



Department of
Indian and Northern Affairs
Northern Program

OFFICE COPY
DO NOT REMOVE

11/20/95

Northern Environmental Risk Assessment Strategy (NERAS)

USER'S GUIDE

March, 1995

	HIGH	MODERATE	LOW
HIGH			
MODERATE			
LOW			

**THE NORTHERN ENVIRONMENTAL RISK ASSESSMENT STRATEGY (NERAS)
USER'S GUIDE**

FINAL REPORT

February 1995

This report outlines an approach, the Northern Environmental Risk Assessment Strategy (NERAS), to help DIAND establish priorities for remediation at waste sites in Northern Canada. The approach is consistent with the objectives of the Action on Waste Program under the Arctic Environmental Strategy. The objectives of the NERAS are:

- Establish an objective and transparent process for setting clean up priorities;
- Rank northern waste sites based on risk; and
- Provide demonstrable evidence of due diligence.

Prepared for:

DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS CANADA
Northern Affairs Program
Natural Resources and Environment Branch
Environment and Renewable Resources Directorate
Land Management Division

Study Conducted by:

COOPERS & LYBRAND CONSULTING
55 Metcalfe Street
Ottawa, Ontario
K1P 6L5
(613) 237-3702

Project Team:

Lawson J. Heggie
Robert Abbott

Coopers & Lybrand Consulting
Coopers & Lybrand Consulting

**NORTHERN ENVIRONMENTAL RISK ASSESSMENT STRATEGY (NERAS)
USER'S GUIDE**

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1.0	INTRODUCTION	1
1.1	Background	1
1.1	Objectives	2
2.0	THE NERAS PROCESS	3
2.1	Describing the Underlying Risk	3
2.2	Defining the Nature of the Consequences	4
2.3	Assessing and Scoring Risk	4
2.4	Assessing the Ability to Manage Risk	5
2.5	Preparing the NERAS Matrix	5
3.0	CRITERIA TO EVALUATE SITES	6
3.1	Legal	7
3.2	Health & Safety	8
3.3	Public Concerns	9
3.4	Land Claim/Fee Simple Lands	10
4.0	ASSESSING THE ABILITY TO MANAGE RISK	11
4.1	Purpose	12
4.2	Commitment	13
4.3	Capability	16
4.4	Learning	19
5.0	BUILDING AND USING THE NERAS MATRIX	21
5.1	Building the NERAS Matrix	21
5.2	Using the NERAS Matrix	23
6.0	CONCLUSION	24

APPENDICES

I	NERAS SITE SUMMARY WORKSHEET
II	NERAS SITE ASSESSMENT WORKSHEET
III	NERAS ABILITY TO MANAGE RISK WORKSHEET
IV	NERAS SITE SCORING WORKSHEET
V	EXAMPLES OF COMPLETED SITE SCORING WORKSHEETS

EXECUTIVE SUMMARY

This report outlines an approach, the Northern Environmental Risk Assessment Strategy (NERAS), to help DIAND establish priorities for remediation at waste sites in Northern Canada. The approach is consistent with the objectives of the Action on Waste Program under the Arctic Environmental Strategy.

The objectives of the NERAS are:

- Establish an objective and transparent process for setting clean up priorities;
- Rank northern waste sites based on risk; and
- Provide demonstrable evidence of due diligence.

There are five steps to the NERAS process:

- Step 1. Describing the Underlying Risk
- Step 2. Defining the Nature of the Consequences
- Step 3. Assessing and Scoring Risk
- Step 4. Assessing the Ability to Manage Risk
- Step 5. Preparing the NERAS Matrix

Each site is assessed in Steps 1 through 4. The sites can then be compared within the NERAS Matrix (Step 5), and action plans developed based on the relative degree of risk associated with each site (see Figure 1).

To be effective, the following prerequisites should be met before the NERAS is used:

- Skilled environmental practitioners, familiar with the sites to be evaluated, must be used.
- The evaluation(s) should be done on an annual basis, using a jury process with representation from the Regional offices in the Yukon, the Northwest Territories, and from Headquarters.
- Before a site is formally assessed, a judgement must be made about whether sufficient information is known about it to justify going on with the assessment.
- A flexible approach must be used to ensure that resources are allocated to the remediation of known priority sites, also the investigation of unknown sites.
- As sites are remediated, they should be removed from the NERAS Matrix and placed in a monitoring file.

