewardship (Saxe, 1990). Reporting the assessment process and the organization's progress on its environmental initiatives is a positive step in demonstrating that an organization recognizes its duty of care and is willing to be accountable for its environmental performance. Such reports, while informative for management decision-making, also provide evidence of due

diligence, that is, that the firm has an environmental management system in place and is actively monitoring its environmental impact, and that its operations do comply with laws and bylaws and conform to its established environmental policies, principles and codes.

Barriers to Environmental Reporting

Some of the barriers to developing environmental reports include the following:

- cost
- fear of disclosure and prosecution
- image
- commitment to improving performance and continuous reporting

Criteria For State of The Environment Reports

The purpose of this section is to elucidate some of the characteristics of a good state of the environment report and to provide a discussion of them. The following tables (Tables 4 and 5) provide a list of the SOERs examined and some of their basic characteristics. This is followed by a discussion of the main criteria which were established by an examination of the SOERs. The criteria which were discussed include: environmental indicators; pressure-state-response framework; trend data; presentation of good news and bad news; humour and photos and the frequency of the reports.

Table 4: Characteristics of State of the Environment Reports

Title	Author/Source *	Date	Format	Length (pages)	Photos (yes/no)	Glossary	Index	Request for feedback (yes/no)
State of the Environment Report for Canada	Environment Canada	1986	8 ½ × 11	263 pp.	no	no	no	no
The State of Canada's Environment	Government of Canada	1991	8 ½ × 11	744 pp.	yes colour	yes	yes	no
State of the Environment Report for British Columbia	Province of British Columbia Ministry of Environment, Lands and Parks	1993	8 ½ × 11	127 pp.	no	yes	yes	no
Alberta's State of the Environment Comprehensive Report	Alberta Environmental Protection	1994	8 ½ × 11	119 pp.	no	yes	yes	yes
Saskatchewan State of the Environment Report	Saskatchewan Environment and Public Safety	1991	8 ½ × 11	74 pp.	no	no	no	yes
Saskatchewan's State of the Environment Report: The Need for Environmental Indicators	Saskatchewan Environment and Resource Management	1992	8 ½ × 11	34 pp.	no	no	no	yes
Saskatchewan's State of the Environment Report	Saskatchewan Environment and Resource Management	1995	8 ½ × 11	119 pp.	yes b/w	yes	no	no
State of the Environment Report for Manitoba	Manitoba Environment	1991	8 ½ × 11	191 pp.	yes b/w	no	yes	no
State of the Environment Report for Manitoba	Manitoba Environment	1993	8 ½ × 11	167 pp.	yes b/w	no	yes	no
Etat de l'Environnement au Quebec	Ministere de l'environnement	1992	8 ½ × 11	549 pp.	no	no	no	no

* See Appendix 2 for Addresses of Government Organizations

Title	Author/Source	Date	Format	Length	Photos	Glossary	Index	Request for Feedback
State of the Environment in the Atlantic Region	Environment Canada, Atlantic Region	1994	8 ½ × 11	457 pp.	no	yes	yes	no
The State of the Environment Report for Burnaby	City of Burnaby	1993	8 ½ × 11	63 pp.	no	no	no	no
Toronto's First State of the City Report	City of Toronto	1993	8 ½ × 11	94 pp.	yes b/w	no	no	yes
State of the Environment 1990	Regional Municipality of Hamilton-Wentworth, Planning and Development Department	1990	8 ½ × 11	130 pp.	no	no	no	no
State of the Environment Report: An Environmental Health Perspective	Regional Municipality of Ottawa-Carleton	1991	8 ½ × 11	204 pp.	no	no	no	no
State of the Environment Report	Regional Municipality of Waterloo	1986	8 ½ × 11	350 pp.	no	no	no	no
A State of the Environment Report: Canadian Perspectives on Air Pollution	Environment Canada and Atmospheric Environment Service	1990	8 ½ × 11	81 pp.	no	no	no	no
A State of the Environment Report: Contaminants in Canadian Seabirds	Environment Canada and Canadian Wildlife Service	1990	8 ½ × 11	75 pp.	yes b/w	no	no	no
A State of the Environment Report: State of the Environment for the Lower Fraser River Basin	Environment Canada and British Columbia Ministry of Environment, Lands and Parks	1992	8 ½ × 11	79 pp.	no	no	no	no

Title	Author/Source	Date	Format	Length	Photos	Glossary	Index	Request for Feedback
A State of the Environment Report: Pollutants in British Columbia's Marine Environment	Environment Canada	1989	8 ½ × 11	59 pp.	yes b/w	no	no	no
A State of the Environment Report: Understanding Atmospheric Change	Environment Canada	1991	8 ½ × 11	68 pp.	no	no	no	no
Preserving Our Lifeline: A Report on the State of the Bow River	Bow River Water Quality Council	1994	8 ½ × 11	99 pp.	yes b/w	yes	no	yes
State of the Environment in Australia 1986	Australian Government, Department of Arts, Heritage and Environment	1986	7 × 10	129 pp.	yes b/w	no	no	no
The State of the Environment in OECD Member Countries	Organization for Economic Cooperation and Development	1979	6 × 9 ½	177 pp.	yes b/w	no	no	no
State of the World	Lester R. Brown (Worldwatch Institute)	1993	7 × 9	268 pp.	no	no	yes	no
Mexico: National Report on Environment (1989-1991) Summary	Secretariat of Social Development	1992	8 ½ × 11	32 pp.	no	N/A	N/A	no
New South Wales State of the Environment: Highlights	Environmental Protection Authority New South Wales	1993	8 ½ × 11	20 pp.	no	N/A	N/A	no

Title	Author/Source	Date	Format	Length	Photos	Glossary	Index	Request for Feedback
The State of the Environment 1985	Organization for Economic Cooperation and Development	1985	8 ½ × 11	269 pp.	no	no	no	no
The State of the Environment	Organization for Economic Cooperation and Development	1991	8 ½ × 11	295 pp.	no	no	no	no
World Resources: A Guide to the Global Environment	World Resources Institute, United Nations Environment Programme and United Nations Development Programme	1992	8 ½ × 11	385 pp.	no	no	yes	no
The State of the Environment	United Nations Environment Programme	1986	7 × 10	83 pp.	no	no	no	no
Health of the Planet	Gallup International Institute	1992	8 ½ × 11	155 pp.	no	no	no	no

Table 5: Summary of SOER Characteristics

Summary of Report Characteristics (sample: 32 SOERs)	
Range of Pages	68-744
Range of pages in Provincial SOERs	74-549
Range of pages in Municipal SOERs	63-350
8 ½ × 11 format	28
Photos:	
• total	10
• colour	1
• black & white	9
Glossary	6
Index	8
Request for Feedback	5

Environmental Indicators

The literature on state of the environment reporting does not give much attention to indicators as a necessary criterion for environmental reporting. The aggregate of environmental indicators form state of the environment reports. Therefore they are a necessary consideration as a criterion for effective state of the environment reporting.

Environmental indicators are measures of specific aspects of the environment that are monitored to describe and interpret changes in the environment. Using indicators over time helps to identify trends in the health or state of the environment, and allows government, business, nongovernmental organizations and individuals to recognize environmental problems and act to correct them (Alberta Environmental Protection, 1994). As such, environmental indicators are a necessary prerequisite to state of the environment reporting. Environmental indicators are key statistics which represent or summarize some aspect of the state of the environment, natural resources assets and related human activities (Kerr, 1991). They are useful tools for translating and delivering concise, scientifically credible environmental information in a manner that can be readily understood by decision makers and the general public. They should focus on trends in environmental changes, stresses causing these changes, ecological and socio-economic effects and societal responses.

The importance of environmental indicators is recognized both nationally and internationally. The Organization for Economic Cooperation and Development (OECD) is heading an international effort to develop indicators that show the quality of the environment, stresses on the environment and ways to manage stress (OECD, 1993). In Canada, the federal government has established a National Environmental Indicators Project to produce a set of national indicators of environmental quality. In 1991, a federal Indicators Task Force published a preliminary list of national environmental indicators (Indicators Task Force, 1991). Federal work is continuing on the development of a series of broad environmental indices for Canada (Alberta Environmental Protection, 1994).

For the purposes of effectiveness and efficiency it is necessary that a systems approach be developed and used with respect to environmental indicators. A systems approach means that the linkages among elements in the environment must be considered and therefore linkages between indicators must be considered and reported together rather than separately. Environmental indicators form part of a larger system to manage environmental problems. For example, state of the environment reporting describes, analyzes and presents scientifically based information on environmental trends and their significance. SOE reporting, however, is only as useful as the information on which it is based. Therefore the measuring devices used to evaluate problems, their causes and the steps taken to overcome them are an equally important part of the system. When the focus on environmental problems is too narrow (focusing on one or a few specific indicators) there is a strong possibility that problems may only be moved around. That

is, the problem will not be solved but only moved from one medium to another (eg. from solid waste to air or to ground water). Golley (1993) shows that ecosystems are, "more than the sum of the parts", and therefore must be studied as separate "wholes" in order to be understood. That is, understanding all the parts will not give an adequate understanding of the whole system.

Uses of Environmental Indicators

Difficulties can arise for readers of SOERs with information overload and the nonscientist's ability to assimilate and interpret environmental information that is of a complex, scientific and technical nature (Kerr, 1991). Such problems can seriously limit the usefulness of science to policy makers, decision makers and managers and the public. As a result there is a need for more succinct, understandable, scientifically based environmental information that is useful to non-scientists, including policy makers and the general public (Kerr, 1991). Environmental indicators are an important tool for translating and delivering concise, scientifically credible information in a manner that can be readily understood and used by various audiences. Different users of environmental indicators have different needs. Therefore the appropriate set of indicators and the form, format and level of detail depends on their particular use.

Because indicators need to be viewed in a dynamic context, they are subject to revision in order to reflect the changing nature of policy perspectives and of public perceptions regarding the seriousness of different environmental problems (OECD, 1991). On a

broader level, environmental indicators can serve to inform the ongoing process of policy dialogue among countries and to lay the basis for international cooperation and agreements. As noted earlier (p. 25) environmental indicators and reporting are identified as needs in the NAFTA.

Some of the major uses of environmental indicators noted by the OECD (1993) include:

1. Measurement of environmental performance: Before action can be effective, reliable information is needed in order to assess where we are, where we want to be and how to get there.
2. Integration of environmental concerns in sector policies.
3. Integration of environmental and economic decision-making: The information available for decision-making should be quantitative and comprehensive, and should recognize social, economic and environmental linkages. With such information, researchers, policy-makers and the general public can more effectively monitor environmental conditions and trends, promote changes in behaviour to protect the environment, and observe progress toward environmentally sound development.
4. Reporting on the state of the environment: Environmental indicators provide the baseline data necessary for SOE reporting.

Environmental indicators are necessary in the context of state of the environment reporting in terms of the following:

- tracking critical environmental trends and providing information on the present state of a parameter in order to chart progress (Simpson-Lewis, 1994; OECD, 1991),
- measuring the success of policy and program responses (Simpson-Lewis, 1994),
- summarizing aspects of the state of environmental quality, natural resource assets and related human activities (Kerr, 1991),
- providing early warning of potential environmental problems and signifying our ability to manage and resolve these problems, and to monitor trends on the extent to which human activity is causing environmental stress (Simpson-Lewis, 1994; Indicators Task Force, 1991).
- Succinct and readily available information should help policy makers to incorporate environmental considerations into their decisions (Kerr, 1991; OECD, 1991). Broad indicators of environmental change can influence governments to adjust their policies, programs or legislation to address a given problem. The success of specific management responses should be evident in indicator trends (Simpson-Lewis, pers. comm., 1994).
- Environmental indicators help to summarize quantities of complex data and provide a snapshot of what is happening in the environment (Kerr, 1991).
- Widely accepted indicators at regional, national and international levels could provide a common basis for reaching better decisions (Kerr, 1991; Simpson-Lewis, 1994).
- By establishing targets against which to assess a program's success, environmental indicators can help to reinforce the need for international agreements (eg. dumping, fishing) (Simpson-Lewis, pers. comm., 1994).

- Indicators can help in the identification of data gaps which can impede SOE reporting. This can influence future developments and harmonization of monitoring systems (nationally and internationally), and the development of new monitoring systems to close data gaps and improve SOE reporting.

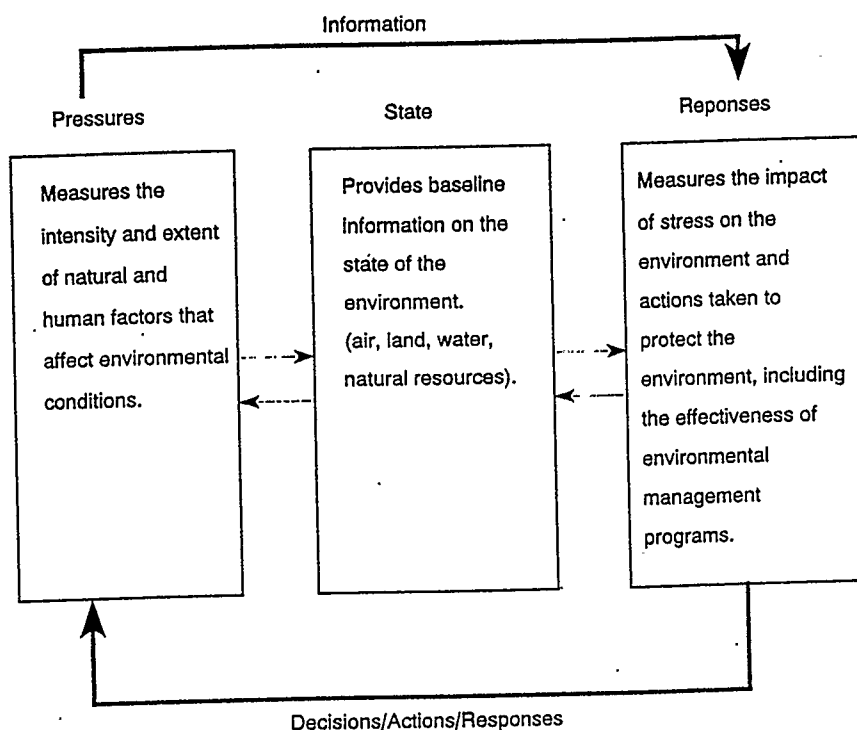
Pressure-State-Response Framework:

In developing indicators, and in turn in writing SOERs, governments should strive for indicators that demonstrate condition, stress, and response in the environment and those that measure the effectiveness of activities undertaken to protect the environment (Saskatchewan Environment and Resource Management, 1992). Many SOERs in Canada at the government level are said to be based on the pressure-state-response framework. However, the approach is not consistently and clearly used throughout the documents and many still focus mainly on the state of the environment and developing a baseline of information.

The Pressure-State-Response framework (PSR) used by the OECD (1993) is based on a concept of causality where human activities exert pressures on the environment and change its quality and quantity of natural resources. Societies respond to these changes through environmental, general economic and sectoral policies. These steps form part of an environmental policy cycle which includes problem perception, policy formulation, monitoring and policy evaluation. While this approach appears to be linear with respect to relationships in human activity-environment interactions, it should still be seen as

incorporating complex relationships in ecosystems and in environment-economy interactions.

The three types of indicators within the PSR framework are shown in Figure 1:



Source: Adapted from OECD, 1993.

Figure 1: Pressure-State-Response Framework

1. Indicators of environmental pressures (P)

Indicators of environmental pressures describe pressures from human activities exerted on the environment, including the quality and quantity of natural resources. Indicators of stress measure the intensity and extent of natural and human factors that affect

environmental conditions. Stress indicators include measurements of pollutant inputs into the environment or resources extracted from it. Such indicators may be drawn from economic information and social statistics in addition to physical and chemical data (Saskatchewan Environment and Resource Management, 1992).

2. Indicators of environmental conditions (State (S))

Indicators of environmental conditions relate to the quality of the environment and the quality and quantity of natural resources. They should be designed to give an overview of the situation (the state) of the environment and its development over time; and not the pressures on it.

3. Indicators of societal responses (R)

Indicators of societal response are measurements which show to what degree society is responding to environmental changes and concerns, including individual and collective actions to mitigate, adapt to or prevent human-induced negative impacts on the environment or to reverse environmental damage already done. This category of indicators includes those that assess the effectiveness of environmental management programs, those that measure behaviour patterns and trends related to environmental protection and other factors related to gauging human responses to existing environmental conditions. This also includes actions for preservation and conservation of environment and natural resources.

At present, many SOERs lack information and indicators on responses to environmental change. Management practices need to be continually reviewed to ensure they result in sustainable resource use and protection. In this respect SOE reporting using environmental indicators is very important.

Criteria for Indicator Selection

The selection of indicators will emerge at least in part from value judgements expressed in the environmental goals that guide the analysis. The indicators, however, still need to be grounded in science and remain understandable to the non-specialist. Environment Canada (Kerr, 1991) notes the following three environmental goals that guided the development of indicator criteria.

1. Assure viability of ecosystem: major concerns relate to fundamental changes in structure owing to environmental contamination, as well as a decline in biodiversity.
2. Assure the protection and enhancement of human health and well being: the focus is on pollution, especially toxic compounds and pathways from environment to human systems.
3. Assure the protection, maintenance and sustainability of natural resources: the focus is on management of resources. (For more details of indicator selection criteria see Appendix 1).

An exhaustive list of the criteria for indicator selection has not been developed and presented here. It is felt, however, that one of the key qualities of environmental indicators for the purpose of state of the environment reporting is that they be relevant, useful and understandable. The selection of environmental indicators should represent matters which require attention and action; and portray accurately what is happening in the state of the environment and assessing the significance of levels and rates of change (Indicator Task Force, 1991). They should be relevant to stated goals and objectives as well as to policies or issues of concern (Kerr, 1991). Similarly, they should be relevant to people's lives by relating to the things that people value or with which they can identify (Western Environmental and Social Trends, 1990). This may not be the case for SOERs which serve to establish a baseline for all aspects of environmental quality. There may be a conflict in reporting in terms of developing indicators and reports which establish a baseline versus indicators which focus on critical issues.

As well, it becomes clear that some indication of the relative importance of a specific impact is critical if indicators presented in the reports are to be used to set priorities and allocate funds. That is, if one specific source of impact is small relative to another source, the benefits from expenditure to reduce that specific source would be relatively small. As such, environmental indicators should have some form of "scaler" with them to understand the relative importance of the impacts (Thompson, 1993).

The indicator selection, and hence the information presented in SOERs, should involve greater consideration of the key environmental concerns in a jurisdiction (or medium) rather than trying to include everything, except for reports which are intended to establish a baseline of environmental information. As well the information should be put in visual formats wherever possible to provide easy access to the key information. Given the considerable length of most SOERs (see tables 4 and 5) these aspects can help to make more concise readable documents.

Indicators are tools for increasing our knowledge about environmental ecosystems. They monitor threats to the environment and track progress toward increased environmental protection. The information which indicators yield could help researchers, policy-makers and the general public make informed decisions to protect the environment and promote environmentally sound development. Wherever possible reports should present information by way of environmental indicators. When studied collectively, indicators can provide information about overall environmental conditions and trends. Indicators enable reporting on the health of the environment in an objective manner. Such reporting not only informs but also measures progress toward or away from a sustainable society and a healthy environment. Indicator development is an ongoing process of continuous improvement. There will always be more information and better communication and therefore indicator development will be undergoing a state of revision. This ongoing work to develop and use environmental indicators will make it possible for future state of the

environment reports to provide people with more complete and concise information about the health of their environment.

Need to Demonstrate Trends

Demonstrating trends in environmental changes is a very important criterion for effective SOERs. An environmental report must go beyond just identifying the current state of the environment in a snapshot. While the description or snapshot of the environment is an essential component in an environmental report, it is not sufficient on its own. Reports must also show trends either temporally or spatially. This is a necessary condition to determine how close the environment is to a desired state and whether it is moving toward or away from that baseline or prior state. This means it must tell the reader what is happening in a given environment, ecosystem, or environmental medium (air, land, water, etc) and how things are changing. The purpose of this is to inform the reader as to what is being done correctly and what is being done incorrectly in terms of managing the environment. Clearly presented trends should be especially useful for politicians, policy makers, decision-makers or managers in understanding where actions have been effective, where more work needs to be done and will help set priorities for the allocation of limited resources (Dixon Thompson, pers. comm, 1994). If there are parameters for which no data on trends are available, that is a very important finding in determining what new monitoring functions are needed. Trends can be shown both quantitatively through graphs and charts, or they can be designed qualitatively to show that a certain parameter is getting better, worse or remaining stable (eg. State of the Environment Report for Manitoba, 1991; 1993). As well, demonstrating trends provides a baseline which is necessary if the environmental indicators are to describe the state of the

environment either in terms of its current condition or of conditions likely to occur in the future.