The NERAS Matrix will be a useful management tool because it explicitly organizes, and sets priorities for all of the sites that have been assessed. The matrix is, of course, only a tool and there may be important mitigating circumstances that cause DIAND to investigate and remediate certain sites in a way other than suggested by the matrix. It should be used as a guide to focus management attention on the following:

- Sites requiring immediate investigation or remedial attention because of the issues present;
- Sites that are candidates for an audit or more detailed assessment;
- Sites that should be monitored to ensure that environmental conditions do not worsen; and
- Sites that should be carefully managed to ensure that DIAND receives value for money.

Quite apart from facilitating the evaluation of DIAND's ability to manage risk at any site, the use of an EMS model points out systemic weaknesses (and strengths) in DIAND's environmental capability. For example, consideration of the scores for each of "purpose," "commitment," "capability" and "learning" at two or more sites will point out whether the Department is consistently weak (or strong) in a particular EMS element. This knowledge is invaluable in the planning and delivery of improvement initiatives to raise overall "ability to manage" scores.

1.0 INTRODUCTION

1.1 Background

Approximately 1,300 waste sites have been identified throughout Northern Canada. These sites included, but are not limited to, abandoned mine sites, military installations, waste dumps, camp sites, and barrel dumps. In view of the range of different sites within this geographic territory, the risk associated with each site varies considerably.

It is important to note that risk refers to:

- The hazards to air, land, or water arising from a particular site and their consequent effects on flora, fauna, or human health and safety; and
- The risk to the Department of Indian and Northern Affairs (DIAND) as legal liability for failure to comply with, for example, federal statutes.

DIAND does not have the funding to remediate all 1,300 sites over a short time-frame. However, public health risks are a high priority, and the Department has a legal obligation to remediate contaminated sites pursuant to the Canadian Environmental Protection Act (CEPA). Moreover, the Department is accountable for:

- Fisheries Act (FA) violations;
- Territorial Lands Acts (TLAs) violations;
- Aboriginal Land Claims Obligations; and
- Public liabilities on territorial land managed by DIAND.

This report outlines an approach, the Northern Environmental Risk Assessment Strategy (NERAS), to help DIAND establish priorities for remediation at waste sites in Northern Canada. The approach is consistent with the objectives of the Action on Waste Program under the Arctic Environmental Strategy.

The NERAS establishes the first risk assessment strategy for DIAND northern waste sites. With increased knowledge and experience the strategy will evolve and improve over time.

It is recognized that an important issue underlying the application of any decision framework is the notion of equity. Each region administered by DIAND must be made to feel that it has been treated fairly. DIAND must have sufficient confidence in the framework that it can show how priority sites were selected and express a clear and concise message to members of the public and other stakeholders. Managerial discretion

must, of course, be accepted in the application of the framework, but DIAND must define the broad limits within which such discretion may be applied.

1.2 Objectives

The objectives of the NERAS are:

- Establish an objective and transparent process for setting clean up priorities;
- Rank northern waste sites based on risk and ability to manage that risk; and
- Provide demonstrable evidence of due diligence.

2.0 THE NERAS PROCESS

There are five steps to the NERAS process:

- Step 1. Describing the Underlying Risk
- Step 2. Defining the Nature of the Consequences
- Step 3. Assessing and Scoring Risk
- Step 4. Assessing the Ability to Manage Risk
- Step 5. Preparing the NERAS Matrix

Each site is assessed in Steps 1 through 4. The sites can then be compared within the NERAS Matrix (Step 5), and action plans developed based on the relative degree of risk associated with each site.

The NERAS is a tool to help the comparison and evaluation of different sites. To assist in this regard, Site Summaries should be prepared for each site under consideration. Site Summary Worksheets are enclosed in Appendices I-III.

2.1 Describing the Underlying Risk

The first step is to define and characterize the risk associated with each site. The risk is based on the kind(s) of impact(s) the site has (or might have) on the environment.

Some risks are relatively clear (e.g., for Underground Storage Tanks, the obvious risk centres around potential leaks), for others, such as PCBs, the nature of the risk(s) at a particular site is more complex and require the use of subcategories to facilitate a representative and accurate assessment (e.g., PCB fires, PCB spills, PCB transport, etc.).

Defining and characterizing each risk involves the determination of the environmental impacts that might occur if the event(s) associated with that risk appeared. These potential impacts must be considered for each of: air, water, land and social.

This characterization of the underlying environmental hazard forms the basis upon which the risk(s) and DIAND's obligations can be assessed.

2.2 Defining the Nature of The Consequences

The second step involves evaluating the consequences to DIAND should an event appear.

Four criteria are recommended to evaluate sites. These are:

- Legal;
- Health & Safety;
- Public Concerns; and
- Land Claim Settlement/Other Fee Simple Land Transfer Processes.

(Note: Section 3.0 contains definitions for each criterion)

2.3 Assessing and Scoring Risk

The third step focuses on assigning a score to each criterion identified in Section 2.2. This includes assessing both the **probability** and the **severity** of an event appearing. The probability is an assessment of the likelihood of an event happening and the severity considers how significant the event would be if it happened.

Based on the scores assigned for severity and probability, a numerical risk score can be derived for each site.

The relative importance of each risk category is weighted to adjust the "raw scores" to take account of the higher importance that DIAND places on legal compliance and health and safety. This weighting can, of course, be changed from time to time to reflect shifting priorities. For the initial assessment (January 1995), the following weighting was used:

Legal:	4
Health & Safety	4
Public Perceptions	1
Land Claims	2

The risk value R (score) can be written as:

$$\begin{aligned} R = & (PL * SL * WL) && \text{Legal} \\ & + (PH * SH * WH) && \text{Health \& Safety} \\ & + (PP * SP * WP) && \text{Public Perceptions} \\ & + (PL * SL * WL) && \text{Land Claims} \end{aligned}$$

where:

R is the risk score for the site

- PL is the probability score for Legal
- SL is the severity score for Legal
- WL is the weighting for Legal
- PH is the probability score for Health & Safety
and so on . . .

2.4 Assessing the Ability to Manage Risk

The next step focuses on the ability of DIAND to manage or reduce environmental risk at each site. The four components of an Environmental Management System (EMS) are used to measure DIAND's capability in this regard. An EMS is a formal, structured mechanism that provides a rigorous framework within which a consistent level of environmental performance can be achieved. The principal components of an EMS, drawn from national and international experience with Total Quality Management, are powerful benchmarks against which DIAND's ability to manage environmental risk can be measured.

2.5 Preparing the NERAS Matrix

The final step in the assessment process is the synthesis of environmental risk profiles and ability to manage ratings to produce the NERAS Matrix (Figure 1). The Matrix presents the environmental risk associated with each site and the current ability of DIAND to manage it. More important, each site is presented compared with all of the other sites for which the Department is responsible.

The distribution of sites within the Matrix should be carefully reviewed by DIAND managers to decide if it makes sense on an intuitive level. Preparation of the NERAS Matrix represents completion of the risk assessment. However, each site will require a specific strategy or action plan (e.g., completion of full site assessment, monitoring, excavation and removal and treatment of soils, preparation of operational procedures, provision of emergency preparedness training).

Northern Environmental Risk Assessment Strategy

RISK

	HIGH	MODERATE	LOW
HIGH	Orange	Light Green	Dark Green
MODERATE	Red	Orange	Dark Green
LOW	Red	Light Orange	Dark Green

Ability to Manage Risk

3.0 CRITERIA TO EVALUATE SITES

Four criteria are recommended to evaluate sites. These are:

- Legal;
- Health & Safety;
- Public Concerns; and
- Land Claim Settlement/Other Fee Simple Land Transfer Processes.

3.1 Legal

DEFINITION:

This criterion examines the legislation that might be mobilized against DIAND. There is an array of legislation, rulings and judicial determinations that must be considered (e.g., Sparrow Decision, Inuvialuit Land Claim Arbitration Commission finding on Horton River).

PROBABILITY:

The probability of an incident.

- | | |
|---------------------|--|
| High (3) | A violation has been identified. |
| Moderate (2) | Moderate chance that a violation will occur. |
| Low (1) | Unlikely that a violation will occur. |

SEVERITY:

A measure of whether the site is in violation.