Presentation of Good News and Bad News

As is noted later with corporate environmental reports (see section on Criteria for Corporate Environmental Reports, p.81), SOERs need to show both good and bad news aspects on environmental performance and the state of the environment. This is necessary both to increase accountability of governments and to achieve the SOE reporting goals of providing credible, accurate and reliable information to decision-makers. Some of the key differences between SOERs arise in relation to the relative emphasis given to commenting on current policies and programs as they affect the environment. Some jurisdictions stress the state of the environment itself, while others go into more detail on human activities that affect the environment and on efforts made to remedy environmental problems or to prevent them. At present much of the information is more resource-inventory based rather than focused on providing critical assessments on the state of the environment and the major areas for concern. Most reports appear to favour neutral or non-controversial issues. For example, most reports do not clearly or consistently provide information on such things as, where policies or programs are not working or highlighting the major problem areas so that attention can be given to them. Both good and bad news is necessary to establish credibility and to minimize environmental stress and related problems that impose severe costs on society. As well, engaging in anticipatory management and preventive action helps to orient the decision process toward resolving the most urgent environmental problems (NRTEE, 1993).

One of the few examples of a clear presentation of good news and bad news is seen in the SOER of Atlantic Canada (Eaton et al., 1994) which not only discusses the positive and negative information on the state of the environment, but also provides summary tables with this information (see Figure 2). This allows for quick access to the key information and findings of the report.

Forest Ecosystem Integrity	
Positive	Negative
Forest ecosystems are resilient and have the potential to recover, following fire or other human disturbances Sustainability concepts are beginning to be incorporated in provincial forestry policies and legislation. The importance of the ecological integrity of forests is recognized by the New National Forestry Act (1990) Several projects in the Region are attempting to integrate wildlife habitat and forest management. Protected areas, particularly national parks and ecological reserves, are preserving a portion of the biological diversity of our forests. Forest activities create suitable habitat for certain wildlife species.	The structure and diversity of the Region's forest ecosystems have been diminished as a result of human land-use. Forest harvesting and management affects almost all of the forested land in the Atlantic Region. The environmental impacts of forestry practices are cumulative. Populations of some forest wildlife species have been severely reduced as a result of loss and fragmentation of habitat. Forest practices, particularly stream crossings, may have an adverse effect on fish habitat. Only a few of the specifically identified forested sites have been set aside as ecological reserves. Long range transport of air pollutants continues to stress some forest ecosystems. The impact of anticipated global warming on the viability of native forests is unknown. Some pesticides used in forests management have a negative impact on ecological processes. The uncontrolled use of recreational off-road vehicles stresses some components of forest ecosystems.

Source: Eaton et al, 1994

Figure 2: Example of Good News and Bad News in an SOER

One of the more effective reports for successfully reporting a balanced perspective is the SOER put out by the Organization for Economic Cooperation and Development (OECD, 1985; 1991). This report explicitly states that it "examines the state of the environment itself concerning air, inland waters, the marine environment, land, forest and wildlife resources as well as solid waste and noise (Part I). The state of the environment is shaped by the pressure on the environment from human activities such as agriculture, industry and transport activities (Part II), and the curative and preventative responses from the public, enterprises and government to these pressures (Part III)".

One of the reasons that many government SOERs are limited in their presentation of poor performance may be due to the difficulty of a government department (eg. Environment Canada) essentially reporting on the success or failure of its own departmental activity, let alone another department under another Minister. This conservative approach to reporting which is seen in many SOERs tends to be more inventory-related than performance oriented. Elkin (1990) questions whether the broader view of environmental reporting by the OECD, which focuses not only on environmental conditions and trends but also assesses government response and pinpointing more effective methods of management, may reflect the role of the OECD as a non-government organization.

However, with respect to full disclosure in government SOERs it is important to note that in recent years environmental regulators have steadily increased the scope of liability for

environmental problems to include landlords, officers and directors, and even creditors. In fact it is one of the basic principles of the Canadian Environmental Protection Act that liability follows control (Saxe, 1993). However, this has created a paradox, since a government Ministry itself often has as much or more control over an environmental problem as those it is pursuing. If liability follows control for the private sector and for municipalities, so may liability follow control for government ministries. In a recent case, *R. v. Karsz*, a Ministry was sued on the grounds that the pollution would not have occurred if the Ministry had adequately exercised its regulatory power (Saxe, 1994). Such cases may make it easier to sue ministries which have failed to use their statutory power effectively to manage pollution of which they are aware. As such, disclosing the good and the bad information and reporting on action to remediate problems in state of the environment reports will be valuable in terms of not only identifying problems and coming up with corrective action, but disclosing the negative information may be helpful in demonstrating a due diligence defence and being seen to be doing a reasonable job by showing that an environmental management system is in place.

For government agencies producing state of the environment reports, the objectivity of the information disclosed could be enhanced by some of the following:

- Report objectively on issues that are controversial and subject to debate,
- Acknowledge mistakes made in the past and report on past actions taken to prevent environmental harm (Gardner, 1994),

- Relate existing policies and programs to their effect on environmental issues,
- Highlight the weaknesses and strengths of the current environmental management system, including the effectiveness of institutions and decision systems, laws, and legislation (Gardner, 1994),
- Provide information on existing policies, programs, and activities and their effects and how successful or unsuccessful they have been. It is important to know where our efforts and policies have worked and where changes and improvements are needed (Rolfe, pers. comm., 1994).
- Present more information in the reports on government agencies and the policies and programs for which they are responsible (Gardner, 1994),
- Present mechanisms and criteria for evaluating measures taken to address environmental concerns (Gardner, 1994),
- Note where data gaps exist and where lack of knowledge, missing information, and indicator gaps are a problem in making evaluations. Missing data or indicator gaps is an important policy issue (Gardner, 1994),
- SOE reports should contribute to the monitoring and assessment capabilities by reporting on what is being monitored and by identifying where further important aspects of the SOE should be monitored. Additionally, the reports should comment on the strengths and weaknesses of current monitoring programs (Gardner, 1994),
- Finally, disclose the policy on environmental disclosures in terms of whether what is reported is guided by terms of reference set for the reporting agency (Thompson, pers. comm, 1995).

Frequency of Environmental Reporting

There is a broad understanding that the development and use of state of the environment reports and environmental performance indicators is a continuous process that must show trends and not an intermittent or ad hoc one. This wide acceptance is confirmed by the OECD (1993) and the Canadian Environmental Protection Act (1988) which are both committed to regular reporting. There does not, however, seem to be any agreement on how often that ongoing process should be to publish SOERs. It is critical that SOERs are not simply one-off exercises (Jacob, 1992). Many of the SOERs are produced every five years. It will probably be necessary to produce reports more than every five years because major changes to the environment can happen in five years and even profound natural changes can occur in two years (Beamish, pers. comm. 1995). If one of the objectives of SOE reporting is to contribute to the preservation and protection of environmental quality and the quality of life by making informed decisions about the environment in order to properly manage it, then current information is necessary. A snapshot of environmental conditions will quickly become out of date because the state of scientific knowledge can change in that time period (Rolfe, pers. comm., 1995). If the SOER process can provide managers and decision makers with important information at critical intervals, the formal and expensive process need not be annual or biennial. But less frequent reporting on environmental performance and environmental indicators (3 or more years) may be too long between reports to give decision-makers and the public the sense of accomplishment where progress is being

made, or a sense of urgency where conditions are worsening. As well, if the information is outdated, then it is of limited use to decision makers. Continuous and frequent updating of the information is essential for the formulation of sound environmental policies, management and planning (Jacob, 1992). Only through continued monitoring and evaluation of environmental indicators over a period of time can the success or failure of environmental policies be determined. As well, if the SOERs are produced regularly, the information can be used as a form of feedback on actions taken to better understand and evaluate the effectiveness of our efforts and publicly funded interventions and to make informed choices about where to put limited resources. Periodic newsletters or report cards could be used as a partial solution to the problem. Alternatively, the SOE reporting process should move toward electronic data bases. The state of the environment report generally summarizes issues but an electronic data base would allow not only for access to more detailed information but it will also allow for continuous updating of the data. If the reporting process is an ongoing system from which specific information can be obtained rather than producing a periodic and expensive publication. CD Rom or disks will be cheaper to produce.

Lighten Up

SOE reports, because they contain scientific and technical information, must somehow be made accessible to the general reader. The nature of these reports requires that they be lengthy, and contain a large amount of detailed information. This information is often technical, consisting of charts, graphs, statistics and a substantial amount of explanatory text. Even if readers are familiar with this form of scientific data, they may be overwhelmed by the amount of information, thus finding the report daunting and difficult to use. The reader may get the impression that the report is dry and boring. Consequently, it is in the best interest of the issuing agency to attempt to make the report more accessible. Also, one of the noted uses of a state of the environment report is in schools and educational contexts. The extreme dryness and terseness detracts from the usefulness of these materials for students. A lighter presentation in some places from time to time would enhance the feasibility of these goals. There are several ways that this can be achieved, one of which is humour.

Humour

There are benefits and problems with the use of humour in SOE reports. The advantage in readability and accessibility which humour provides is obvious, but a more profound benefit is gained because humour is the primary method by which the tensions related to sensitive subjects are eased. Also the presence of humour makes it more accommodating to the needs of students. However, care must be taken in the style of

humour chosen. Particularly in these politically correct times, certain types of humour will be seen to be offensive by some people. Additionally, as a result of individual differences in sense of humour some material may be seen to be offensive and inappropriate, or just not funny. Therefore, humour that directly or indirectly deals with questions such as race, religion and gender must be avoided. Such things may offend people and can detract from the message. Introducing humour in places to solve the boring problem sounds good but may be difficult to achieve.

The various issues involved can be illustrated by specific examples. A good example of environmental humour is figure 3. The main thing accomplished by this cartoon is that by role reversal it establishes a sympathy with the plight of wildlife in an increasingly polluted environment. In general, anthropomorphization, aside from being a major source of humour, points to a care and understanding for the state of the environment and the consequences human action may have on the biosphere. Also there are many insightful cartoons which encapsulate the basic issues and problems involved in the state of the environment. An effective use of these cartoons can be made to present these issues in a simple, direct and accessible way which does not require any kind of comment.

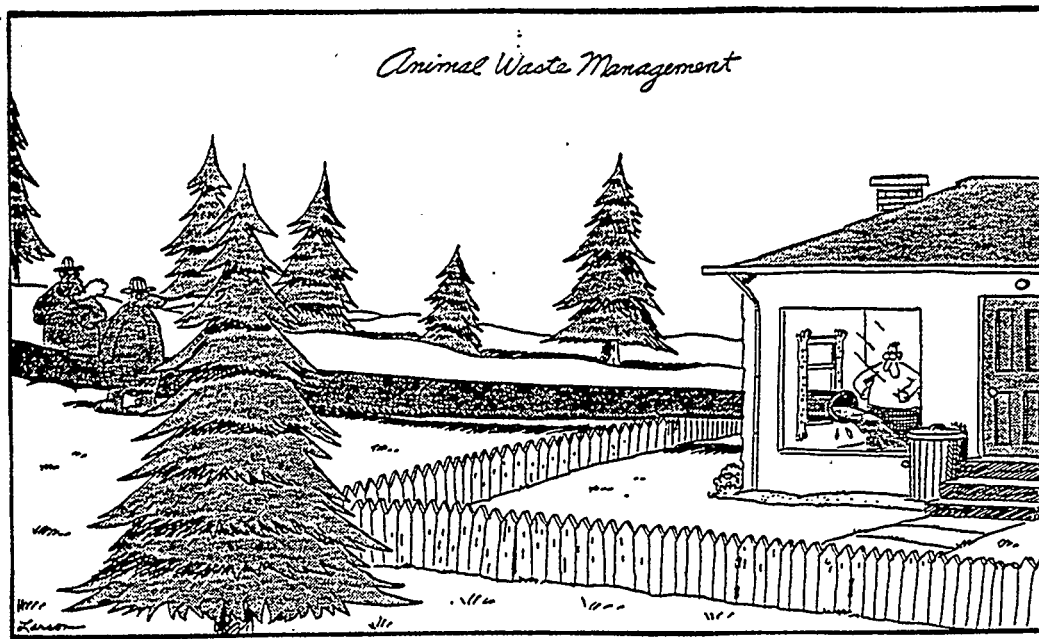


Figure 3: Example of Good Humour

(Source: Larson, 1989)

Government policies often deal with complex and sensitive issues, such issues are often not fully understood and certain policies may have only limited success. Rather than direct comment on these policies, humour can provide an alternate way to cope with the discussion of ineffective policies and unresolved issues. This is particularly effective if used in conjunction with a description of the positive steps being taken with respect to these issues (see Figure 4).

Sea dumping of wastes

The Commonwealth *Environment Protection (Sea Dumping) Act* 1981 was proclaimed by the Governor-General and came into operation in March 1984. The Act provides for protection of the marine environment by regulating dumping into the sea, loading for the purpose of dumping and incineration at sea of wastes and other matter.

The Act gives effect to the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, known as the London Dumping Convention (LDC). The legislation applies to any vessels, aircraft and platforms in Australian waters and to Australian vessels anywhere. There are significant penalties for non-compliance.

The LDC has been signed by some sixty countries and came into force internationally in 1975. It was ratified by Australia in 1985. The Convention is

aimed at preventing pollution of the sea, particularly through the regulation and control of dumping activities.

Under the LDC, materials are divided into three categories, those for which dumping at sea is prohibited, those that may be dumped under special conditions subject to rigorous controls and those that may be dumped subject to normal care and precautions. Information on permits issued and on dumping operations is provided by Member Countries to the LDC Secretariat.

An amendment to the Sea Dumping Act, prohibiting dumping of radioactive waste at sea, was given Royal assent in December 1986, thus giving effect to the provisions of the *South Pacific Nuclear Free Zone Treaty* and the *Convention for the Protection and Development of the Natural Resources and Environment of the South Pacific Region*.

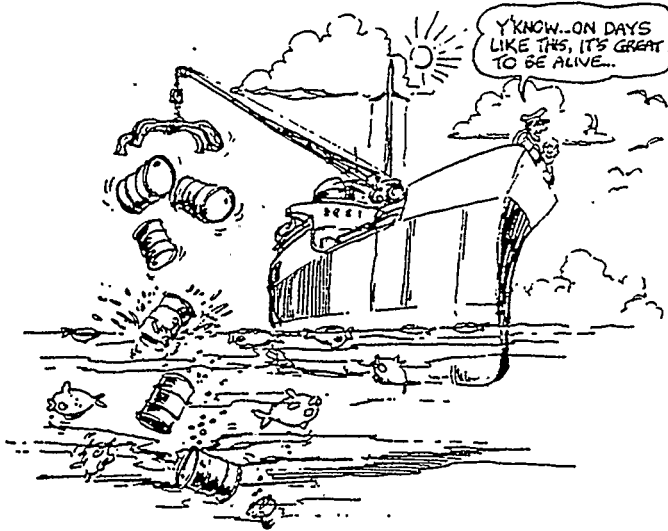


Figure 4: Example of Humour

(Source: Department of Arts, Heritage and Environment, 1986)

Another example of good humour is the following cartoon (Figure 5):

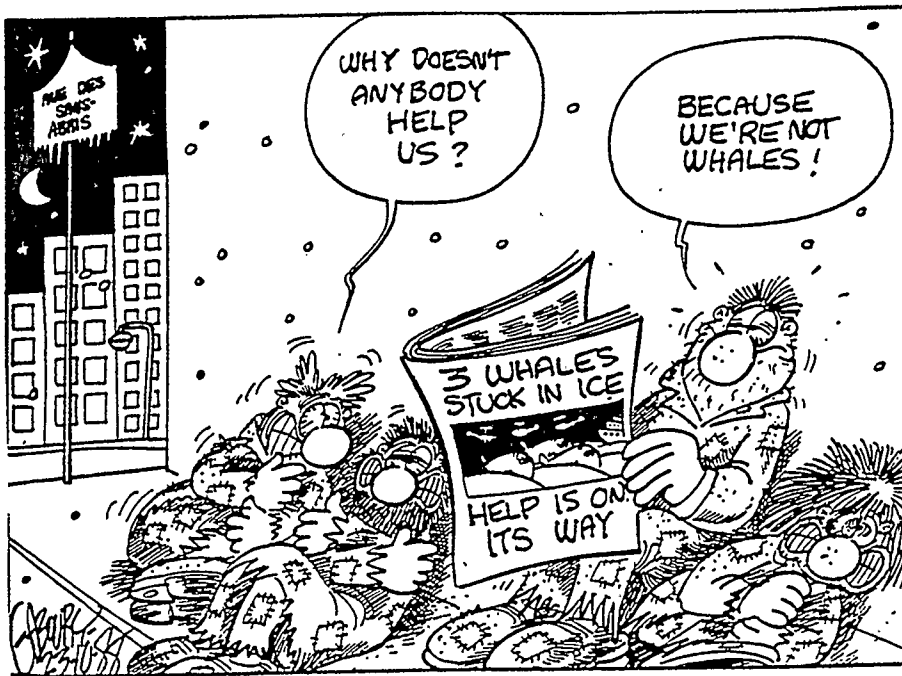


Figure 5: Example of Humour

(Source: Badeaux, 1989)

The potential value of this cartoon is that it is illustrative of our frequently inappropriate emphasis on a problem. The public or media's perception of problems may not always be based on sound science. The result is that often we allocate too many resources (time, money, knowledge etc.) to problems which are non-problems in scientific terms relative to other issues.

Certain cartoons or styles of humour may be damaging to and detract from the message. Aside from the issue of political correctness, and the question of offence,

humour may be just negative or mocking. A primary example is figure 6. In the first place, religious content in general is to be avoided, although in this cartoon that aspect may not be particularly offensive. The major objection to this cartoon is the negativity and pessimism of its outlook. It supports a bleak view of the state of the environment and presents no hope for the future. Also, the picture is unattractive due to its dark shading and overall black impression.



Figure 6: Example of Inappropriate Humour

(Source: Badeaux, 1990)

The value of humour, in the form of a cartoon or caricature, should not be overlooked in state of the environment reports. One of their main advantages is their directness and simplicity, which does not allow for fine degrees of criticism or the opportunity to dilute

its message. Not only can cartoons be humorous and thus memorable, but they can also summarize the message concisely and get the point across in a different, perhaps even dramatic, way. A cartoon can serve the purpose of making a problem or issue tangible. A cartoon's visual nature as well as its humorous qualities give it added effectiveness. The use of cartoons or humour may go a long way in helping the reader to retain some key issues and grasp a quick understanding of the problems in state of the environment reports. While it may take some courage and careful thought before humour can be introduced and used effectively, the examples used should not be aimed at the lowest common denominator in terms of the humour so as not to offend, because the result will be that it is no longer funny.

Photos

A lighter presentation may also be achieved through the use of photos or drawings. A common feature of state of the environment reports is the omission of photos or pictures, with a few notable exceptions, such as the SOERs for Manitoba (1991, 1993) (see Tables 4 and 5). Pictures can enhance the look and accessibility of the report. Pictures are just as powerful a communicator of information as graphs, charts or texts. The choice of pictures should be made with this goal in mind. For example, when talking about fish population, pictures of the main species involved should be provided (for example, State of the Environment Report for Manitoba, 1991). They should be relevant to the matter at hand and most importantly should be identified with as much precision

as possible. Generic or gratuitous photos, such as those in The State of Canada's Environment (1991), of plant life or wildlife should be avoided in preference for pictures of relevant species, key environmental areas or photos that contribute to the meaning of the discussion. In addition, the caption can provide extra information. Trends can be indicated by using several pictures in combination such as historical and modern photos of the same site, or pictures of similar habitats (environments) which have been subjected to different policies, for example, see figure 7. This is a rare example where this can be accomplished by one picture. Using photos to illustrate trends or differences in management practices or policies should be used wherever possible.

Fitzroy Valley area, Western Australia: natural regeneration of trees and plants in an area protected from cattle grazing (left) compared with growth in an unprotected area (right) (David Wilcox)



Source: Department of Arts, Heritage and Environment, 1986

Figure 7: Example of Effective Use of Photos

Criteria for Corporate Environmental Reports

The purpose of this section is to provide an analysis and discussion of the criteria that contribute to the evaluation of a corporate environmental report.

The contents of corporate environmental reports have been analyzed to determine how well they demonstrate three aspects and what criteria are necessary within those categories. The three basic categories include:

1. A commitment to environmental management
2. Demonstrated environmental performance
3. Credibility

The reports were rated to see how well they met the developed criteria and to examine the best examples in order to provide a discussion of those criteria. What follows are the criteria used to rate the reports, the tables of data and an explanation of these three categories and the elements that are reported within them.

Table 6: Criteria Used to Rate CERs

The scoring used to rate the CERs is roughly as follows:

0: The criterion is absent

1: The criterion is present but is only briefly mentioned

2: The criterion is present and a sufficient and insightful discussion is provided.

Commitment

Management Commitment:

0: No mention

1: Letter/message signed by VP Environment or Board Member

2: Clear and candid letter/message signed by the CEO and/or President

Environmental Policy:

0: No mention

1: General statement of policy (i.e. we commit to...) but no principles.

2: Comprehensive policy and principles (dated)

Environmental Management System:

0: No mention

1: Some mention of EMS and components but no discussion of how the environmental department fits in with the management structure

2: Discussion of management structure and responsibilities for the environment, as well as education and training, emergency response planning, and risk assessment.

Objectives and Targets:

0: No mention

1: A few targets which are not dated

2: Many targets provided including plans to achieve them, baselines and target dates included, and updates on status of previously stated targets

Environmental Audits:

0: No mention

1: Mention of commitment to do environmental audits.

2: Mentions commitment to environmental audits as well as the numbers of facilities audited, general results of actions needed based on audit findings, or a description of follow-up process.

Table 6 (Continued)

Community Relations:

0: No mention

1: Brief mention of commitment to community relations with a few details only.

2: A detailed section which includes: initiatives, funding, open houses, etc.

Performance

Quantified Data:

0: 0-1 EPIs and Trends

1: 2-3 EPIs and trends; or some statistical data.

2: 4 or more EPIs with trends and statistical data (comprehensive and appropriate data)

Worker Health and Safety Data:

0: No mention

1: Discussion only of health and safety information

2: Discussion of H&S with data on lost time, injuries, deaths

Research and Development:

0: No mention

1: Mention of commitment to R&D only

2: Provision of specific examples of initiatives or activities in R&D

Waste minimization initiatives and results:

0: No mention

1: A few examples only

2: Many examples indicating specific initiatives and results

Other Environmental Initiatives and Results:

0: None

1: A few selected stories or examples

2: Many stories and examples throughout the report

Credibility

Overall Presentation:

0: Unnecessarily long (≥ 60 pages) or short (≤ 10 pages), writing style is too technical

1: Not dated on cover, reasonable length and writing style

2: Dated, reasonable length (16-25 pages), format ($8 \frac{1}{2} \times 11$), recycled paper, understandable

Table 6 (Continued)

Not Public Relations-Driven:

0: Many irrelevant photos and use of colour

1: A few photos

2: No or almost no use of photos. *

* Because no examples of CERs were observed that used photos to convey information, enhance the text, show trends or ease the readability of the documents, the reports with no photos were rated the highest. If reports had been observed that used photos effectively and meaningfully, then the criteria and the rating may have been different. Photos of this nature are recommended in future reports.

Good news / bad news:

0: Primarily stories of success and self-congratulation

1: A few carefully worded disclosures which appear to be selective

2: A well balanced approach which indicates the need for improvements, discusses core impacts, and significance of what is being reported

Feedback:

0: No mention of feedback

1: An invitation to comment (eg. in CEO letter) with address and phone number

2: Prepaid pull-out comment card, preferably large enough to give comments

Fines, citations, permit exceedances, accidents, or spills

0: No mention

1: A few carefully worded fines or accidents imbedded in the text

2: Reported fines etc., comprehensive description of fines, open approach

Environmental Issues Defined:

0: No explanation of key issues

1: A brief attempt to explain issues but it is inconsistent

2: A Comprehensive description of issues in all areas discussed.

	Abitibi-Price	Amoco	Ashland Oil	AT&T	Baxter Healthcare	Bayer	Bell Canada	B.C. Hydro	Body Shop	Bristol-Myers Squibb	British Airways	British Gas	British Petroleum
Commitment													
Management Commitment and Foreword	2	1	0	0	0	2	2	2	1	2	0	2	0
Environmental Policy Statement	2	2	0	0	2	2	2	0	1	2	2	2	2
Environmental Management System (EMS)	2	2	1	0	2	1	0	1	1	2	1	1	0
Objectives and Targets	0	0	0	1	2	0	0	0	2	1	1	1	2
Environmental Audits	1	2	0	2	2	0	0	1	2	1	2	2	1
Community Relations	0	1	0	0	2	2	0	0	1	0	0	1	0
Total	7	8	1	3	10	7	4	4	8	3	5	9	5
Performance													
Quantified Data: EPIs, Trends, Statistics	1	1	0	1	2	2	0	0	0	2	2	1	2
Worker Health and Safety	0	2	0	2	0	0	0	0	0	2	0	0	2
Research & Development	2	0	0	2	0	1	0	2	2	2	1	2	0
Discussion of results of waste management	0	1	0	2	2	2	2	2	1	2	2	0	0
Discussion of initiatives to improve performance	0	0	1	2	2	2	1	1	1	2	2	1	1
Total	3	4	1	9	6	7	3	5	4	10	7	4	5
Credibility													
Overall Presentation	1	1	1	2	2	1	1	2	0	2	1	2	1
Not Public Relations Oriented	1	2	0	1	2	2	0	1	1	2	2	2	1
Good News/Bad News	1	1	0	1	2	1	0	1	1	2	1	2	1
Feedback Request	2	2	0	1	2	0	0	0	0	2	0	1	1
Fines, Spills, Exceedances, Accidents Reported	2	2	0	2	2	0	0	1	0	2	0	2	1
Issues Defined	0	0	0	0	0	1	0	0	1	0	1	0	0
Total	7	8	1	7	10	5	1	5	3	10	5	9	5
Overall Score (Highest possible score: 34)	17	20	3	19	26	19	8	14	15	28	18	22	15

Total Sample: 56

Table 7: Analysis of Corporate Environmental Reports

	BT	BFI	Canadian Oxy	Canfor	Celanese	Ciba	Dofasco	Dow Canada	Duke Power	DuPont	E.B. Eddy	Eastman Kodak	Glaxo
Commitment													
Management Commitment and Foreword	1	2	0	2	1	2	0	2	1	1	2	2	2
Environmental Policy Statement	2	2	0	2	0	0	2	1	0	2	0	2	2
Environmental Management System (EMS)	2	2	1	0	0	1	1	1	1	1	1	1	1
Objectives and Targets	2	0	2	1	1	0	1	0	1	2	2	0	0
Environmental Audits	0	2	2	1	0	2	1	0	0	2	1	0	0
Community Relations	1	2	1	0	1	0	0	2	0	1	1	0	0
Total	8	10	6	6	3	5	5	6	3	9	7	5	5
Performance													
Quantified Data: EPIs, Trends, Statistics	1	0	0	1	1	2	2	2	1	2	2	1	0
Worker Health and Safety	0	1	2	0	0	2	2	0	0	2	0	0	0
Research & Development	0	0	0	0	0	0	0	0	0	0	2	2	0
Discussion of results of waste management	2	2	1	1	1	1	2	2	1	1	1	0	1
Discussion of initiatives to improve performance	2	1	1	2	0	2	2	2	1	1	1	2	0
Total	5	4	4	4	2	7	8	6	3	6	6	5	1
Credibility													
Overall Presentation	2	1	1	2	2	1	2	2	1	2	2	2	1
Not Public Relations Oriented	2	1	2	1	1	2	1	1	1	2	2	1	0
Good News/Bad News	2	1	2	1	1	2	1	1	0	2	2	0	0
Feedback Request	2	1	0	2	2	2	0	2	2	2	2	2	0
Fines, Exceedances, Spills, Accidents Reported	2	2	1	1	1	1	0	0	0	2	2	0	0
Issues Defined	0	0	0	0	2	0	0	1	0	0	1	0	0
Total	10	6	6	7	9	8	4	7	4	10	11	5	1
Overall Score (highest possible score: 34)	23	20	16	17	14	20	17	18	10	25	24	15	7

Table 7 (Continued)

	Henkel	ICI	Imperial Oil	Johnson & Johnson	Lever	MacMillan Bloedel	Merck	Monstanto	National Westminster Bank	Noranda Forest	Noranda Minerals	Norsk Hydro	Northern Telecom
Commitment													
Management Commitment and Foreward	2	2	2	0	2	2	2	2	1	2	2	1	1
Environmental Policy Statement	0	2	2	2	2	2	2	2	2	2	2	2	0
Environmental Management System (EMS)	0	0	1	1	0	1	2	1	2	1	2	0	2
Objectives and Targets	0	0	0	0	2	0	1	2	2	0	1	0	0
Environmental Audits	0	0	0	0	0	2	1	0	2	1	1	1	0
Community Relations	0	0	2	0	0	0	2	0	0	0	0	0	1
Total	2	4	7	3	6	7	10	7	9	6	8	4	4
Performance													
Quantified Data: EPIs, Trends, Statistics	2	2	0	1	1	2	0	2	0	2	2	1	0
Worker Health and Safety	0	0	2	0	0	0	1	1	0	1	2	2	0
Research & Development	2	0	0	0	0	2	1	0	0	2	1	1	1
Discussion of results of waste management	2	1	1	0	2	1	2	0	0	2	0	0	2
Discussion of initiatives to improve performance	0	2	1	2	2	1	1	1	2	1	1	1	1
Total	6	5	4	3	5	6	5	4	2	8	6	5	4
Credibility													
Overall Presentation	1	2	1	1	2	2	2	2	2	2	2	1	2
Not Public Relations Oriented	1	1	1	0	2	2	2	1	2	2	2	1	2
Good News/Bad News	1	1	0	0	1	1	1	0	2	2	2	1	1
Feedback Request	0	1	2	0	2	2	0	2	2	2	0	0	0
Fines, Exceedances, Spills, Accidents	0	1	0	0	0	0	0	0	0	1	2	1	0
Issues Defined	0	0	1	0	1	0	0	0	0	2	2	0	0
Total	3	6	5	1	8	7	5	5	8	11	10	4	5
Overall Score (highest possible score: 34)	11	15	16	7	19	20	20	16	19	25	24	13	13

Table 7 (Continued)

	Ontario Hydro	Petro-Canada	Polaroid	Procter & Gamble	Rhom & Haas	S.C. Johnson Wax	Shell	Southern Company	Sunoco	SwissAir	Tembec	Thorn EMI	Toyota
Commitment													
Management Commitment and Foreword	1	0	2	0	2	2	2	2	2	0	2	1	0
Environmental Policy Statement	2	2	2	2	2	0	2	2	2	0	2	2	2
Environmental Management System (EMS)	2	1	2	1	0	0	2	0	0	0	0	1	1
Objectives and Targets	0	0	0	1	0	1	2	0	0	0	0	2	0
Environmental Audits	2	1	1	0	0	0	1	1	0	1	0	0	0
Community Relations	0	0	0	0	0	0	2	1	1	0	0	0	0
Total	7	4	7	4	4	3	11	6	5	1	4	4	3
Performance													
Quantified Data: EPIs, Trends, Statistics	2	0	2	0	0	1	1	0	1	2	0	0	1
Worker Health and Safety	0	0	1	0	0	0	2	0	2	0	0	0	0
Research & Development	2	0	0	0	0	0	0	1	0	0	0	0	2
Discussion of results of waste management	2	0	1	2	2	1	2	1	1	2	0	2	2
Discussion of initiatives to improve performance	2	1	1	0	1	0	2	1	1	1	1	1	1
Total	8	1	5	2	3	2	7	3	5	5	1	3	6
Credibility													
Overall Presentation	1	0	2	1	1	1	2	2	2	2	1	2	1
Not Public Relations Oriented	2	0	1	0	0	0	2	1	1	2	1	2	0
Good News/Bad News	2	0	1	0	0	1	2	2	2	1	1	2	0
Feedback Request	0	2	0	0	0	0	2	2	2	0	0	2	0
Fines, Exceedances, Spills, Accidents	2	0	0	0	0	0	2	1	2	0	0	0	0
Issues Defined	0	0	0	0	0	0	2	0	0	1	0	0	1
Total	7	2	4	1	1	2	12	8	9	6	3	8	2
Overall Score (highest possible score: 34)	22	7	16	7	8	5	30	17	19	12	8	15	11

Table 7 (Continued)

	Union Carbide	Volkswagen	Volvo	WMX		Total with score of 2	Total with score of 1	Total with score of 0
Commitment						2	1	0
Management Commitment and Foreword	2	0	2	2		32	11	13
Environmental Policy Statement	0	0	2	1		39	3	14
Environmental Management System (EMS)	1	0	2	1		14	26	16
Objectives and Targets	1	0	0	1		12	14	30
Environmental Audits	1	0	1	2		14	18	24
Community Relations	0	0	0	0		7	11	38
Total	5	0	7	7				
Performance								
Quantified Data: EPIs, Trends, Statistics	2	0	0	2		21	16	19
Worker Health and Safety	2	0	0	1		14	6	36
Research & Development	1	2	2	2		16	8	32
Discussion of results of waste management	0	2	1	2		25	18	13
Discussion of initiatives to improve performance	0	1	1	2		18	30	8
Total	5	5	4	9				
Credibility								
Overall Presentation	2	1	1	1		29	25	2
Not Public Relations Oriented	2	0	1	2		24	22	10
Good News/Bad News	1	0	0	1		16	26	14
Feedback Request	2	0	0	2		26	5	25
Fines, Exceedances, Spills, Accidents	1	0	0	0		14	11	31
Issues Defined	0	0	0	0		4	9	43
Total	8	1	2	6				
Overall Score (highest possible score: 34)	18	6	13	22				

Table 7 (Continued)

Table 8: Corporate Environmental Reports Characteristics

Title	Author/Source *	Date	Format	Length (pages)	Photos (Yes/No)	Comment Card (Yes/No)
An Environmental Progress Report	Abitibi-Price	no date	8 ½ × 11	31 pp.	yes colour	yes
Environment Health & Safety Report	Amoco Corporation	1993	8 ½ × 11	17 pp.	yes colour	yes
Environmental Compliance	Ashland Oil Inc.	no date	8 ½ × 11	8 pp.	yes colour	no
Environment & Safety Report	AT & T	1993	8 ½ × 11	28 pp.	yes b/w	no
Baxter Environmental Performance Report	Baxter Healthcare	1992	8 ½ × 11	29 pp.	no	yes
Environmental Report	Bayer AG	1993	8 ½ × 11	67 pp.	yes colour	no
The State of the Environment at Bell Canada	Bell Canada	1993	11 × 8 ½	14 pp.	yes b/w	no
B.C. Hydro Report on the Environment	B.C. Hydro	1993	8 ½ × 11	32 pp.	yes b/w	no
The Green Book	The Body Shop	1992	8 ½ × 11	49 pp.	no	no
Report on Environmental Progress	Bristol-Myers Squibb Company	1993	8 ½ × 11	38 pp.	yes colour	yes
1993 Annual Environmental Report	British Airways	1993	8 ½ × 11	61 pp.	no	no
Environmental Review	British Gas	1993	8 ½ × 11	32 pp.	yes colour	no
New Horizons: The Environment and BP	British Petroleum	1993	8 ½ × 11	28 pp.	yes b/w	no

* See Appendix 3 for addresses of corporations

Title	Author/Source	Date	Format	Length (pages)	Photos (yes/no)	Comment Card (yes/no)
BT and the Environment: Environmental Performance Report 1993	British Telecommunications	1993	8 ½ × 11	37 pp.	no	yes
Environment, Health and Safety Report	Browning-Ferris Industries Inc.	1992	8 ½ × 11	36 pp.	yes b/w	no
Environment, Health and Safety 1993 Annual Report	Canadian Occidental Petroleum Ltd.	1993	8 ½ × 11	24 pp.	no	no
Progress and Improvement	Canfor	1994	8 ½ × 11	20 pp.	yes colour	yes
Environmental Report Card	Celanese	1993	8 ½ × 11	24 pp.	yes colour	yes
Corporate Environmental Report 1992	Ciba-Geigy	1992	11 × 8 ½	28 pp.	yes colour	yes
Environment, Health and Safety Report	Dofasco	1993	8 ½ × 11	16 pp.	yes b/w	no
Dow Canada Environmental Progress Report	Dow Canada	1993	8 ½ × 11	24 pp.	yes colour	yes
1993 Environmental Review	Duke Power	1993	8 ½ × 11	20 pp.	yes b/w	yes
Corporate Environmentalism	DuPont	1993	8 ½ × 11	20 pp.	no	yes
A Question of Balance: Second Status Report on Sustainable Development	E.B. Eddy Forest Products	1994	11 × 10	20 pp.	yes colour	yes
Health, Safety and Environmental Report	Eastman Kodak	1993	8 ½ × 11	24 pp.	no	yes
Glaxo and the Environment	Glaxo Holdings	1992	6 × 8	16 pp.	yes colour	no

Title	Author/Source	Date	Format	Length (pages)	Photos (yes/no)	Comment Card (yes/no)
Environment Report	Henkel	1993	8 ½ × 11	40 pp.	yes b/w	no
Environmental Performance	ICI	1993	8 ½ × 11	15 pp.	yes colour	no
Environment, Health and Safety Report	Imperial Oil	no date	11 × 8 ½	20 pp.	yes colour	yes
A Special Responsibility	Johnson & Johnson	1993	8 ½ × 11	28 pp.	no	no
The Lever Environmental Report 1989-1994	Lever	1989- 1994	11 × 8 ½	26 pp.	no	yes
Annual Environmental Report	MacMillan Bloedel Ltd.	1993	8 ½ × 11	24 pp.	no	yes
Environment, Health and Safety: A Progress Report	Merck and Co. Inc.	1993	8 ½ × 11	17 pp.	no	no
Voluntary Emissions Reduction	Mining Association of Canada	1995	8 ½ × 11	16 pp.	no	no
Environmental Annual Review	Monsanto	1993	8 ½ × 11	26 pp.	yes colour	yes
Environment Report	National Westminster Bank	1993	8 ½ × 11	25 pp.	yes colour	yes
1993 Environmental Report	Noranda Forest Inc.	1993	8 ½ × 11	32 pp.	no	yes
1993 Environmental Report	Noranda Minerals Inc.	1993	8 ½ × 11	16 pp.	yes b/w	no
Norsk Hydro Environmental Report	Norsk Hydro	1993	8 ½ × 11	36 pp.	yes colour	no
Environmental Review	Northern Telecom	1992	8 ½ × 11	16 pp.	no	no
Ontario Hydro 1992 Environmental Performance	Ontario Hydro	1992	8 ½ × 11	60 pp.	no	no
Focus on the Environment	Petro-Canada	1993	fold-out	n/a	no	yes

Title	Author/Source	Date	Format	Length (pages)	Photos (yes/no)	Comment Card (yes/no)
Polaroid Report on the Environment	Polaroid	1992	8 ½ × 11	32 pp.	no	no
The Environment	Procter & Gamble	no date	8 ½ × 11	13 pp.	yes b/w	no
Earning Your Trust	Rohm and Haas	no date	8 ½ × 11	16 pp.	yes colour	no
The Environment: Our Progress Report	S.C. Johnson Wax	no date	8 ½ × 11	21 pp.	yes colour	no
Progress Toward Sustainable Development	Shell Canada Ltd.	1993	8 ½ × 11	24 pp.	no	yes
Environmental Review	The Southern Company	1993	8 ½ × 11	25 pp.	yes colour	yes
Health, Environment and Safety	Sunoco	1993	8 ½ × 11	25 pp.	yes colour	yes
Progress Report	SwissAir	1992	8 ½ × 11	33 pp.	no	no
Tembec: Our Commitment to Sustainable Development	Tembec	no date	8½ × 8½	13 pp.	no	no
Environmental Report	Thorn EMI	1993	8 ½ × 11	44 pp.	yes colour	yes
Environmental Programs and Activities	Toyota	1992	8 ½ × 11	48 pp.	yes colour	no
Responsible Care Progress Report	Union Carbide	1993	8 ½ × 11	16 pp.	no	yes
Environmental Protection at Volkswagen	Volkswagen	no date	8 ½ × 11	42 pp.	yes colour	no
Environmental Report	Volvo	1993	8 ½ × 11	13 pp.	yes colour	no