- | | |
|-----------------|---|
| High (3) | A violation under CEPA, the Fisheries Act, other binding legislation, or other court rulings. |
| Low (1) | A violation has not occurred. |

WEIGHT: 4

3.2 Health & Safety

DEFINITION:

This criterion examines the risk of a particular site to human health and safety. It considers the potential for contact with hazardous materials, contamination of water sources, impacts on the food chain, also human risk through exposure to physical hazards such as open mine shafts and unstable buildings.

PROBABILITY:

The likelihood of a site resulting in a risk to human health and safety through exposure.

- | | |
|---------------------|---|
| High (3) | The site or area is subject to continuous or near continuous human use. |
| Moderate (2) | The site or area is subject to seasonal human use. |
| Low (1) | The site is subject to infrequent human use. |

SEVERITY:

A measure of the potential human health and safety impact attributable to the site or area.

- | | |
|---------------------|---|
| High (3) | Significant risk to life. |
| Moderate (2) | There is a moderate risk to life. This would include sites where buildings or infrastructure remains. |
| Low (1) | No known risk to life. |

WEIGHT: 4

3.3 Public Concerns:

DEFINITION:

This criterion examines the extent to which DIAND might be perceived by the public to operate irresponsibly from an environmental perspective, and the potential for a reaction that affects DIAND's ability to conduct its affairs.

PROBABILITY:

The probability of the public becoming concerned over a specific incident or the threat of a specific incident or the emergence of a particular environmental risk.

- | | |
|---------------------|---|
| High (3) | The site is already, or will become, a public concern. |
| Moderate (2) | Moderate chance that the site will become a public concern. |
| Low (1) | Very unlikely that the site will become a public concern. |

SEVERITY:

The intensity and breadth of the public reaction to an incident, the threat of an incident, or the emergence of a particular environmental risk.

- | | |
|---------------------|---|
| High (3) | Most, if not all, of a Territory very dissatisfied. The site becomes a focus of a national or regional media campaign and impacts on a National or Territorial level. |
| Moderate (2) | Most, if not all, of a Territory or region moderately dissatisfied, <u>or</u> a segment of a Territory or region very dissatisfied. Regional issue but is not getting widespread attention. |
| Low (1) | A segment of a Territory or region moderately dissatisfied. Very local reaction. |

WEIGHT: 1

3.4 Land Claim/Fee Simple Lands

DEFINITION:

This criterion assesses the site's relevance to land ownership and/or land negotiations.

PROBABILITY:

The probability of a site being part of a land settlement, or on other fee simple lands.

- | | |
|---------------------|--|
| High (3) | The site is on a land settlement or on other fee simple lands. |
| Moderate (2) | Moderate chance that the site will become part of a land settlement or other fee simple land(s). |
| Low (1) | Very unlikely that the site will become part of a land settlement or other fee simple land(s). |

SEVERITY:

The impact of a site being located on land that is part or will potentially become part of a land settlement or other fee simple land.

- | | |
|---------------------|---|
| High (3) | Land claimant (or owners of fee simple land) becomes the sole owner of the land and the Crown's obligation has to be exercised within a specified period. |
| Moderate (2) | The Crown retains liability |
| Low (1) | No liability for the Crown |

WEIGHT: 2

4.0 ASSESSING THE ABILITY TO MANAGE RISK

It is not enough to evaluate different sites in view of their physical risk; the ability of DIAND to mitigate risk at each site must also be considered. Ultimately, high risk sites that are well-managed are of secondary importance to high risk sites that are not well-known and/or not well-managed.

This component of the NERAS focuses on DIAND's ability, as measured through its EMS, to manage or reduce environmental risk at each site. An EMS is a specific and focused application of internal control practices. It is the process by which an organization's management and personnel obtain reasonable assurance regarding the achievement of objectives in one or more categories:

- effectiveness and efficiency of environmental operations;
- reliability of information relating to environmental activities; and
- compliance with applicable environmental laws and regulations.

The extent to which DIAND's EMS provides reasonable assurance in any of these categories can be measured through comparison with emerging national (CSA Z750) and international (ISO 14000) EMS standards. The basic elements of these standards are:

- Purpose;
- Commitment;
- Capability; and
- Learning

Brief descriptions of these elements, and some key questions to ask to measure ability are outlined below.