Title	Author/Source	Date	Format	Length (pages)	Photos (yes/no)	Comment Card (yes/no)
Annual Environmental Report	Waste Management Inc.	1993	7 ½ x 11	73 pp.	no	yes

Total Sample: 56 Reports

Table 9: Summary of CER Characteristics

Summary of Characteristics	
Range of years for sample	1992-1994
Format • 8 ½ x 11 • 11 x 8 ½ • other	47 reports (84%) 4 reports (7%) 5 reports (9%)
Range of Length Average Length # of Reports between 8-19 pp. # of Reports between 20-30 pp. # of Reports between 31-40 pp. # of Reports between 41-50 pp. # of Reports between 51 + pp.	8-73 pages 27 pages 15 (26%) 22 (39%) 11 (20%) 4 (7%) 4 (7%)
Photos • Total • Colour • Black & White	35 reports (63%) 25 10
Comment Card	26 reports (46%)

Summary of Report Ratings:

The top 25% of the scores achieved were from the following company reports (listed from highest to lowest):

Shell Canada Ltd.
 Bristol-Myers Squibb
 Baxter Healthcare
 Dupont
 Noranda Forest
 E.B. Eddy Forest Products
 Noranda Minerals
 British Telecommunications

Criteria	Present	2	1	0
Commitment to Environmental Management				
Management Commitment and Foreword	7/8 (88%)	5	2	1
Environmental Policy	7/8 (88%)	7	0	1
Environmental Management Systems	8/8 (100%)	5	3	0
Targets	7/8 (88%)	5	2	1
Environmental Audits	7/8 (88%)	2	5	1
Community Relations	5/8 (63%)	2	3	3
Demonstrated Environmental Performance				
Quantified Performance Data	8/8 (100%)	7	1	0
Worker Health and Safety Data	5/8 (63%)	4	1	3
Research and Development	4/8 (50%)	3	1	4
Results of Waste Management Programs	7/8 (88%)	5	2	1
Results of other Environmental Initiatives	8/8 (100%)	4	4	0
Credibility				
Overall Presentation	8/8 (100%)	8	0	0
Not Public Relations Oriented	8/8 (100%)	8	0	0
Good News and Bad News	8/8 (100%)	8	0	0
Comment Card	7/8 (88%)	7	0	1
Fines, Accidents, Spills, Reported	8/8 (100%)	7	1	0
Issues Defined	4/8 (50%)	3	1	4

Table 10: Summary of top 25% of Corporate Environmental Reports Analyzed

Of the top 25% of the reports the following features were noted:

100% (8/8) of them had:

- Discussion of EMS
- Quantified performance data
- Results of environmental initiatives
- Were not public relations driven
- Presented good news and bad news
- Reported fines, accidents, spills or exceedances

88% (7/8) of the reports had:

- Letter or foreword by the CEO
- Published an environmental policy
- Targets
- Environmental audit information
- Results of waste management
- Provided a prepaid comment card

63% (5/8) of the reports showed information on:

- Community relations
- Worker health and safety

50% (4/8) provided:

- Research and development
- Issues defined

- the length of the reports ranged from 16 to 38 pages
- 6 of the reports had no photos and two had a very small number of photos
- 7 of the reports had an 8 ½ × 11 format and one was 11 × 10

Commitment to Environmental Management

The first thing that corporations need to communicate through their environmental report is a commitment to environmental management. Elements which demonstrate corporate commitment to environmental management include: top management commitment, an environmental policy, discussion of environmental management systems, targets and goals, environmental audits and commitment to community relations. These elements are important because they indicate what the corporation intends to do to protect the environment and how well engrained management of the environment is in the corporate culture. These elements are described below.

Letter or foreword by Senior Management

The best examples of CERs include a letter or foreword which demonstrates that the corporation's commitment to the environment begins at the highest level of management and is shared and reinforced throughout all other levels of management. Many of the letters in the reports are signed by a senior person in management, often the vice-president of environment or another senior member of management. To show the highest level of commitment and support for environmental initiatives, however, it should be signed by the CEO or the president of the company. Of the 56 reports analyzed 32 (57%) had a foreword signed by the CEO. A signature by the CEO gives the document considerably more weight, more value and increased credibility than those signed by managers (Woodruffe, pers. comm., 1995). In the case of Shell Canada Ltd. every word

of the document was reviewed with the CEO indicating the highest level of support (Woodruffe, pers. comm. 1995).

Environmental Policy

The best examples of corporate environmental reports include their environmental policy statement. Forty-two (75%) of the reports included an environmental policy statement. A corporate environmental policy is a mission statement which clearly sets out the strategy of the organization in seeking to minimize or eliminate the overall impacts of its operations on the environment.

Provision of the policy statement is important because it forms the basis from which all of the organization's environmental interactions and policies will be developed and it will be the principal signal to stakeholders of corporate intentions with respect to the environment (Gray, 1993). One of the main reasons for adopting an environmental policy is to guide future actions and to show a commitment to continuous improvement (Gray, 1993). Reporting the environmental policy is valuable because it indicates that the corporation operates at a level beyond mere compliance but operates toward a level of comprehensive environmental management (Scott, pers. comm., 1995).

The most effective policy statements reported show a well-balanced approach to environmental issues by representing all areas where a company will affect the environment. A meaningful statement of environmental policy will establish guiding

principles, identify priorities and key environmental issues for individual areas and operations.

Companies should avoid publishing policy statements that are meaningless general statements of good intent on which little specific and practical action could be based. Reporting on a policy of this nature will not be effective in instilling confidence in the readers that the business has a responsible approach to the management of its environmental affairs. For more information on the content of environmental policy statements the reader is directed to Environmental Policy Statements by Ryley (in progress).

Environmental Management Systems (EMS)

A critical aspect of environmental reporting is showing how the company is organized to manage environmental issues and to communicate how environmental stewardship is integrated into the decision-making process. A properly designed environmental management system (EMS) provides a framework of processes designed to help an organization manage its environmental agenda and document its environmental performance (KPMG, 1994a). Most of the reports (40) included some discussion of environmental management or aspects of their EMS.

As well, reporting on corporate EMS is important in order to demonstrate that a company has allocated sufficient resources to ensure that its infrastructure can perform to the level

of its planning objectives (Ernst & Young, 1994d). Information on a company's environmental management system offers assurance that environmental matters are dealt with in a systematic manner and that there is assigned responsibility and accountability within the organization for environmental performance (Ernst & Young, 1994d).

An environmental report may emphasize programmes and practices used to implement the policy, the organization of environmental responsibility, education and training. As well, it may provide information on specific programs and procedures the organization uses to manage environmental problems. The examples noted most frequently in CERs include, management structure; employee education and training; emergency response planning; and risk assessment. These are described below.

Management structure

CERs should show that a structured management system has been introduced to ensure that environmental factors are taken into account in business decisions and operations. In this section the company should describe the level of organizational accountability for environmental policies and programs and provide a description of the environmental management structure. As well, the report should define and document the responsibility, authority and interrelations of key personnel whose activities can affect the environment.

Some of the key points to convey with respect to the management structure include:

- attempts to focus on the development of programs that fully integrate environmental performance into all aspects of the business,
- the corporate environment, health and safety (EH&S) management program which is fully integrated into the operations of the company at every level, and
- the level of management at which environmental issues are discussed and approved.

Employee training and education

Appropriate training must be provided to all personnel within an organization for employees to have the knowledge and skills to perform their tasks in an efficient, competent and environmentally sensitive manner. It is important for employees to understand the purpose and benefits of the environmental program and specifically how they can incorporate environmental improvements into their area of environmental responsibility and to understand how they should contribute to reporting and environmental performance indicators. The CER should demonstrate that communication and training programs have been established to assure competency of relevant personnel. Some corporations just mention that training is part of their EMS, while others provide details on the level of training, such as:

- the number of employees in environmental awareness training,
- the nature of education for senior level management positions as well as training and education for plant or field level operators,
- other initiatives designed to raise employee awareness of the environment

- programs that prove that environmental issues have been implemented into all relevant company training courses.

Emergency Response Planning

Emergency response planning (ERP) is a necessary component of an EMS in order for the organization to maintain preparedness to deal with emergency situations. The best examples of CERs report on the nature of the training, the extent of the program and the frequency of testing. It should also be articulated that the program is regularly reviewed and updated.

Risk Assessment

A discussion of risk assessment is necessary to demonstrate that the company is making efforts to prioritize objectives and targets, and identify and manage the risks associated with a corporation's activities, processes, products and services in a systematic manner.

Objectives and Targets

Objectives are the overall aims of environmental performance which arise from the environmental policy statement and an assessment of the company's environmental impacts (CSA, 1994). An example of an objective would be 'to reduce or eliminate waste'. Targets are the detailed performance requirements set to be achieved by the

corporation to reduce environmental impacts. They are quantified wherever possible and arise from the objectives and need to be set to achieve the objectives. As well, targets should include a stated baseline (for example, reduce waste by 50% by year 2000 based on 1995 data). The most effective environmental reports demonstrate their commitment to environmental improvements by adopting systematic reporting against quantified targets which address the core business of the company and its key environmental impacts (Gray and Owen, 1994). Only 26 (46%) of the CERs included targets. Reporting and publishing targets is considered to be the driving force behind continuous improvement in environmental performance (British Telecommunications, 1993).

Establishing and reporting targets informs the audience how the organization intends to manage its relationship with the environment. The targets should be measurable actions and should provide benchmarks against which an organization's performance can be assessed (CICA, 1994).

The most effective CERs that establish and publish environmental targets also state their intention to report progress on the targets, how they will be achieved and tell when they will be achieved by providing timescales. An example from a report that establishes and reports on targets is shown in figure 8. The targets shown in figure 8 could be improved by providing consistent dates and baselines. The CERs should provide updates on progress toward targets from the previous year's environmental report by discussing which targets have been implemented or how efforts to achieve them have progressed.

As well, targets from the previous year which have not been met should be reported on with an explanation of why they have been delayed or if they have been modified.

Goals	Progress to December 31, 1993
• increase the production of paper products made from recycled paper	• sales of recycled paper products increased by 63% in 1993 from 1993 levels
• reduce key waste water parameters 50% by December 31, 1995	• a new effluent treatment system has been selected and approved for the Ottawa and Hull mill effluents and will be in operation by March 1995. Toxicity control programs are complete in the mills and all now pass the regulated acute fish toxicity test.
• reduce water usage 20% by December 31, 1995	• water usage in the pulp mill per unit of production has declined 12% and in the paper mills by 2%
• phase out PCB electrical equipment by December 31, 1995	• PCB phase out has been completed on schedule
• Find replacements for all CFCs in air conditioners and water chillers	• The total usage of CFC has been reduced by 10%. Training on the new CFC regulations in Ontario is almost complete. This will facilitate progress on the CFC phase out.
• reduce key air emissions 50% by December 31, 1995	• small reductions in odour emissions and particulate emissions from the pulp mill have been made by installing new equipment on the lime kiln and wood handling system. These reductions have not yet been quantified.
• Develop operating procedures for sustainable forest management in accordance with the Ontario Forest Industries Association Code of Forest Practices	• standard operating procedures to comply with the code have been developed by Forestry personnel and will be introduced throughout the division in 1994.

Source: EB Eddy Group, 1994

Figure 8: Example of Targets

Environmental Audits

Environmental audits serve four main purposes (Thompson and Wilson, 1994):

- (1) Determination of an organization's compliance with regulatory and legislated requirements (external)
- (2) Determination of an organization's conformance with the organization's own policies and industry standards (internal)
- (3) Evaluation of the effectiveness of the organization's routine management practices and housekeeping, and
- (4) Development of an action plan to implement environmental improvements.

Environmental audits allow companies to assess their performance against the objectives and targets set and enable the company to set new targets to ensure that performance is continually improving (KPMG, 1993b).

Environmental auditing is an essential feedback process that informs a company's management whether the components of the system are working correctly and producing the intended results. Without this type of monitoring there is no way to know when things go wrong in time to take corrective actions. As well, this information helps the organization achieve the objectives set out in its environmental policy.

Reporting on corporate commitment to carry out regular environmental audits of a company's environmental performance is vital in demonstrating a company's

commitment to continuous improvement. As well, reporting on audit information helps to inform the reader how well environmental concerns are being handled in day to day operations and it demonstrates that the company is continually assessing its performance, ensuring targets are met and that it is making progress (Sandbourg, 1993). A total of 32 (57%) of the CERs provided some discussion or mention of environmental auditing. Many of the CERs just mention that they are committed to performing regular environmental audits as part of their management system. The most effective reports, however, provide detailed information on:

- the number of facility audits that were conducted
- the number of audit items found
- the number of open audit items at the end of the year, and
- a general discussion of the audit items and actions taken to correct audit findings to demonstrate that an action plan is underway to deal with the audit findings.

Figure 9 is a good example of reporting on audit findings in a CER.

National Westminster Bank

Audit findings:

Transport and Distribution

Sample Finding of Audit

- Business travel policy was fragmented across the Sector and there was a lack of comprehensive monitoring of the different modes of travel.
- Sector staff commuted in excess of 500 million miles in 1991.
- The Sector's fleet of cars totalled approximately 5500 in 1991, although very few had engines over 2000 cc. Only three percent were diesel-powered

Examples of Progress to date

- Guidelines have been issued to staff who are moved to different areas of the country at the request of the Bank. These will help them select areas in which to live that are convenient for likely career moves in the future and for public transport services.
- A study was undertaken in Bristol, where the Bank has a large representation, to identify the practical difficulties involved in commuting and indicate possible solutions. On the basis of this, guidance is being given to local management on ways of easing the commuting burden, for example, staggered working hours and homeworking.
- 1000 diesel powered cars were purchased in 1992 for the Sector's peripatetic sales team. Apart from the environmental benefits, this brings an estimated saving of 300,000 per annum in terms of fuel expenses.

Source: National Westminster Bank, 1993

Figure 9: Example of Reporting on Audit Findings

Community Relations

CERs should indicate the company's acknowledgement that environmental performance extends beyond an institution's operations and into the community in which it operates. Only a small number of CERs (18 or 32%) include information on community relations. Comprehensive treatment of community relations in reports often includes a discussion of company's efforts to:

- develop educational and environmental partnerships,

- support and participate in community environmental programs and activities on sustainable development,
- build community awareness through such things as open houses or plant tours,
- seek partnerships with public organizations and participate in public programs,
- support research and academic organizations, and
- inform the reader as to the company's memberships in industry organizations, environmental contributions, and employee community projects.

Demonstrated Environmental Performance

In environmental reporting, a corporation must go beyond simply demonstrating a commitment to environmental management. Demonstrated environmental performance in CERs is a critical element to support the environmental commitment claims. It also serves to enhance credibility. To be effective and credible the reports must also show actions to improve performance, achievements, and quantifiable results. Measuring changes in environmental parameters encourages companies to achieve continuous improvements in their environmental performance and requires companies to set baselines from which changes can be measured. Elements typically used in CERs include: quantified data in the form of environmental performance indicators (EPIs), trends and statistical data; worker health and safety information; research and development (R&D); waste management initiatives and results; and some narrative discussion of other environmental initiatives and results. These are discussed below.

Quantified Performance Data

Corporate environmental reports should show quantitative data to demonstrate their progress against targets. Without such data, it is hard to manage environmental performance and to demonstrate credibly that the company is performing adequately or improving. Publication of quantified data in the form of statistics or EPIs also indicates that companies have established the necessary systems for measuring and tracking environmental performance (KPMG, 1993b). As well, it is a necessary component of a comprehensive environmental management system that produces regular quantifiable

data with which the company manages and measures its performance. When reporting performance data, it is important that the company provide numbers and not just the percent reductions, since that information alone can be misleading. EPIs and trends are used to show performance achievements and are both considered an important criterion for good CERs.

Environmental Performance Indicators (EPIs)

Environmental performance indicators are an integral part of environmental management systems (KPMG, 1993b). As mentioned earlier, to achieve a desired level of environmental performance, a target must be set and striven for. In order to chart progress towards a target, effective performance indicators must be in place which are clearly designed for the targets and goals. (Stuetz and Woodruffe, 1992). An environmental performance indicator is a parameter that a corporation has adopted to measure its performance in one specific area or medium and should be related to the specific environmental objectives and targets set out by the corporation (Woodruffe, pers. comm, 1995). If targets are present, then an indicator must be tied to it to measure progress towards it (see figure 10). Corporations should include enough EPIs in reports to provide a balanced look at performance results and the overall success of its environmental strategy (CICA, 1994). Companies with established environmental performance measurement programs gather environmental data and distribute it to both internal and external audiences (KPMG, 1993a). This communication helps to drive increased awareness internally and documents performance externally (KPMG, 1993a).

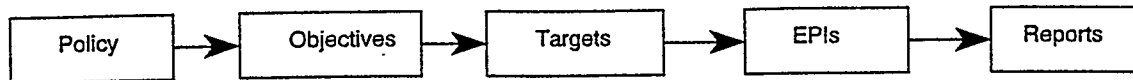


Figure 10: Relationship of EPIs to targets and reporting

Companies that adopt and report on performance indicators will see many benefits. Reporting on EPIs in corporate environmental reports is useful and necessary for the following reasons:

1. EPIs are needed to measure progress in achieving the company's environmental goals and objectives and to communicate their performance (Stuetz and Woodruffe, 1992). For example, developing and reporting on EPIs can provide information on the company's performance to allow the re-evaluation and redesign of corporate policy and objectives. As well, EPIs provide better information for environmental reporting because developing EPIs in a systematic fashion, in turn enables a corporation to produce reports for external audiences and users.
2. Problem areas within a company can be identified. This allows a company to prioritize and direct its resources to the problems requiring attention (Stuetz and Woodruffe, 1992). For example, EPIs may help to:
 - chart progressive increases or decreases in contaminants and reliance on raw materials or natural resources,
 - assess efficiency of operations,
 - justify pollution expenditures, and

- establish research priorities.

3. Reporting on EPIs provides documentation of accomplishments or failures. This allows a company to have an idea of what programmes and policies work and which do not (Stuetz and Woodruffe, 1992). Such information is useful for input into strategic planning. For example, indicators of (unit) outputs can assist corporate decision-makers to modify their production processes (Simpson-Lewis, pers. comm., 1994).

4. The use of indicators will allow the company to measure progress toward a set target (Stuetz and Woodruffe, 1992). Indicators can help assess whether the company's activities have actually achieved the established environmental policy and objectives. (Eckel et al., 1992). If there is an indicator for each target then the targets can be linked to planning and policy development. As well, EPIs can help to track external standards. For example:

- Industry compliance with government regulated targets can be tracked,
- EPIs can help in responding to regulatory requirements and environmental standards (Deloitte and Touche, 1993); or
- EPIs can help in comparing performance to current and future regulatory limits for emissions or effluents.

There is not yet a single, generally accepted set of environmental performance indicators - national, international or even within industry sectors - to be used for internal or

external performance measurement and reporting (Willis, 1994). Because most companies report the information they believe to be most relevant, using a wide range of environmental performance indicators, indicators and topics reported vary widely between companies in the same industry (Willis, 1994). No attempt has been made to develop a comprehensive list of indicators or provide a discussion of the specific indicators used in reporting, since there is so much variation within and between industries. However, some of the key characteristics in selecting environmental performance indicators are that they be:

- clearly understandable
- related to a target
- clearly relate to an issue or to perceived priorities
- linked to a specific impact.

A systematic means for developing environmental performance indicators enables companies to produce reports for external audiences on aspects of their environmental performance. Despite the wide variations of indicators reported among companies, environmental performance indicator development, for the purposes of environmental reporting, should emphasize those areas of performance which can have a direct impact on the environment. In terms of deciding on key measures to incorporate into environmental reports, progress will most likely be directed toward meeting management needs for information in discharging their responsibilities including reports to external stakeholders (Deloitte and Touche, 1993).

Examination of corporate environmental reports indicates that a growing number of reports include environmental performance indicators but many reports still lack indicators and quantitative data altogether. Nineteen out of the 56 (34%) reports did not provide performance data at all and only 21 (37%) were considered to be showing any significant amount of performance data. Performance evaluation should be based on quantitative measures, wherever possible, rather than just management opinion. Presently there is a lack of data and statistics in the information that is reported (Billing and Scott, 1993). A recent survey by the accounting firm KPMG suggests that the low numbers of companies with quantitative data and indicators may be a result of the lack of established environmental management systems that contain objectives and targets required to provide the level of data needed to measure performance (KPMG, 1993b).

Trends

The demonstration of trends in environmental performance is a very important assessment criterion for effective corporate environmental reports. This is a necessary condition to determine how close the company's environmental performance is to achieving its targets or a desired state and whether it is moving toward that target. The purpose of this is to inform the reader as to where the corporation is showing improvements and where corrective actions are needed and to help the company set targets for improvements. In CERs, reporting trends in environmental performance may involve a comparison of environmental performance indicators against historical values

(baseline data), or external standards. In the case of showing comparisons against external standards, this may involve a comparison with legislative standards, industry averages or the performance of other comparable companies (Eckel et al, 1992). The best practice in corporate environmental reporting involves showing trends but also reporting a defined objective for that particular issue. This is more useful than just examining point data or providing figures on reduction. Another important aspect of reporting trends is to indicate why the trend is going up or down. A good example of this is in the EB Eddy (1994) environmental report, A Question of Balance, which states the trend has occurred because of actions implemented by management, legislation, or technological change. This gives an understanding for the linkages between management aspects and performance. This is similar to the information which is conveyed by the pressure-state-response framework described earlier (see section on Criteria for SOERs).

Worker Health and Safety Information

A discussion of worker health and safety data often indicates the approach taken to minimize health and safety risks in the company operations. Some reports describe formal policies and management practices to reduce health and safety risks and provide data on the number of lost work days, work related injuries and the number of accidents. Twenty (35%) of the CERs that were analyzed provided worker health and safety data.

Research & Development

Provision of information on research and development (R&D) shows that the corporation is committed to continuous improvement and is actively seeking ways to improve performance and minimize environmental impacts. Twenty four (42%) of the CERs provided some information on R&D. Companies should show that they conduct, or alternatively, that they support research on the environmental impacts of products, processes, emissions, raw materials and wastes associated with the enterprise and on the means of minimizing such impacts, as they are applicable to the company in question.

Waste Minimization Initiatives and Results

Waste minimization was chosen as an important criterion in environmental reports because it is a key issue on which many companies and external stakeholders focus. As well, it is a universal issue amongst corporations. For example, waste arises throughout the whole production and distribution process, as well as in the use of the product itself. The essential aim is to minimize resource consumption throughout the process. This minimization of resource use is in keeping with the economic aims of the business. Large amounts of waste generation and disposal can suggest inefficiency, liability and adverse impacts on the environment. Environmental reports could show information on the costs of waste disposal, revenues from recycling, and cost avoidance for source reduction. Source reduction is a key aspect of waste minimization and should be discussed. As well the report may provide information on reducing product volume,

packaging reduction, increasing product life, purchasing products selectively, promoting product reuse, and decreasing product consumption.

Other types of information to be included may consist of: waste audits, the types of waste, disposal methods (on or off site), and hazardous wastes. Two specific aspects of waste minimization programs include life cycle assessments (LCA) and purchasing guidelines. Some companies report their initiatives in these areas and as LCAs become more common in industry more emphasis on reporting results of LCAs may occur.

Life Cycle Assessments (LCA)

Life cycle reviews are intended to identify and minimize a project's or a product's environmental impact at each stage of its life - from design, manufacturing and packaging, to use and ultimate disposal. For existing products, LCAs help to identify where improvements can be made. For products under development, reviews help to prevent the use of materials and practices that may be expensive and detrimental to the environment. Information on life cycle assessments (LCA) or product stewardship indicates the degree to which the organization is committed to evaluating the environmental impact of products, processes and services.

Purchasing Guidelines

Purchasing guidelines can minimize any adverse environmental impact directly associated with goods and services purchased by the company. At a minimum, purchasing decisions should consider source reduction; availability of recycled materials;

recyclability and reusability; renewable resources; hazard reduction; process waste reduction; handling and disposal; environmental technology; energy efficiency and suppliers' environmental sensitivity (Bristol Myer-Squibb, 1993).

Other Environmental Initiatives and Results

Many reports provide a narrative or descriptive section of examples throughout the report of general initiatives to improve environmental performance. This does not involve providing quantified performance data, such as an EPI, but it is important to indicate the initiatives the company has taken to improve its performance. This information is usually anecdotal. Many reports provide numerous examples of efforts to improve environmental performance in the areas relevant to the company. The nature of these initiatives varies widely based on the industry and the company involved. Some examples of initiatives include:

- "Among the successful initiatives launched last year was an assessment of network facilities near Laval, Quebec. by examining all development projects from an environmental perspective, Bell was able to identify sensitive areas and modify the placement of such facilities as poles and cables to reduce their visual or functional impact. Based on the success of this pilot project, the environmental assessment process will be gradually implemented throughout Bell's system" (Bell Canada, 1993).
- "In 1993 Bell developed a computerized management system that will monitor all general hazardous wastes generated through its operations" (Bell Canada, 1993).
- Caroline Complex: "The Caroline gas plant is in the process of establishing an energy-use baseline. One opportunity to save energy is by reducing the temperature of the gas leaving the sulphur plant tail-gas incinerator stack. This temperature is controlled by regulation to ensure sulphur compounds leaving the stack are properly oxidized, thereby minimizing environmental impacts..." (Shell Canada, 1993).

- "Fish and Water: A comprehensive five-year schedule of research and habitat enhancement projects for the Bridge River area began last year. Some of the work included:
 - a Five year spawning gravel replacement program with a budget of \$375,000.
 - completion of a minimum flow release study to determine the most feasible and cost effective method to release flows for fisheries purposes".
(BC Hydro, 1993)
- "Major initiatives were implemented in 1993 to rehabilitate old forestry road systems. The objectives of the program are to mitigate erosion and stability problems that can cause progressive site deterioration or damage to fish habitat, to restore site productivity where feasible, and to improve the appearance of high-visibility sites..."
(Macmillan Bloedel Ltd, 1993).

Credibility

The third criteria for effective environmental reporting is to demonstrate credibility. If the reports are to be taken seriously, internally or externally, credibility issues must be considered. The elements which are considered to be helpful in preparing a credible report include: the overall presentation; efforts not to make a public relations document; presentation of good and bad news; request for feedback; disclosure of fines, accidents, spills etc.; and an appropriate explanation and definition of the key environmental issues covered in the reports.

Overall Presentation

The overall presentation of the reports can contribute to its credibility. The aspects considered to assess presentation are as follows:

Length

The reports should not be unnecessarily long or short. The reports reviewed ranged from 8 to 73 pages with an average length of 27 pages. Twenty two (39%) of the reports fell in the range of 20-30 pages. The average length of the top 25% of the reports was also 27 pages. The longer reports (50-70 pages) also tended to be more technical and have more complicated language. The shorter reports were written in a more concise and succinct format and restricted the discussion to the most relevant issues. A shorter report is important if the report is to be read and used.

Understandable

Although the level of language in the CERs was not analyzed in detail, it is clear that some reports use technical language making it harder to understand for a non-technical audience. Future work on environmental reports may involve an examination of language usage in the documents to determine the level of language and report formats for different audiences.

Dated

The CERs should be clearly dated on the cover so the reader can tell if public reporting is an ongoing effort or the document is a one time report. Eight of the reports were not dated at all, and another eight were not dated on the cover.

At present, many CERs are produced every year along with annual financial reports. It may be more efficient and cost effective for the reports to be produced every other year with an update of the data in a summary report for the years in between (Woodruffe, pers. comm., 1995). This allows for continuous monitoring, reporting and improvement but can help to reduce the expense involved in putting together a full report annually. This will still provide for ongoing performance evaluation and demonstrates efforts to manage environmental matters but the companies will not be spending money by putting out a full report every year for the sake of appearance. As well, there may not be significant changes in one year to warrant a full report (Woodruffe, pers. comm., 1995).

Not Public Relations Driven

Of the 56 reports examined, thirty five (63%) of them used photos. Twenty five of those were in colour and ten were black and white. Excessive use of gratuitous photos which do not communicate important information about environmental performance or commitment serve no real purpose. This may suggest to the reader that the reports are for image enhancement rather than for increasing accountability. In many cases there seemed to be a desire to portray good corporate citizenship by being environmentally aware, rather than representing a real commitment to the concept of public accountability. As well, use of photos can considerably increase the costs of the document. Although it has been stated (see section on Criteria for SOERs) that photos can be a powerful and effective communicator of information, this is only true if the choice of photo is relevant to the discussion in the reports. The photos used in many corporate environmental reports are not of this nature, but rather are purely gratuitous and are not recommended in this instance. In SOERs, the use of photos is recommended as a means to lighten the report and to break up large amounts of text. This can help in part because SOERs are generally of considerable length (see Table 4). Conversely, most CERs are not as long as SOERs and the use of photos is not always necessary and may detract from the message. Further, no CERS were observed by this researcher which used photos to show trends, changes in environmental conditions or performance or as a means of conveying information quickly and easily. As such, photos have not been recommended in general. Had photos of this nature been used in the reports examined, then they may be recommended for good reporting.

Good News and Bad News

An important criterion for CERs is the disclosure of poor environmental performance as well as good performance. Both positive and negative performance information should have a fair representation in the reports where shortcomings in performance are not glossed over. Disclosing the bad news as well as the good is very important in order that the reports be perceived as credible. Otherwise, the reports can appear biased and akin to public relations tools, thus limiting their potential to promote public accountability. As well, it becomes questionable how much audiences can rely on the content of the reports and how useful they are for internal management and improving business activities, as they affect the environment, if they choose not to present any negative information. This positive-only approach to reporting can do more harm than good, because readers may be unsure whether there is no bad news or whether the company has chosen not to present all pertinent information (Billing and Scott, 1993). For these reasons a key part of any environmental management system should be the development of policies regarding what information on environmental risks and impacts that will be made public and how these disclosures should be made. For any decision to exclude information, it is important to understand and be able to communicate the rationale (WICE, 1994).

At present, some of the disclosure in corporate environmental reports appears to be dominated by partial and unsystematic reporting which concentrates on the descriptive rather than the quantitative. With the continued development of environmental

performance indicators, this aspect of disclosure may improve. Some of the reports to date are more in the style of a general philosophy than detailed reporting on environmental impacts about how the corporate activities affect the environment. Even when disclosure is somewhat detailed, it appears to be partial, selective and for the most part positive, in order to reflect well on the company. In some cases the information that is disclosed in the reports appears to be linked to the development of an image. Neu and Powrie (1994) concluded that environmental disclosures in financial reports (as opposed to CERs) are for impression management. The tendency to err on the side of self-congratulation through success stories can carry the risk of eliciting a cynical response in any intended audience and limits the usefulness of an environmental report.

A study by KPMG (1993b) emphasizes that even if there are considerable data presented in the report, an otherwise good report will invite suspicion on all its disclosures if companies are not up front about the problems they are facing. If the company can demonstrate clear plans, goals and objectives and report upon its progress on these plans, then it can gain accountability, credibility and enhance the use of the report for management functions. Only by making public not just the positive, but also the negative, environmental impacts of corporate activity will management attention be focused on improving these aspects of performance, especially given that external company reports are extremely important as a means of accountability.

In terms of presenting a balanced perspective in reports, companies should focus on the critical and most significant impacts. Effective and credible environmental reports will provide a comprehensive review of the environmental performance of a company. Disclosure and reporting should concentrate on the core activities of the corporation and the key environmental impacts of corporate activity, with an attempt to be consistent and complete in acknowledging unsatisfactory performance (Gray and Owen, 1994).

Request for Feedback

Feedback should be requested from employees and other stakeholders and the responses should be acted upon and incorporated into the next CER. Almost half (26) (46%) of the corporate environmental reports reviewed provided a prepaid comment card. This suggests a high level of credibility by inviting comments from the readers. A few (5) corporations, that did not provide comment cards, had an invitation to comment on the report and provided names and addresses of people to contact. Many reports (25) did not have any request for feedback.

Fines, Exceedances, Compliance, Accidents or Spills

Provision of information on fines, prosecutions, accidents or spills can increase the accountability of the corporation and the credibility of the report. Recording and reporting spills or accidents helps to prevent problems recurring by allowing lessons to be learned throughout the company, while also providing a tangible measure of the company's environmental performance (British Gas, 1993). The best examples of reports

provide specific details on the numbers of accidents, spills, fines etc., the scope and magnitude of any environmental impact, the location, reasons for the incident and actions taken to remedy the problems. As well, the report should show that procedures have been introduced for categorizing and reporting environmental incidents to ensure that a consistent method exists throughout the company (British Gas, 1993). The following are good examples of disclosure on spills and accidents (see Figures 11 and 12).

Spills There were 88 spills reported to governments, as required, in 1993.[...] Most of the spills were contained and cleaned up and the causes of all these spills have been identified and corrective measures are being implemented. Implementing spill prevention programs is a priority in 1994 and we are working diligently toward our objective. Our pulp spills will be reduced or eliminated as we complete installation of secondary treatment systems. Our ultimate objective is to eliminate spills altogether. In most jurisdictions the law requires that any spill - no matter how small - be reported if the material involved can escape to the environment and there is a possibility of harm. The total of all our spills reported to regulatory authorities in 1993 is listed below.	
Type of Spill	Number of spills
Pulp: 132.8 tonnes of wood fibre. Of the reported spills, 23 were less than one tonne The largest was 100 tonnes and was the result of a storage tank failure; containment dykes have since been installed.	29
Oil: 19,485 litres. Spills on the ground, accounting for 65% of the total, were contained and cleaned up; 32% was spilled to sewers or effluent treatment systems with special oil recovery capabilities, 3% was directly spilled to waterways.	31
Chemicals: 149,000 litres. The two largest spills (sodium sulphate solution) accounted for 80% of the total and were neutralized before discharge.	9
Miscellaneous: other spills during the year included minor amounts of untreated effluent, dye, paper machine chemicals, sulphur dioxide, effluent treatment sludge, chlorine, solvent and clay slurry.	14

Source: Abitibi-Price, No date
Figure 11: Example of Open Disclosure on Spills

Bristol Myers Squibb:

1988	\$25,000	Bio / Chem Division Syracuse	Civil penalty which an air contamination source at the Syracuse facility was in violation of New York State regulations. Specifically the quantity of methyl isobutyl ketone discharged from three emission points during the period 2/28/86 to 7/7/87 exceeded the maximum allowable quantity.
1988	\$4,000	Pharmaceutical Manufacturing Division, NJ	A November notice of violation for the failure of an air control device as reported to the New Jersey Department of Environmental Protection by the facility.
1990	\$400	Bristol-Myer Products Division, NJ	A notice of violation was received for two unpermitted control devices. The necessary permit applications were filed.
1991	\$12,625	Pharmaceutical Research Institute, NJ	Fine for 5 permit violations of total suspended solids and Ph between 6/91 and 12/91 due to fecal contamination of on-site duck pond by migratory fowl.
1991	1,000	Pharmaceutical Manufacturing Division, NJ	Notice of violation issued for 3/91 discharge of sewage to stormwater system.

Figure 12: Example of Open Disclosure on Fines

Source: Bristol Myers-Squibb, 1993

Environmental Issues Defined

A comprehensive description of the issues should be described in all the areas reported. This is necessary for the reader to understand what is being reported and why. Many reports show data and trends going up or down but not why such parameters are being reported to the audience or the significance of those data. Many reports do not make it sufficiently clear what the key environmental impacts of the corporate activities are. In this respect effective reporting requires disclosure of significant environmental risks and impacts of operations and actions to mitigate them. While it may not be possible to cover everything, the report should address the most important or high priority issues. The most effective reports present data and provide insight into the significance of the figures. For example, the Dow Canada Report (1993), provides a two page summary at the end of the report that lists all the chemicals used in their activities which are a priority for reduction. The report indicates their significance to the environment and to human health by stating whether they meet the criteria for persistent toxic substances, bioaccumulation and toxicity, or if they are considered carcinogenic, potentially carcinogenic, or if they contribute to environmental degradation through smog, ozone depletion, or global warming. This type of reporting provides a concise summary regarding the significance and reasons for what they are reporting. Another example is the Noranda Minerals report (1993) (see figure 13) which provides a summary at the beginning of each section of the report (land, air, water, etc) of the most important issues. This gives the reader some perspective as to the importance of the discussion and why the issues are relevant. At present very few reports provide an explanation of

the issues. Of the reports reviewed only 13 out of 56 (23%) made any attempt to explain the issues."

Water:

The mining industry uses large amounts of water in mining and milling processes, which must be treated before being released back into the environment. This treated water, particularly from older operations, may contain some concentrations of metals. Over time, these metals can build up in sediments of lakes, rivers and oceans downstream from a mining facility. At certain concentrations, aquatic life may be affected.

Air:

Air emissions are a major issue in the metallurgical industry. they consist of gases, primarily sulphur dioxide (SO₂), and various metals. SO₂, which has been identified as one cause of acid rain, is produced from sulphur found naturally in most base metal deposits. Fully recovering gas and metal emissions from smelters is proving to be a technological challenge for the mining industry and for Noranda Minerals.

Land:

Mining activities disturb land. For example, open pit mining requires that large amounts of soil and rock be removed to gain access to mineral deposits. The soil and rock must be deposited somewhere, which disturbs more land. Tailings from the milling process also take up significant areas of land as do roads, railways, power transmission and pipeline corridors, and water supply reservoirs.

Figure 13: Example of Issues Defined

Source: Noranda Minerals, 1993

External Validation

Although the CERs were not reviewed for external validation, a brief mention of its value for enhancing credibility was felt to be useful. External validation of CERs has been mentioned briefly in the literature (eg. CICA, 1993; Cutter Information Corp., 1995). There is some discussion as to it becoming a requirement in the future for corporate environmental reporting. External validation may be a reasonable proposal to ensure

objectivity and enhance the credibility of the reports. This may be achieved in one of two ways: (1) voluntary selection of a third party to review the document, or (2) the use of some form of certified "report auditors". A few reports were noted (eg. The Body Shop) which employed some form of external validation. External validation may become more common in future reports to enhance credibility and ensure objectivity.

Uses and Roles of Environmental Reporting

The purpose of this section is to provide a discussion of the uses and roles that SOERs and CERs can serve in environmental management.

Environmental reports (both CERs and SOERs) can improve the effectiveness and efficiency of environmental management by seeing that the reporting process is developed and implemented so that it can serve many different purposes (Thompson, pers. comm., 1994). Environmental reports should be viewed as one tool in a set of environmental management tools. Thompson (1995) lists the following environmental management tools: Strategic Environmental Planning, Environmental Management Structure, Environmental Policy or Code, Environmental Impact Assessment, Environmental Audits, Environmental Reporting, Environmental Indicators, Product and Technology Assessment, Life Cycle Assessment, Life Cycle Costing, New Systems of Accounting, and Economic Instruments. The development and use of these tools should include a recognition of the roles they play in the integrated development and management of the set, not as separate and isolated management options (Thompson, pers. comm., 1994-1995).

State of the Environment Reporting

State of the environment reports have the potential to serve many uses. However, very few state of the environment reports discuss their role and the means of using the report.

Similarly, none of the literature reviewed on SOERs discusses how the reports can be used. Most government SOERs present general goals and objectives of the report. The following are some of the most common objectives stated in SOERs:

- to improve public understanding and informed decision making about the environment (education),
- to provide timely and open access to environmental information,
- to identify trends in resource use, and
- to give decision makers a tool to gauge how their policies and programs affect the environment.

While the objectives stated above are common to many SOER programs, there are many other uses that SOERs can serve. It is implied in most SOERs that they are primarily for presenting information and for educating the general public. Providing the public with information about their environment, information which would otherwise be hard to obtain, is useful but should not be regarded as an end in itself (Jacob, 1992). This role may be increasingly important with the general acceptance that people have a right to know the condition of the environment in which they are living. However, this view of SOERs as primarily a tool for education is too narrow. In addition to the objectives stated above, SOERs can be used to serve other purposes, including integration with other environmental management tools; management information; and input into planning.