Quite apart from helping the evaluation of DIAND's ability to manage risk at any site, the use of the EMS model points out systemic weaknesses (and strengths) in DIAND's environmental capability. For example, consideration of the scores for each of "purpose," "commitment," "capability" and "learning" at two or more sites will point out whether the Department is consistently weak (or strong) in a particular EMS element. This knowledge is invaluable in the planning and delivery of improvement initiatives to raise total "ability to manage" scores.

4.1 Purpose

DIAND must know what needs to be done at each site - it must have purpose. Purpose is shown by having:

- environmental policies;
- risk assessments; and
- environmental objectives and targets.

KEY QUESTIONS TO MEASURE PURPOSE:

DEPARTMENTAL	SITE SPECIFIC
Primary Question	Primary Question
1. Does DIAND have a policy with respect to environmental management in the North?	1. Have specific environmental objectives at each site been defined because of the risk assessment process?
Supporting Questions	Supporting Questions
1. Does the policy state DIAND's commitment to meet or exceed legal requirements and the expectations of its stakeholders, and encourage improvement in environmental performance?	1. Does a site profile exist?
2. Is the policy effectively communicated to both internal and external stakeholders?	2. Is there a system in place to identify and assess environmental risks at each site?
	3. How is progress against these objectives being measured?
	4. How much progress has been achieved at this site?

SCORING:

- High (3)** Clearly defined objectives for the site.
- Moderate (2)** Objectives in development.
- Low (1)** Awareness of the issues at the site, but no action yet on establishing objectives.

4.2 Commitment

DIAND must have the commitment to take appropriate actions in support of its environmental objectives at each site. Commitment is shown by having:

- shared values;
- alignment and integration; and
- accountability and responsibility.

KEY QUESTIONS TO MEASURE COMMITMENT:

DEPARTMENTAL	SITE SPECIFIC
<p style="text-align: center;">Primary Question</p> <p>1. Does senior DIAND management (in Ottawa) integrate environmental management at Northern sites into its normal business activities (i.e., is environmental management at Northern sites recognized to be important)?</p>	<p style="text-align: center;">Primary Question.</p> <p>1. Are the responsibilities and accountability of key DIAND personnel who manage, perform and verify environmental work in the North defined and documented?</p>
<p style="text-align: center;">Supporting Questions</p> <p>1. Has the appropriate authority been identified to oversee management of environmental issues at Northern sites?</p> <p>2. To what extent do DIAND employees understand their responsibilities and potential contributions to improve environmental conditions at Northern sites?</p> <p>3. Is commitment reflected in:</p> <ul style="list-style-type: none"> • internal priority statements; • public or employee notice-boards; • vision and mission statements; • codes of conduct; or • other visible documentation. 	<p style="text-align: center;">Supporting Questions</p> <p>1. Do these personnel:</p> <ul style="list-style-type: none"> • Act appropriately in emergencies? • Understand the consequences of non-compliance? • Understand their accountability?

SCORING:

- High (3)** Clearly defined authority and accountability.
- Moderate (2)** Ad hoc authority and accountability.
- Low (1)** No or small commitment to authority and accountability.

4.3 Capability

DIAND must have the capability to continuously support its environmental objectives at each site. Capability is displayed by having:

- human, physical and financial resources;
- knowledge, skills and training; and
- information management.

KEY QUESTIONS TO MEASURE CAPABILITY:

DEPARTMENTAL	SITE SPECIFIC
<p style="text-align: center;">Primary Question</p> <p>1. Is there a process within DIAND to identify and evaluate environmental management resource requirements in the North?</p>	<p style="text-align: center;">Primary Question</p> <p>1. To what extent are resources (money, equipment, people) available for environmental initiatives at this site?</p>
<p style="text-align: center;">Supporting Questions</p> <p>1. Is there a process within DIAND to manage the training and development of personnel?</p> <p>2. Has the Northern Program been able to identify and track key variables of environmental performance at each site?</p>	<p style="text-align: center;">Supporting Questions</p> <p>1. What equipment is available to respond to the needs at this site?</p> <p>2. What equipment is needed to respond to the needs at this site?</p> <p>3. In view of the risks at this site, is Northern DIAND staffs appropriately trained (e.g., soil chemistry, toxicology, site investigation and remediation, project management)?</p> <p>4. Are sufficient people available (or can they be mobilized) to manage the risk(s) at this site?</p> <p>5. Is there sufficient information to deal with problems at this site?</p> <p>6. Do contingency plans exist in case of a local emergency?</p> <p>7. Are the mix and level of resources adequately planned for to meet the objectives for this site?</p>