Integration with other environmental management tools

SOERs can increase the efficiency of other environmental management tools such as EIA, environmental auditing, planning and monitoring:

- The baseline data contained in such reports can be used as a backcloth against which the specific environmental impacts of proposed planning strategies and developments can be evaluated (see figure 14). As well, SOERs can provide input into strategic planning.
- A comprehensive SOER can be useful for scoping in environmental impact assessment (EIA) and to identify problem areas in order to lead to a better understanding of where EIAs should be performed. In particular the trends which an environmental report shows can help to improve both EIAs and environmental audits in terms of selecting those aspects which deserve careful consideration (Thompson and Wilson, 1994). SOERs can enhance the quality of screening in EIAs by picking up on adverse environmental impacts.
- SOERs can improve the prediction aspect of EIA. It has been noted in EIA literature that uncertainties and limited understanding of ecosystems, related uncertainty and risk in predicting impacts increases the political and financial difficulties faced by decision makers when they must choose between going ahead or discouraging

development projects (McDonald et al., 1989). SOERs should identify sensitive areas and areas of significant concern, thus facilitating the EIA process in general.

- SOERs can help to identify cumulative impacts and areas of greatest stress through trend data. Cumulative impacts in EIA are difficult to study in part because it is not possible to monitor every possible environmental impact (Davies, 1992). SOERs however, can help in identifying the areas of greatest stress.
- SOERs can serve as a database which in turn can increase the efficiency of doing an EIA. This has the potential to decrease the costs of collection of data and can become much easier and less time consuming. As well, they can serve as baseline data for environmental audits and monitoring programs.

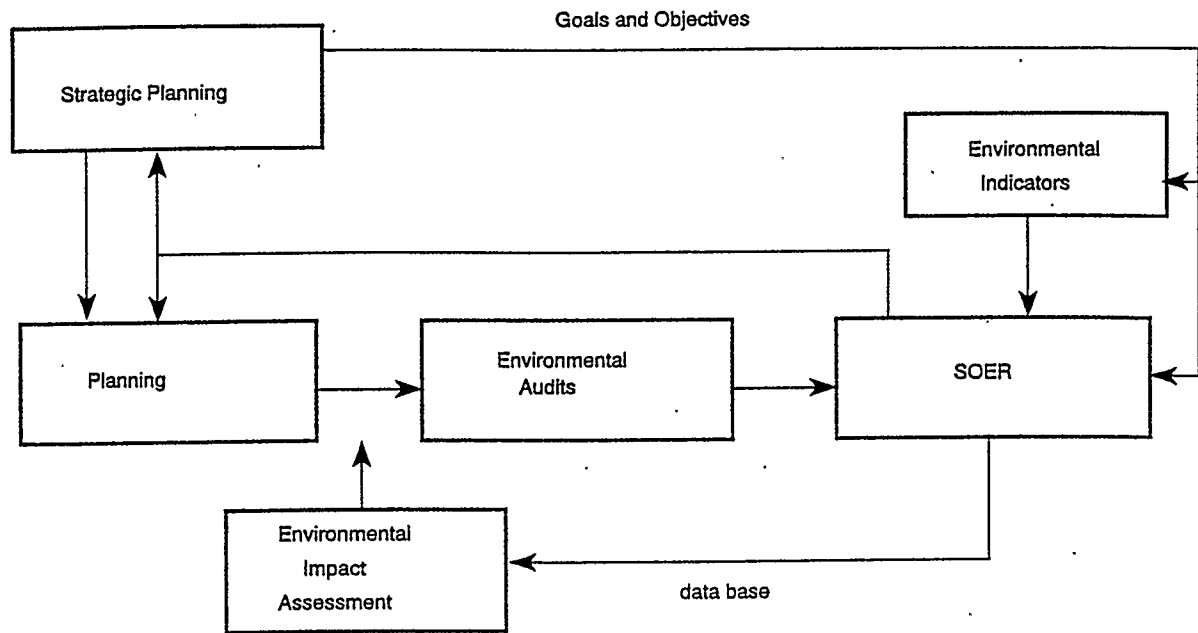


Figure 14: Relationship of SOERs with other management tools.

Management tool

A major objective in producing government SOERs is their use as an environmental management tool (Thompson, 1995). One of the stated objectives of SOE reporting is to provide a management response to the issues (SOE Reporting Branch, 1989). Despite this objective, many reports do not include any management intervention and if there is an attempt, it is generally inconsistent. While SOERs can serve several different functions, such as educating and informing the general public, or providing an inventory or baseline of environmental conditions against which future changes can be judged,

one of their main uses should be the provision of environmental management information. Elkin (1988) states that:

The report should not be seen simply as a pollution accounting exercise or a catalogue of environmental problems. Rather it should attempt to define an overall perspective on environmental issues as well as provide guidance for environmental management (p.62).

Some of the key differences between SOERs arise in relation to the relative emphasis given to commenting on current policies and programs as they affect the environment. Some jurisdictions stress the state of the environment itself, while others go into more detail on human activities that affect the environment and on efforts made to remedy environmental problems or to prevent them. For example, the SOER from Ottawa-Carleton (Ottawa-Carleton Health Department, 1991) is a good example of reporting on management intervention. There are consistent separate sections on "initiatives to improve or protect the environment". Further, the report discusses federal, provincial and municipal initiatives for environmental protection where they are applicable.

Management involves setting goals, organizing resources to achieve those goals, developing feedback mechanisms to provide information regarding programs towards the goals, and a response to the feedback (Dixon Thompson, pers. comm., 1994). While there are many different definitions of management, it is felt that feedback is an important component in order to have a check on the system. The SOERs should incorporate these aspects of management into the reports to be effective and useful to a wide audience.

SOERs could more effectively achieve their stated uses if the reporting process and format were consistent and clear. For example, most SOERs are organized into chapters on environmental media (air, land, water, natural resources) and chapters on economic sectors (forests, mining, agriculture, etc.). Each of these chapters could be organized by clearly indicating the following:

1. Environmental Issues and Problems:

This section would focus on the identification of environmental issues and concerns in the given subject area. It should focus on the most significant issues rather than covering everything. As well, the significance of the issues should be clearly articulated so the reader has some understanding of why they are being reported. The presentation of good news and bad news will be necessary to achieve this properly.

2. Environmental Goals and Objectives:

This section would state environmental goals and objectives that respond to the issues and concerns identified. This section should state goals and measurable objectives, both short and long term and should be followed by an explanation of how these goals might be achieved. The development of goals would be based in part on the information gained from the trends and environmental indicators.

3. Environmental Actions:

This section could include ideas for specific actions to be taken to meet or address the environmental goals and objectives. This could involve some discussion of where to allocate scarce resources.

Effective management requires feedback that allows for effective decision making and monitoring of policy implementation. This is necessary in order to assess performance in relation to the goals set for a program. In environmental reports the feedback should take place in subsequent reports to understand how successful or unsuccessful efforts on environment protection have been.

Input Into Planning and Policy Development

One important role for SOERs should be to serve as management tools in the formulation of environmental plans and strategies (Elkin, 1990; City of Burnaby, 1993). SOERs should be considered as an important basic data source for the formulation of governmental policies (Elkin, 1990). Holtz (1991) notes that SOERs are an emerging tool for use in actual policy formulation and in making specific decisions about regulations. As well, one of the purposes of an SOER is to provide the information which can lead to better environmental policies (OECD, 1995). For example, Elkin (1988) notes that

reports help in the continuing appraisal of the relevance and effectiveness of existing environmental protection policies. Environmental monitoring can lead to the identification of problem areas and trends and then to the

design and implementation of appropriate policies to counter problems and finally to a monitoring of the effectiveness of the policies (p.76).

The reports enable policy makers to take stock of where they stand in relation to their overall environmental goals and where necessary to redesign policies in accordance with changing circumstances and perceived problems.

While few examples of government SOERs have been found that have taken this approach, there are exceptions. Elkin (1990) notes the exception of the Metropolitan of Kirklees (England) which has recognized that the report is only a first step. This report states:

"we do not see the report as an end in itself, but as a tool which must be used effectively. Any authority which takes such matters seriously must use a report to set themselves an environmental agenda containing achievable goals which are regularly reviewed to ensure their implementation" (p.76).

The district of Kirklees Metropolitan Council has responded to the findings of the SOER by setting up an environmental improvements strategy. This approach to the SOER process takes the view that the document should be central to the planning system.

Another example is the SOER for the Municipality of Burnaby which outlines a policy framework to address the environmental challenges facing Burnaby. The report identifies environmental issues and concerns, develops goals and discusses ideas for environmental actions (City of Burnaby, 1993). The purpose of the SOER is to provide a comprehensive framework for identifying and addressing environmental issues and concerns in the City. The SOER is to be incorporated into Burnaby's Official Plan review

and will include the environmental visions and goals that will guide Burnaby in the future.

The stated objectives of Burnaby's SOER include direct reference to:

- developing a set of environmental goals and objectives for the City, and
- integrating an environmental action program into all City decisions and activities

This report goes beyond the traditional state of the environment report in that it is used as a mandate for environmental planning by identifying key issues within the municipality. As well, it includes an environmental action plan for the community in addition to the more typical base line environmental data seen in most SOERs. It is considered as a companion document to Burnaby's Official Plan and will help inform revisions to the new Official Plan (Haid, pers. comm., 1994). Further, the environmental planners use a checklist to identify what actions have been taken since the report was written in order to keep track of how the report is being implemented. The report is used as a set of guidelines and from there the various departments develop a more detailed implementation strategy. The report is also used by the departments of Parks, Planning, Building Permits, Engineering and Environmental Health (Haid, pers. comm., 1994). Because the report has been adopted by Council, the City departments are obliged to consider its contents and use it (Haid, pers. comm., 1994).

Audience Considerations for SOERs

The State of the Environment Directorate (SOED) of Environment Canada states that all SOERs are written in a style and at a level suitable for many different audiences

including the general public, environmental groups, educators, students and decision-makers in government and industry (Simpson-Lewis, 1994). One of the challenges of state of the environment reporting is that most reports have not clearly identified an audience and tailored the information in the reports to the data and reporting needs of that audience. Identification of users should be a critical part of the development and application of an SOER. Clearly one of the challenges in state of the environment reporting is to balance the level of detail needed for decision makers with the need to reduce the complexity and length so as to make the report suitable for all these audiences. The contents of a SOER cannot just inform the public because it is also intended to assist in promoting and guiding effective and efficient intervention and to improve the state of the environment. As well, there may be audiences that require the report more often than others. To be useful SOERs must do a careful assessment of how best to reach several different audiences, namely, the general public and those responsible for managing the resources. It may be necessary to have two versions of the report: one for the general public to educate and inform; and another for those involved in decision-making.

Corporate Environmental Reporting

Similar to SOERs, corporate environmental reports can be used in management functions, such as:

- to guide actions and decisions on the environment
- to assist corporations to define and implement programs or policies
- to evaluate environmental problems; and
- to incorporate environmental concerns into decision-making.

Environmental reports can become an effective tool for proactive environmental planning and management and informed decision-making. However, information that is adequate and relevant to decision-making needs (such as targets) must be presented in the reports to achieve this role.

Some additional uses of corporate environmental reports include:

- providing baseline information for environmental planning and assessment
- providing accountability concerning environmental management
- monitoring progress toward achievement of environmental objectives and targets
- motivating organizations to improve performance (CICA, 1993)
- reporting on environmental performance can help to regain public confidence (CICA, 1993)
- The information compiled in the reports should be valuable in managing operations by enabling identification of environmental status and helping to make projections.

- Preparing reports annually helps to track environmental progress and demonstrates priority that the company places on environmental goals (Sandbourg, 1993).
- A reliable environmental reporting and performance measurement system is needed to provide information for making decisions and to monitor performance (Eckel et al., 1992).
- The allocation of scarce resources towards solving environmental problems requires persuasive evidence of the relative benefits of doing so. Reporting can help to show where resources have been the most effective and where more should be allocated.
- Disclosure gives companies a chance to influence the environmental debate rather than to react passively or defensively.
- Reporting can provide companies with managerial benchmarks and can help focus stakeholders' interest on the environmental issues that companies believe are most important (Naimon, 1993).
- The information in the reports enables management to assess performance and to identify areas that require attention and to encourage management to promote activities that will further enhance the entity's performance in those fields (IISD, 1992).

Although there are some differences in the roles the CERs and the SOERs can serve, some of the key management uses that they both share are as follows:

- Environmental reports help to ensure that decisions are made with adequate, integrated and coordinated information. The environmental reports help to encourage

the inclusion of environmental considerations in decision-making contexts where environmental issues are significant.

- The information contained within the reports can act as baseline data for input into planning and strategic planning contexts.
- Environmental reports can be used to set objectives for environmental programs and to provide feedback for managers.
- Reports may help to establish and maintain credibility in the face of exaggeration and misinformation.
- The reports should make some attempt to orient the decision-making process toward resolving the most urgent environmental problems or prioritizing environmental goals.

While this may involve a certain amount of subjectivity it is still better than the inaction that may result if no attempt is made. As well, in times of financial cutbacks, this should be one of the most beneficial aspects of environmental reports for aiding in the allocation of scarce resources.

Conclusions and Recommendations

The objectives of this project were to (1) examine the current state of corporate environmental reporting and state of the environment reporting; (2) examine and analyze corporate environmental reports and government state of the environment reports; and (3) to look at the uses and roles of environmental reporting.

To achieve these objectives 56 corporate environmental reports and 36 government state of the environment reports were examined to determine the criteria for good environmental reports. Because no method for analyzing or determining reporting criteria was established in the literature an iterative process was used to:

1. Determine an initial set of criteria by analyzing the reports
2. Re-examine the reports to see how well they met the established criteria and to provide a discussion of the criteria.

Corporate Environmental Reports

Early efforts to disclose and report on environmental performance in annual financial reports appears to have been associated primarily with public relations management. Recent efforts to produce stand-alone environmental reports, however, have taken on a more substantive role in environmental management. Although some stand-alone environmental reports appear to be published for public relations reasons, many examples are emerging where the reports are serving a considerably different purpose such as tracking progress toward sustainable development.

There is no consensus as to what constitutes a standardized format for a corporate environmental report. There is very little academic literature on the subject of corporate environmental reporting probably because corporate environmental reporting is a very recent practice. Moreover, the literature that does exist on environmental reporting does not provide any consistent framework for reporting. Despite the guidelines that have been developed, environmental reports vary greatly in terms of content, format and presentation. Further, these guidelines do not represent the driving forces behind corporate environmental reporting.

Recommendation 1: There are many driving forces behind environmental reporting. Corporate environmental reports are an increasingly important part of environmental management. The key driving forces identified in this project for producing a report include the following:

- Reporting can help to avoid, or at least reduce, the need for command and control approaches to managing operations and instead can help corporations and industries focus on self-policing.
- Reports are a valuable means for evaluating continuous improvement of a company's performance over time.
- Reports provide a focus for the whole company's environmental program by highlighting the shortcomings and recording achievements and act as a stimulant for future actions.

- Reporting enables a company to track their environmental performance, especially if targets and goals linked to performance data are reported.
- Reporting can increase and demonstrate the accountability of corporations where environmental performance is concerned.
- In the event that a company is charged with environmental violations, one possible defence is due diligence. Due diligence generally means that the defendant took all reasonable steps to avoid a particular event. Environmental reporting shows that directors and officers understand the organization's environmental issues and thus it helps to demonstrate that they have maintained an effective environmental management system. As well, by reporting an organization's progress and shortcomings on its environmental initiatives the company can demonstrate that it recognizes its duty of care and that the company is willing to be accountable for its environmental performance and actions.
- It demonstrates commitment and shows progress.
- It shows transparency, accountability and awareness.
- Reporting is valuable for building trust (risk management).
- Reporting provides a motivation for improvement.
- Reporting can be valuable in terms of earning a licence for continuing operations and setting up new operations (cost and time savings).

Recommendation 2: The model and criteria which follow should be used by companies seeking to develop effective corporate environmental reports.

Based on the analysis of the corporate environmental reports it was determined that the three key attributes of a good corporate environmental report should be:

1. Commitment to Environmental Management
2. Demonstrated Environmental Performance
3. Credibility

1. Commitment to Environmental Management

Commitment to environmental management communicates how a company plans to deal with the environment and how well engrained environmental considerations are in the corporate culture. This is necessary to provide the reader with an understanding that the corporation is aware of its impacts and has systems in place to deal with them. The criteria identified in this project which are used to effectively communicate a commitment to environmental management in environmental reports include:

- a candid foreword or letter signed by the CEO
- reporting on the corporate environmental policy and principles
- reporting on the company's environmental management system (EMS) which clearly indicates that systems and programs are in place or under development to deal with issues
- reporting on targets which are used to track and measure progress (with related indicators)
- providing a discussion of auditing practices and findings; and
- reporting on community relations

2. Demonstrated Environmental Performance

Demonstrated environmental performance is critical to support the claims of commitment to the environment. The company must go beyond just conveying its environmental commitments. Performance is best shown by providing quantitative performance data in the form of EPIs that are linked to targets and that show trends which indicate how a corporation is achieving its targets. The reports should make reference to earlier reports to demonstrate how they are progressing. Reports providing quantified data (both CERs and SOERs) should provide absolute numbers or statistical data where possible and not just the percentage of reductions from previous years because this type of information can be misleading. Additional criteria established in this project for demonstrating environmental performance include:

- information on worker health and safety
- research and development efforts
- results of waste management initiatives
- results of other environmental initiatives

3. Credibility

Concern has been expressed about the quality of information that is shared with the public in annual financial reports (McMurdy, 1995). The key information which is to be conveyed by the reports is often considered to be evasive (McMurdy, 1995). As such, considerations of credibility in writing and producing an environmental report are important. Credibility is best communicated by:

- providing an open and balanced discussion of good news and bad news, including shortcomings in performance such as information on spills, accidents and prosecutions
- provision of a prepaid comment card
- clearly defining the issues that are relevant to the company
- limiting the use of irrelevant photos can help in enhancing report credibility.

External validation is considered to be a valuable means to enhance credibility and ensure objectivity of environmental reports. It may become more common in the future.

While regular reporting is necessary to ensure that progress is being made, corporate environmental reports may not need to be produced annually. Because there may not be significant changes from one year to the next, companies should consider producing an update of the data for years when a full report is not produced. This way corporations will not be spending money on developing a CER annually just for the sake of appearances.

The top 25% of the reports analyzed exhibited the following:

All of the reports had:

- discussion of environmental management systems
- quantified performance data
- results of environmental initiatives
- were not public relations driven

- presented good news and bad news
- reported on fines, accidents, spills, or exceedances

88% of the top 25% of reports had:

- a letter or foreword by the CEO
- an environmental policy
- objectives and targets
- environmental audit information
- results of waste management
- a prepaid comment card

Recommendation 3: It is recommended that the criteria established in this Master's Degree Project be used for benchmarking in environmental reporting.

McNair and Leibfried (1992) define benchmarking as an external focus on internal activities, functions or operations in order to achieve continuous improvement. The objective is to understand existing processes within a firm and then to identify an external point of reference or standard by which that activity can be measured. The overriding objective of benchmarking is to identify the best practice in order to ensure better performance (McNair and Leibfried, 1992). The criteria for good CERs established in this project can be used as the external focus for companies wanting to benchmark on environmental reporting.

State of the Environment Reports

Similar to corporate environmental reports, there is no standard format for state of the environment reports. As a result they vary greatly in length, frequency, content, and their approach to commenting on and providing information on management intervention.

Recommendation 4: The main reasons identified in this project why governments should produce SOERs include:

- State of the environment reporting can help decision-makers establish priorities and resolve the most urgent environmental problems. Monitoring and reporting is critical in the formulation of environmental management policies for sustainable use of the environment and its resources.
- Information from SOERs can help to allocate scarce resources to where they are most needed. The information can be used to evaluate the effectiveness of publicly funded interventions and to make informed choices about where to put limited resources. The SOERs could state that: they have achieved goals and no funds are necessary; they are still in the process of achieving their goals and more money should be allocated; or new projects need to be established or areas of concern where resources should be directed.
- SOERs can help to offset myths, ideologies and exaggeration about the environment. This can result in resources being allocated in the wrong places or on less serious problems. One advantage which stems from producing a SOER is that it gives

governments a chance to influence the environmental debate rather than to act passively or defensively.

Recommendation 5: SOERs should be used to clearly communicate three things:

1. Identification of environmental issues
2. Development of environmental goals and objectives that respond to the issues and concerns identified
3. Identification of environmental actions to be taken to meet the goals and objectives.

Recommendation 6: To effectively determine issues and objectives the key criteria which should be provided or considered in SOERs include:

- Information on trends: This is necessary to determine how close the environment is to a desired state and whether it is moving toward or away from that state. Also, trends help the reader to understand where actions have been effective or ineffective and where to set priorities. Trends are also important in terms of determining if there are areas or parameters for which no data are available. This is important in terms of determining what new monitoring functions may be needed.
- Environmental indicators: Indicators are necessary to provide succinct, understandable, concise information which summarizes aspects of the state of the environment. Since the numbers of environmental variables are so great, it is essential to focus on a number of critical ones that can be considered as indicators of the environment or of significant change. Management practices need to be continually

reviewed to ensure they result in sustainable resource use and protection. In this respect SOE reporting using environmental indicators wherever possible is very important. "Scalers" are important to include along with environmental indicators in order to give an idea of the relative importance of a specific impact. If one specific source of impact is small relative to another source then the benefits from allocating money or other efforts to reduce that specific source would be relatively small. Scalers provide an indication of where resources can be best placed. Also, environmental indicators should be used for:

- measurement of performance (and feedback for management)
 - building blocks for state of the environment reports
 - integrating environmental and economic decision-making
 - baseline data
 - determining trends
 - allocation of scarce resources
 - early warning system
 - identifying significant data gaps
-
- Good News and Bad News: Presentation of balanced information is important if accurate and effective goals are to be developed. At present most reports tend to favour good news, neutral and non-controversial issues.
 - Regularly produced: SOERs need to be ongoing efforts to develop continuous baselines or to highlight issues and problems. If they become an intermittent process

then governments will miss a major management tool. Unfortunately recent budget cuts have resulted in the disbanding of Environment Canada's State of the Environment Reporting Unit (Anon, 1995). The federal government will no longer produce a comprehensive SOER for Canada. Electronic databases for SOE information can be very useful in terms of reducing the costs of putting out hard copies of SOERs. It would also allow for continuous updating of the information as well as allowing for easy extraction of information between written reports.

Many SOERs are directed at educating the general public. The role of SOERs can and should be expanded to include the information from SOERs as a form of feedback for and input into strategic planning or policy development. The information from SOERs can also act as a baseline for input into strategic planning. Environmental factors must be included in strategic planning if they are not to be expensive afterthoughts. By identifying major problems and key issues, SOERs can be a useful part of strategic planning.

State of the environmental reports differ considerably in the degree to which they provide information to guide environmental management. This remains a weak feature of most SOERs. A few recent SOERs, however, are becoming more useful by moving towards an environmental management function by providing input into strategic planning and planning and by identifying weaknesses in management practices.

Although first time SOERs are a major step in establishing a baseline of data which can be updated regularly, the key to state of the environment reporting is not to develop large, all encompassing databases or information for many or all issues. More information is now available than is being used effectively to plan solutions (Elkin, 1990). It becomes clear from reading many of the SOERs that a substantial amount of data on the state of the environment has been assembled. SOERs could be more effective if they developed the specific information necessary and applied it thoughtfully and directly to carefully identified problems and objectives in order to permit better decisions than were possible in the past. As well, the SOERs should summarize important environmental problems which must be faced in the period to the next report. This could help in reducing the considerable size and length of the documents.

Recommendation 7: Environmental reports, both CERs and SOERs, can be used for several different purposes. Some of the key uses for doing an environmental report include:

- Ensuring that decisions are made with adequate, integrated and coordinated information. SOERs and CERs can help to encourage the inclusion of environmental considerations in decision-making contexts where environmental issues are significant in institutions or corporations.
- Setting targets, goals and objectives for programs to bring about environmental improvements and to monitor progress in performance or on the state of the environment.

- To allocate scarce resources to where they are the most needed and can bring about the greatest benefits.

Appendix 1: Criteria for Environmental Indicator Selection

Policy Relevance and Utility for Users

1. Responsive to Change

The indicator should show changes or trends in the environment or in an environment-related human activity, ideally within a fairly short time frame (Kerr, 1991; Western Environmental and Social Trends, 1990). Also, they should be flexible in order to respond to new scientific information and changes in public attitudes.

2. Understandable

The indicator must be simple and clear, its significance should be fairly obvious and easily understood by those nonspecialists intended to make use of them, particularly in the context of the issue to which it is related (Kerr, 1991).

3. Relevance

The indicator should be relevant to stated goals and objectives as well as to policies or issues of concern (Kerr, 1991). Also, indicators should be relevant to people's lives by relating to the things that people value or with which they can identify (Western Environmental and Social Trends, 1990).

4. Useful and purposeful

The indicators should represent matters which require attention and action. They must tie into human necessity and political imperatives (Western Environmental and Social Trends, 1990).

5. Clarity

The indicator and its significance should not depend on subtle or complex interpretations but should be capable of being readily understood by the public and non-specialists (VHB Research, 1989). Putting the information in a visual format, such as graphs or a tabular form, may be beneficial in this respect.

6. Utility: The indicator should be selected and rationales developed with close attention to needs of potential users (VHB Research, 1989).

7. Comparable - between corporations and between countries (Thompson, 1993).

8. For purposes of efficiency indicators should serve more than one purpose. For example they should provide feedback for planning and management (Thompson, 1993).

9. Clearly defined and unambiguously interpreted as well, not easily distorted or misused (Thompson, 1993).

10. Drive policy and practice in the right direction, for example, promote prevention not focus on cures (Thompson, 1993).

11. Scalars - a mechanism to indicate the scale of the problem (eg. various anthropogenic sources relative to natural sources)

Analytical Soundness

1. Scientific Validity

The indicator has to be technically sound, consistent with scientific understanding of the system or element being described and its significance (Kerr, 1991). Its attributed significance should be scientifically defensible (VHB Research, 1989).

2. Representative

The information that an indicator conveys should provide a representative picture of environmental conditions, pressures on the environment or society's responses (Kerr, 1991).

3. Lend itself to being linked to economic models, forecasting and information systems

Measurability

1. Data Availability

The indicator should be supported by sufficient data (more than one time period) to show trends over time and be readily available. The security of data monitoring programs should be reasonably stable to ensure comparable data in the future (Kerr, 1991).

2. Target or threshold

Ideally an indicator should have a target or threshold against which to compare it in order that users are able to assess the significance of the values associated with it (Kerr, 1991).

3. Trends

Indicators should be chosen which illustrate changes or trends within a fairly short time frame (Western Environmental and Social Trends, 1990).

4. Consistency

They should be consistent with existing data series and indicators already in use by others with whom comparisons might wish to be made. Enables comparisons over time and space (VHB Research, 1989).

5. Time

The amount of time required to obtain an indicator may affect the relevance (timeliness) of the indicator (Gelinas and Slaats, 1989).

6. Cost

The cost associated with obtaining the SOE indicator can be prohibitive. The cost of obtaining or using the indicator should correspond to the importance of the results (Gelinas and Slaats, 1989).

7. Updated at regular intervals in accordance with reliable procedures.

Appendix 2: Addresses of Government Agencies contacted for State of the Environment Reports

The State of the Environment Report for Burnaby, September, 1993
Environmental Planner, Planning and Building Inspection
District of Burnaby
4949 Canada Way, Burnaby, BC
V5G 1M2
City of Burnaby,

Toronto's First State of the City Report
June, 1993
City of Toronto

State of the Environment: Regional Municipality of Hamilton-Wentworth
Planning and Development Department
October, 1990

State of the Environment Report: An Environmental Health Perspective, Regional
Municipality of Ottawa-Carleton
August, 1991
Ottawa-Carleton Health Department
594 Richmond Road
Ottawa, Ontario K2A 4A4

State of the Environment Report: Waterloo Region
1986
School of Urban and Regional Planning
University of Waterloo
Waterloo, Ontario
N2L 3G1

State of the Environment Report for British Columbia, 1993
Province of British Columbia
Ministry of Environment, Lands and Parks
Public Affairs Branch
810 Blanshard Street
Victoria, B.C.
V8V 1X4

Saskatchewan State of the Environment Report, 1991
Saskatchewan Environment and Public Safety
Public Affairs
3085 Albert Street
Regina, Saskatchewan
S4S 0B1

State of the Environment: Report for Manitoba, 1991; 1993
Manitoba Environment
Building 2
139 Tuxedo Avenue
Winnipeg, Manitoba
R3N 0H6

Environmental Quality in the Atlantic Provinces, 1979
Environmental Protection Service
Environment Canada
Atlantic Region

Environmental Quality in the Atlantic Region, 1985
Environmental Protection Service
Environment Canada
Atlantic Region

State of the Environment in the Atlantic Region, 1994
Environment Canada
Atlantic Region

State of the Environment in Australia, 1986
Department of Arts, Heritage and Environment
GPO Box 1252
Canberra, ACT 2601

New South Wales State of the Environment, 1994
Environmental Protection Authority
799 Pacific Highway
P.O. Box 1135
Chatswood 2057

The State of Canada's Environment, 1991
State of the Environment Reporting
Ottawa, Canada, K1A 0H3

Etat de l'Environnement au Quebec, 1992

Ministere de l'environnement
Gouvernement du Quebec

The State of the Environment in Switzerland, Summary
1990 Report on the Environment
Fédéral Office of Environment, Forest and Landscape
EDMZ, 3000 Bern (CH), Switzerland

Health of the Planet, 1992
Gallup International Institute
47 Hulfish St.
P.O. Box 140
Princeton, New Jersey, USA

The State of the Environment, 1986
United Nations Environment Programme
P.O. Box 30552
Nairobi, Kenya

Work Resources: A Guide to the Global Environment, 1992-1993
A Report by the World Resources Institute
United Nations Environment Programme

The State of the Environment, 1985; 1991
Organization for Economic Cooperation and Development
2, rue Andre-Pascal
75775 Paris Cedex 16, France

The following SOERs were obtained from:

State of the Environment Reporting
Environment Canada
Ottawa, Ontario, K1A 0H3

A SOER: Contaminants in Canadian Seabirds, 1990
State of the Environment Reporting, Environment Canada, and Canadian Wildlife Service,
Conservation and Protection, Environment Canada.

A SOER: Understanding Atmospheric Change, 1991
State of the Environment Reporting, Environment Canada;
Atmospheric Environment Service, Environment Canada

A SOER: Pollutants in B.C.'s Marine Environment: A Status Report, 1989

State of the Environment Reporting, Environment Canada;
Environmental Protection, Pacific and Yukon Region
Conservation and Protection, Environment Canada

A SOER: State of the Environment for the Lower Fraser River Basin, 1992
State of the Environment Reporting, Environment Canada
Ottawa, Ontario
K1A 0H3

A SOER: Canadian Perspectives on Air Pollution, 1990
State of the Environment Reporting, Environment Canada
Atmospheric Environment Service, Environment Canada

A SOER: The State of Canada's Climate, Temperature Change in Canada
State of the Environment Reporting, Environment Canada
Atmospheric Environment Service, Environment Canada

State of the Environment Reporting, Environment Canada
Atmospheric Environment Service, Environment Canada

Appendix 3: Addresses of Corporations Contacted for Reports

EUROPE

Bayer AG
Bayerwerk
5090 Leverkusen, Germany

BP Chemicals Ltd.
76 Buckingham Palace Rd
London SW1WO SU
England

British Telecommunications
81 Newgate Street
London, EC 1A 7AJ
England

Henkel KGAA
Henkelstrasse 67
Postfach 1100
D - 4000 Dusseldorf 1
Germany

National Westminster Bank Plc
41 Lothbury
P.O. Box 82
Redcliffe Way
London EC 2P 2BP
England

Swiss Air
Hirschengraben 84
Zuerich 8001
Switzerland

The Body Shop International
Watersmead Business Park
Littlehampton
West Sussex BN 176 LS
England

British Airways
Speedbird House, P.O. Box 10
Heathrow Airport
Hounslow, TW6 2JA
England

Ciba-Geigy
Klybeckstrasse 141
CH - 4002 Basel
Switzerland

ICI
9 Millbank
London SW1P 3JF

Norsk Hydro UK
Bridge House
69 London Road
Twickenham
TW1 1EE
UK

Thorn EMI Plc
4 Tenterden Street
Hanover Square
London W1A 2AY
England

CANADA

Abitibi-Price Inc.
207 Queen's Quay West
Suite 680 Box 102
Toronto, Ontario
M5J 2P5

Bell Canada
1420, 1050 Cote Du Beaver Hall
Montreal, Quebec
H2Z 1S4

Canadian Occidental Petroleum Ltd.
1500, 635 - 8th Ave. S.W.
Calgary, AB
T2P 3Z1

Celanese Canada Inc.
P.O. Box 99
Edmonton, Alberta
T5J 2H7

Dofasco Inc
1330 Burlington St. E.
P.O. Box 2460
Hamilton, Ontario

Dow Chemical Canada Inc
1086 Modeland Rd
Sarnia Ontario
N7T 7K7

Eddy EB Forest Products
1 Station Toad
Espanola, Ontario
P0P 1C0

Imperial Oil Ltd.
111 Street Clair Ave. W.
Toronto, Ontario
M5W 1K3

Amoco Canada Petroleum Co.
240 - 4th Ave S.W.
Calgary, Alberta
T2P 4H4

British Columbia Hydro and Power
970 Burrard Street 5th Floor
Vancouver, B.C.
V6Z 1Y3

Canfor Corporation
2900, 1055 Dunsmuir St.
PO Box 49420, Bentall Postal
Vancouver British Columbia
V7X 1B5

Cominco Ltd.
500, 200 Burrard Street
Vancouver, British Columbia
V6C 3L7

Domtar Inc
395 de Maisonneuve Blvd. W.
Montreal, Quebec
H3A 1L6

DuPont Canada Inc.
Box 2200
Streetsville
Mississauga, Ontario
L5M 2H3

Hydro-Quebec
75 Rene-Levesque Blvd. W.
Montreal, Quebec
H2Z 1A4

Lever
1 Sunlight Park Road
Toronto, Ontario
M4M 1B6

Macmillan Bloedel Ltd
925 West Georgia Street
Vancouver, British Columbia
V6C 3L2

Noranda Minerals Inc.
4100, 181 Bay Street
BCE Place
Toronto, Ontario
M5J 2T3

Nova Corporation of Alberta
801 - 7th Ave. S.W.
Calgary, Alberta
T2P 2N6

Petro-Canada
P.O. Box 2844 Station M
Calgary, Alberta
T2P 9Z9

Tembec Inc
2790, 800 Rene-Levesque Blvd.
Montreal, Quebec
H3B 1X9

Noranda Forest Inc
4414, Toronto Dominion Centre
Box 7
Toronto, Ontario
M5K 1A1

Northern Telecom Ltd.
3 Robert Speck Pkwy.
Mississauga, Ontario
L4Z 3C8

Ontario Hydro
700 University Ave
Toronto, Ontario
M5G 1X6

Shell Canada Ltd.
P.O. Box 100, Station M
Calgary, Alberta
T2P 9Z9

UNITED STATES

Ashland Oil Inc
Deck Slone
Corporate Communications
P.O. Box 391
100 Ashland Drive
Ashland KY 41114
United States

Baxter Healthcare Corporation
One Baxter Parkway
Deerfield, Illinois
60015

Browning-Ferris Industries Inc
757 N. Eldridge
P.O. Box 3151
Houston, TX
77253

Duke Power Company
P.O. Box 33189
Charlotte, N.C.
28242

Eastman Kodak Co.
343 State Street
Rochester, New York
14650
United States

Merck and Co., Inc
P.O. Box 2000
(RY 32 - 68)
Rahway, NJ
07065 - 0900

Polaroid Corporation
549 Technology Square
Cambridge, MA
02139
United States

AT & T Co.
131 Morristown Road
Room B1338
Basking Ridge, NJ
07920

Bristol - Myers Squibb
345 Park Avenue
New York, NY
10154

Dow Chemical Company
2030 Willard H. Dow Centre
Midland, Mi 48674

Du Pont
1007 Market Street
Nemours 11539
Wilmington, DE
19898

Johnson and Johnson
One Johnson and Johnson Plaza
New Brunswick, NJ
08933

Monsanto Company
800 North Lindbergh Boulevard
St. Louis, MO
63167

Procter and Gamble Company
2 Procter and Gamble Plaza
Cincinnati, OH
45202 - 3314

Rohm and Haas Company
Independence Mall West
Philadelphia, PA
19105
United States

Sun Company Inc
100 Matsonford Road
Radnor PA
19087 - 4597

Toyota Motor Corp.
9 W 57th St Ste 4900
New York, NY
10019 - 2601

Volkswagen, AG
Volkswagen Public Relations Department
Volkswagen United States Inc
Public Relations Mail Code 3002
P3800 Hamlin,
Auburn Hills, MI
48326

Waste Management Inc
3003 Butterfield Road
Oak Brook, IL
60521

The Southern Company
64 Perimeter CenterEast
Atlanta, GA
30346

S.C. Johnson Wax Inc.
1525 Howe Street
Racine, WI
53403

Union Carbide
39 Old Ridgeberg Road
Danbury, CT
06817-0001

Volvo North America Corporation
535 Madison Avenue
25th Floor
New York, NY
10022

Bibliography

Abitibi-Price. An Environmental Progress Report. No date.

Alberta Environmental Protection. "What are Environmental Indicators". Alberta's State of the Environment Fact Sheet #2. Summer, 1994.

Anon. "Groups fear loss of report on environment". The Calgary Herald. May 2, 1995: A13.

Badeaux, Guy (ed.). Portfolio: 1989 in Canadian Caricature. MacMillan of Canada. Toronto, Ontario. 1989.

Badeaux, Guy (ed.). Portfolio: The Year in Canadian Caricature. MacMillan of Canada. Toronto, Ontario. 1990.

Bakkes, J.A et al. An Overview of Environmental Indicators: State of the art and Perspectives. United Nations Environment Program. June 1994.

Bayswater Consulting Group. The Status of State of the Environment Reporting Activities in Canadian Jurisdictions. Prepared for the Canadian Council of Ministers of the Environment State of the Environment Reporting Task Group. 1994.

Beamish, Dick. Personal Communications. Senior Scientist Department of Fisheries and Oceans, Pacific Biological Station. (604) 756-7029

Billing, Randy and Barb Scott. "Current Level of Environmental Reporting Leaves Significant Room for Improvement". The Financial Post Annual Report Awards: The Judges' Comments. CICA. 1993.

Birchard, Bill. "By the Numbers" in Tomorrow. pp. 52-53. no date.

Bristol Myer-Squibb. Report on Environmental Progress. 1993.

British Gas. British Gas Environmental Review. 1993.

British Telecommunications. BT and the Environment: Environmental Performance Report. 1993.

Burch, Douglas. "Municipal Reporting on Sustainable Development: Charting New Ground" in National Round Table Review. Spring, 1994.

- Burch, Douglas. Municipal Reporting on Sustainable Development: A Status Review. (Working Paper no. 24). National Round Table on Environment and Economy (NRTEE). Ottawa, Ontario. January, 1994.
- British Columbia Ministry of Environment, Lands and Parks. State of the Environment Report for British Columbia. 1993.
- Brownwell, William. "A survey of Environmental Reporting and Disclosure Requirements". Hunton and Williams Washington D.C. Paper Presented at Corporate Environmental Reporting Workshop for World Environment Centre. August, 1994.
- BSI. British Standards. Specification for Environmental Management Systems. BS 7750. Great Britain. BSI, 1994.
- CEPA. Canadian Environmental Protection Act. R.S.C. 1985, C. 16, 4th Supplement. Section 7.
- CCC. Canadian Chamber of Commerce. A Guideline on Corporate Environmental Reporting. Toronto, Ontario. Canadian Chamber of Commerce. 1992.
- CERES. Coalition for Environmental Responsible Economies. Guide to the CERES Principles. Boston, Massachusetts. 1994.
- Canadian Forest Service Newsletter. "Canadian Criteria and Indicators Initiative for Sustainable Forest Management". Vol 1, Issues 1 and 2. April/May 1994 and June/July 1994.
- "Cefic Steps up drive for standard Environmental Reporting" in Chemical Week. July 28, 1993: 10.
- Cefic: Emissions Reporting Goal: Working Toward Common Standards" in Chemical Week. July 7/14, 1993: 123-124.
- Chemical Industries Association. Environmental Reporting. London, England. 1992.
- Chemical Manufacturers Association. Responsible Care: A Public Commitment and Responsible Care Progress. 1992.
- CICA. Canadian Institute of Chartered Accountants. Reporting on Environmental Performance: A Discussion Paper. CICA and Canadian Standards Association, Toronto, Ontario. July 1993a.
- CICA. Environmental Costs and Liabilities: Accounting and Financial Reporting Issues. CICA, Toronto, Ontario, 1993b.

CICA. Reporting on Environmental Performance. CICA, Toronto, Ontario, 1994.

City of Burnaby. The State of the Environment Report for Burnaby. Burnaby, British Columbia. 1993.

City of Toronto. Toronto's First State of the City Report. Toronto, Ontario. 1993.

Cogan, D. and Scott Fenn. "Public Environmental Reporting Initiative" in Investor's Environmental Report. Investors Responsibility Research Centre, Vol.3, no. 3, 1993: 1, 12-13.

Confederation of British Industries and the Chartered Association of Accountants. Introducing Environmental Reporting: Guidelines for Business. London. No date.

CSA. Canadian Standards Association. A Voluntary Environmental Management System. Toronto, Ontario. CSA, 1994.

Cutter Information Corp. "Trends in Corporate Environmental Management" in Business in the Environment. Vol. 1, 1994.

Cutter Information Corp. "Shell Canada Uses Environmental Report to Track Progress on Sustainable Development" in Business and the Environment. Vol 6, No. 3. March, 1995: 4-6.

Deloitte Touche Tohmatsu International. Current Issues in Financial Reporting. 1994-1995 edition.

Deloitte and Touche Tohmatsu International and the IISD (International Institute for Sustainable Development). Coming Clean: Corporate Environmental Reporting. Deloitte and Touche Tohmatsu International. 1993.

Department of Arts, Heritage and Environment. State of the Environment in Australia, 1986.

Dow Canada. Environmental Progress Report. 1993.

Eaton et al. Environmental Quality in the Atlantic Provinces. Environmental Protection Service, Environment Canada, Atlantic Region. 1979.

Eaton et al. Environmental Quality in the Atlantic Region. Environmental Protection Service, Environment Canada, Atlantic Region. 1985.

Eaton et al. State of the Environment in the Atlantic Region. Environment Canada, Ottawa, Canada. 1994.

- The E.B. Eddy Group. A Question of Balance: Second Status Report on Sustainable Development. August, 1994.
- Eckel, L. and Kathryn Fisher and Grant Russel. "Environmental Performance Measurement" in CMA Magazine. March 1992: 16-23.
- Elkin, T.J. State of the Environment Report - Regional Municipality of Waterloo. Working Paper Series no. 23, School of Urban and Regional Planning, Faculty of Environmental Studies, University of Waterloo, Ontario. 1987.
- Elkin, T.J. Municipal State of the Environment Reports: A Case Study. Unpublished Ph.D. Thesis, School of Planning, University of Waterloo. 1988.
- Elkin, T.J. "State of the Environment Reports and National Conservation Strategies: The Linkages" in Alternatives. Vol. 16, No. 4. 1990: 52-61.
- Elkington, John and Nick Robins. The Corporate Environment Report: A Necessary Condition for the Implementation of Industry's Voluntary Codes of Conduct on Environment and Sustainable Development. SustainAbility. 1993
- Environment Canada. A Study of Environmental Reporting in Canada. Conservation and Protection Headquarters, SOE Reporting Branch, Environment Canada, Ottawa. 1987.
- Environment Canada and Statistics Canada. Databases for Environmental Analysis: Government of Canada. Ottawa, Canada: Environment Canada and Statistics Canada. 1994.
- Ernst and Young. Corporate Reporting on Environmental Performance. Canada, Ernst and Young Environmental Services. 1994a.
- Ernst and Young. General Framework for Environmental Management. Canada, Ernst and Young Environmental Services. 1994b.
- Ernst and Young. Managing Environmental Issues. Canada, Ernst and Young Environmental Services. 1994c.
- Ernst and Young. Survey of Environmental Management in Canada. Canada, Ernst and Young Environmental Services. 1994d.
- "Europe Progresses Despite Financial Hardships: Advances in Reporting, Management". Chemical Week. December 8, 1993: 62- 65.
- European Chemical Industry Council and Responsible Care. CEFIC Guidelines on Environmental Reporting for the European Chemical Industry. June, 1993.

- Gardner, J. Evaluation of the State of the Environment Report for British Columbia. March, 1994.
- Gelinas, R. and J. Slaats. Selecting Indicators for State of the Environment Reporting. Technical Report #8. Strategies and Scientific Methods, SOE Reporting Branch, Environment Canada. 1989.
- GEMI. Global Environmental Management Initiative. Environmental Reporting in a Total Quality Management Framework: A Primer. No date. GEMI, Washington, D.C.
- Golley, Frank, B. A History of the Ecosystem Concept in Ecology. Yale University Press, New Haven and London. 1993.
- Government of Canada. Canada's Green Plan for a Healthy Environment. Minister of Supply and Services. 1990.
- Gray, Rob. "Current Practice in Environmental Reporting" in Social and Environmental Accounting: The Newsletter of The Centre for Social and Environmental Accounting Research. University of Dundee. Volume 13, No. 1. Spring, 1993a.
- Gray, Rob. Accounting for the Environment. The Chartered Association of Certified Accountants. Chapman Publishing Company, London, England. 1993b.
- Gray, Rob and David Owen. "The Rocky Road to Green" in Certified Accountant. March, 1993: 36-38.
- Gray, Rob, and David Owen. "Environmental Reporting Award: Profession Fails to Rise to the Challenge" in Certified Accountant. April, 1994: 44-48.
- Gullet, D. and W. Skinner. A State of the Environment Report: The State of Canada's Climate: Temperature Change in Canada 1895-1991. State of the Environment Reporting, Environment Canada, Ottawa, Canada. 1992.
- Haid, Susan. Personal Communications. City of Burnaby, Environmental Planner, Planning and Building Inspection, Corporation of the District of Burnaby, 4949 Canada Way, Burnaby, B.C. (604) 294-7297
- Harte, G. and D. Owen. "Environmental Disclosure in the Annual Reports of British Companies: A Research Note:" in Accounting, Auditing and Accountability Journal. Vol. 6, No. 3, 1991: 51-61.
- Hengeveld, Henry. A State of the Environment Report: Understanding Atmospheric Change. State of the Environment Reporting, Environment Canada, Ottawa, Canada. 1991.

- Herremans et al. "An investigation of Corporate Social Responsibility Reputation and Economic Performance" in Accounting, Organizations and Society. Vol 18, No. 7/8. 1993: 587-604.
- Hilborn, J. and M. Still. A State of the Environment Report: Canadian Perspectives on Air Pollution. State of the Environment Reporting, Environment Canada, Ottawa, Canada. 1990.
- Holtz, Susan. "Reporting Environmental Information" in Proceedings of Environmental Information Forum. Montreal, Canada, May 21-24, 1991.
- Huizing, A. and Carel Dekker. "Helping to Pull Our Planet Out of the Red: An Environmental Report of BSO/Origin" in Accounting, Organizations and Society. Vol. 17, No. 5. 1992: 471-475.
- The Hundred Group of Finance Directors. Statement of Good Practice - Environmental Reporting in Annual Reports. The Hundred Group of Finance Directors Environmental Working Party, June, 1992.
- IISD. International Institute of Sustainable Development. Business Strategy for Sustainable Development. IISD, Winnipeg, Manitoba. 1992.
- Indicators Branch. Environmental Indicator Selection Criteria. State of the Environment Directorate, Environment Canada. 1994.
- Indicators Task Force. A Report on Canada's Progress Towards a National Set of Environmental Indicators. SOE Report # 91-1. State of the Environment Reporting, Environment Canada. 1991.
- Jacob, M. "Environmental Auditing and Management in Local Government" in Journal of the Institution of Water and Environmental Management. October, 1992: 583-587.
- Jenkins, G. Personal Communications. Chartered Accountant with Deloitte and Touche, Toronto, Ontario. (416) 601-6260
- Kay, B.H. A State of the Environment Report: Pollutants in B.C.'s Marine Environment: A Status Report. State of the Environment Reporting, Environment Canada, Ottawa, Canada. 1989.
- Kerr, Anne. Framework for State of the Environment Reporting Operations. Technical Report No. 1., SOE Reporting Branch, Environment Canada, Ottawa. 1988.

- Kerr, Anne. Selection and Presentation of a National Set of Preliminary Environmental Indicators: Canada's Experience. Conference of European Statisticians. State of the Environment Reporting: Environment Canada. 1991.
- Keddy, C.J. and T. McRae. Environmental Databases for SOE Reporting. Conservation and Protection Headquarters. Technical Report No. 9, SOE Reporting Branch, Environment Canada, Ottawa. 1989.
- Kerr, Anne. Briefing Note on Indicators. Indicators Branch, State of the Environment Reporting, Environment Canada. 1994a.
- Kerr, Anne. National Environmental Indicators: Summary Status Report. Indicators Branch, State of the Environment Reporting, Environment Canada, 1994b.
- KPMG. "Environmental Performance Measurement: If you can't measure it, you can't manage it" in Environmental Solutions: A Newsletter on Business and the Environment. KPMG Peat Marwick Thorne, Toronto, 1993a.
- KPMG. International Survey of Environmental Reporting. KPMG Peat Marwick Thorne. Toronto Canada. 1993b.
- KPMG. Canadian Environmental Management Survey. KPMG Peat Marwick Thorne. Toronto, Canada. 1994a.
- KPMG. Environmental Risks and Opportunities. KPMG Peat Marwick Thorne. Toronto, Canada. 1994b.
- Larson, Gary. Wildlife Preserves: A FarSide Collection. Andrews and McMeel, New York, NY. 1989
- Macve, Richard and Anthony Carey (eds.). Business, Accountancy and the Environment: A Policy and Research Agenda. Institute of Chartered Accountants in England and Wales. London, England. 1992.
- Manitoba Environment. State of the Environment: A Report for Manitoba. 1991.
- Manitoba Environment. State of the Environment: A Report for Manitoba. 1993.
- McNair, C.J. and K Leibfried. Benchmarking: A tool for continuous improvement. The Coopers and Lybrand Performance Solution Series. Oliver Wight Publications Inc. Essex Junction, Vermont, 1992.
- Mining Association of Canada. Voluntary Emissions Reduction. Ottawa, Canada, March, 1995.

McDonald, G. and Lex Brown. "Planning and Management Processes and Environmental Assessment" in Impact Assessment Bulletin, Vol. 8, No. 4. 1992: 605-615.

McMurdy, Deirdre. "Divine Disclosure" in McLean's Magazine..1995

Murphy, Margaret. "SEC Targets Environmental Disclosure Practices" in National Underwriter, Vol. 97, No. 36. September, 1993: 22-23.

Naimon, Jonathon. "Corporate Reporting Picks Up Speed. in Tomorrow. pp.62-75. no date.

Naimon, Jonathon. "Lifting the Veil" in Tomorrow Magazine. pp. 54-66. 1993.

National Westminster Bank. Environment Report. 1993.

Neu, Dean and Eric Powrie. "Do Actions Speak Louder than Words? Reconsidering the Association between social performance and disclosure". Faculty of Management, University of Calgary, Calgary. 1994.

Nitkin, David and David Powell. Corporate Sustainable Development Reporting in Canada (Working Paper no. 17). National Round Table on Environment and the Economy (NRTEE). Ottawa, Ontario. March. 1993.

Noakes, Susan. "Reports Gain New Prominence" in Financial Post. Thursday, December 2, 1993: 16-17.

Noakes, Susan. "Resource Firms Top in Environmental Reporting" in Financial Post. December 13, 1994: 18-19.

Noble, David. A State of the Environment Report: Contaminants in Canadian Seabirds. State of the Environment Reporting, Environment Canada, Ottawa, Canada. 1990.

Noranda Minerals Inc. Environment Report. 1993.

North American Agreement on Environmental Cooperation. The Government of Canada, the Government of the United Mexican States, and the Government of the United States of America. External Affairs, Ottawa, Canada. 1993.

NRTEE. National Round Table on the Economy and the Environment. Toward Reporting Progress on Sustainable Development in Canada: Report to the Prime Minister. December, 1993.

- OECD. Organization for Economic and Cooperative Development. OECD Core Set of Indicators for Environmental Performance Reviews. Paris. Prepared by the Group on State of the Environment Reporting. 1993.
- OECD. Environmental Indicators: A Preliminary Set. OECD, Paris. 1991.
- Organization for Economic Cooperation and Development. OECD Core Set of Indicators for Environmental Performance Reviews: A Synthesis Report Prepared by the Group on State of the Environment Reporting. Paris, 1993.
- OECD. Organization for Economic Cooperation and Development. The State of the Environment. OECD, Paris. 1991.
- OECD. The State of the Environment 1985. OECD, Paris. 1985.
- Ottawa-Carleton Health Department. State of the Environment Report: An Environmental Health Perspective. Regional Municipality of Ottawa-Carleton. August, 1991.
- Owen, David (ed.). Green Reporting: Accountancy and the Challenge of the Nineties. Chapman and Hall, London, England. 1992.
- Patten, Dennis. "Exposure, Legitimacy and Social Disclosure" in Journal of Accounting and Public Policy. Vol. 10, 1991: 297-308.
- Patten, Dennis. "Intra-industry Environmental Disclosures in Response to the Alaskan Oil Spill: A Note on Legitimacy Theory" in Accounting, Organizations and Society. Vol. 17, No. 5, 1992: 471-475.
- Rapport and Bird. State of the Environment Report for Canada. Ministry of Supply and Services Canada, Hull, Quebec Canada. 1986.
- Regional Municipality of Hamilton-Wentworth. State of the Environment 1990. Planning and Development Department. October, 1990.
- Reiss, Ilze. Menu of Environmental Indicators. Prepared for the Canadian Council of Ministers for the Environment State of the Environment Reporting Group. 1994.
- Robson, Colin. Real World Research: A Resource for Social Scientists and Practitioner Researchers. Blackwell. Oxford, UK. 1993.
- Rolfe, Chris. Personal Communications. Lawyer. West Coast Environmental Law Centre. Vancouver, British Columbia (604) 684-7378

Rutherford, Ian. Briefing Note on the State of the Environment Directorate. State of the Environment Reporting Branch. Environment Canada. 1994.

Ryley, C. Environmental Policy Statements. Masters Degree Project, Faculty of Environmental Design, University of Calgary, Calgary. In progress..

Sandbourg, Verie. "Producing an Annual Environmental Report" in Journal of Environmental Regulation, Vol. 3, No. 1. 1993: 57-68.

Saskatchewan Environment and Public Safety. Saskatchewan State of the Environment Report. 1991.

Saskatchewan Environment and Resource Management. Saskatchewan's State of the Environment Report: The Need for Environmental Indicators. 1992.

Saxe, Diane. Environmental Offenses: Corporate Responsibility and Executive Liability. Aurora: Canada. 1990.

Saxe, Diane. "The Worm Turns: Environmental Regulators Caught in Their Own Net" in Hazardous Materials Management. June, 1994: 42.

Secretaria de Desarrollo Social and the Instituto Nacional de Ecologia, Mexico D.F. Mexico: Informe de la situacion General en Materia de Equilibrio Ecologico y Proteccion al Ambiente 1991-1992. 1993.

Secretariat of Social Development. Mexico: National Report on Environment (1989-1991) for the United Nations Conference on Environment and Development. July, 1992.

Scott, Barb. Personal Communications. Chartered Accountant at Ernst and Young, Senior Manager. Toronto, Ontario. (416) 864-1234

Sheey, G. Organizational and Spatial Frameworks For State of the Environment Reporting. Minister of Supply and Services. 1989.

Shell Canada Ltd. Progress Towards Sustainable Development. 1993.

Simpson-Lewis, W. Briefing Note: National Report and the Fact Sheet and Report Series. State of the Environment Directorate, Environmental Conservation Service, Environment Canada. 1994.

Simpson-Lewis. Canadian State of the Environment Reporting Experiences. State of the Environment Reporting, Environment Canada. 1993.

- Simpson-Lewis, Wendy. Personal Communications. Chief, Reports Division. State of the Environment Directorate, Environment Canada. 9th Floor, Place Vincent Massey, 351 St. Joseph Blvd, Ottawa, Ontario, (819) 994-9875
- Smith, Risa. Personal Communications. Researcher with B.C. Ministry of Environment, Lands and Parks. Corporate Planning and Legislation. (604) 387-9666
- Spears, Tom. "A Faint Whiff of Finest Farmyard" in The Calgary Herald. p. A2, April 13, 1995.
- Speirs, John. "The Value of Environmental Reporting" in Greener Management International. Issue #1: 18-23. 1993.
- Spencer-Cooke, Andrea. Corporate Environmental Reporting. Business Council for Sustainable Development. 1993.
- State of the Environment Reporting Branch, Environment Canada, Ottawa. Towards an SOE Reporting Action Plan: Opportunities to 1993. Technical Report No. 3. 1989.
- State of the Environment Reporting. A State of the Environment Report: State of the Environment Report for the Lower Fraser River Basin. Environment Canada, Ottawa, Canada. 1992.
- Statistics Canada. Canada Handbook. Minister of Supply and Services Canada, Ottawa, Canada. 1977.
- Statistics Canada. Canada Year Book 1994. Minister of Industry Science and Technology. Ottawa, Canada. 1993.
- Statistics Canada. Human Activity and the Environment 1994. Ottawa, Canada: Statistics Canada. 1994.
- Statistics Canada and Council of Ministers of the Environment. Databases for Environmental Analysis: Provincial and Territorial Governments. Ottawa, Canada: Statistics Canada. 1994.
- Stuetz, George and J. Woodruffe. Environmental Performance Indicators. Unpublished Manuscript. August, 1992.
- Szajka, Aniko. Personal Communications. Alberta Environmental Protection. Manager, Strategic Management Division. 9820 - 106 Street, Edmonton, Alberta, T5K 2J6. (403) 427-0047

- Thompson, D. Environmental Performance Indicators: Development and Applications. Presentation to EPI Workshop. Canadian Association of Petroleum Producers, June 1993.
- Thompson, D. Notes for SOER Harmonization Workshop. Vancouver, British Columbia. Sept. 22, 1994.
- Thompson, D. Revised Chapter for North America Without Borders. The NAFTA Parallel Accord on the Environment. 1995, in progress.
- Thompson, Dixon. Personal Communications. Professor at the Faculty of Environmental Design, University of Calgary, Calgary, Alberta. (403) 220-3625
- Thompson, D. and Mel Wilson. "Environmental Auditing: Theory and Applications" in Environmental Management. Vol. 18, No. 4, 1994: 605-615.
- United Nations. United Nations Conference on Environment and Development, Agenda 21. Published by the United Nations. 1992.
- University of Waterloo, School of Urban and Regional Planning. State of the Environment Report for the Waterloo Region. Waterloo, Ontario. 1986.
- US EPA. 1990 Toxics Release Inventory Public Data Release. Office of Pollution Prevention and Toxics, United States Environmental Protection Agency. May, 1992.
- VHB Research and Consulting Inc. Indicators and Indices of the State of the Environment. Environment Canada and Statistics Canada. 1989.
- Watkins, Mel. (ed.). Handbooks to the Modern World: Canada. Facts on File, New York, New York. 1993.
- Western Environmental and Social Trends. Environmental Indicators: Opinions of Potential Users. Technical Report Series #17. State of the Environment Reporting, Corporate Policy Group, Environment Canada. 1990.
- WICE. World Industry Council on Environment. WICE Environmental Reporting Guide. Draft. April, 1994.
- Willis, Allan. "For Good Measure: Tracking Corporate Performance Moves Beyond Financial Statements to Recognize the Environment and Human Well-Being" in CA Magazine. December, 1994: 16-27.

Wiseman, Joanne. "An Evaluation of Environmental Disclosures Made in Corporate Annual Reports" in Accounting, Organizations and Society. Vol. 7, No. 1. 1982: 53-63.

Woodruffe, John. Personal Communications. Consultant. Woodruffe Associates Inc. Calgary, Alberta. (403) 949-3204.