SCORING:

- | | |
|---------------------|--|
| High (3) | Adequate; resources (human and financial) are available or are made available. |
| Moderate (2) | Some uncertainty as to the availability of resources. |
| Low (1) | Low to no resources is available. |

4.4 Learning:

DIAND must continuously learn how to perform better in the pursuit of its environmental objectives. An organization that is continuously learning will have:

- measuring and monitoring tools and procedures;
- communication and reporting; and
- continuous improvement.

KEY QUESTIONS TO MEASURE LEARNING:

DEPARTMENTAL	SITE SPECIFIC
<p style="text-align: center;">Primary Question</p> <p>1. To what extent is information communicated internally (both within the Yukon and NWT, and to HQ)?</p>	<p style="text-align: center;">Primary Question</p> <p>1. Does the Northern Program collect data on each site and conduct trend analysis to assess the impact of changes that may alter the risk profile (and therefore the need for action) of that site?</p>

Supporting Questions	Supporting Questions
<p>1. Is progress in achieving objectives regularly monitored?</p>	<p>1. What quantitative data has been collected for this site?</p> <p>2. Is the available information being distributed and used by the responsible officials?</p> <p>3. In view of experiences with this site, are other sites being screened for the same kinds of problems?</p> <p>4. How is information on this (and other) site(s) collected, stored and retrieved? Are there standard protocols that ensure the same questions are asked for each site?</p> <p>5. Are new technologies being investigated?</p>

SCORING:

- High (3)** Good information exchange; follow-up, assessment and pooling of experiences.
- Moderate (2)** Inconsistent information exchange.
- Low (1)** No follow-up; low to no information exchange.

5.0 BUILDING AND USING THE NERAS

5.1 Building the NERAS

CALCULATING SITE SCORES

At the end of Step 4 of the NERAS process each site has been:

- The risk has been assessed and scored; and
- The ability to manage risk has been scored.

For each site the NERAS SITE SCORING WORKSHEET will have been completed. Examples of the completed worksheets are shown in Appendix V for the following sites:

- Sarcpa;
- Haines Junction Refinery; and
- Contact Lake.

The following table summarizes the scores for each site.

Site	Site Risk Assessment Score	Ability to Manage Risk
Sarcpa	68	8
Haines Junction Refinery	30	8
Contact Lake	61	5

POSITIONING THE SITES INTO THE NERAS MATRIX

The dimensions of the NERAS Matrix are defined as follows:

Site Risk:

- High** - score of 68 or greater.
- Moderate** - score of between 36 and 67.
- Low** - score of 36 or less.

Ability to Manage Risk: **High** - score of 11 or greater.

Moderate - score of between 8 and 10.

Low - score of 7 or less.

Each site is positioned in the NERAS Matrix based on its two scores. The following page shows the NERAS Matrix with the sites positioned into it.

The second matrix shows the sites with the following breakdown of Site Risk used:

Site Risk:

High - score of 68 or greater.

Moderate - score of between 24 and 67.

Low - score of 24 or less.

Northern Environmental Risk Assessment Strategy

RISK

Ability to Manage Risk

		RISK		
		99 HIGH	67 MODERATE	36 LOW 11
HIGH	12	Bar E. Horton River (76/12)	Pearce Point (42/11) Coral Harbour (39/11)	Old Mayo (16/12) Dawson (16/12) Choutia (22/11)
	11			
MODERATE	10	Jqaliut (89/8) Venus (80/8) Discovery (74/8) Snag (71/8) Aishsihik (70/8) Sarcpe (68/8) Resolution (68/8)	Atkinson Point (37/10) Peel River (54/8) Clifton Point (40/8)	Haimes Refinery (35/8)
	8			
LOW	7	Ray Rock (71/6) Cape Christian (68/6) Watson Lake (68/6)	Dawson NE (54/7) Fox 1 (50/7) Contact Lake (61/5) Indore (61/5) Smallwood (57/5) Hope Bay (57/5) Norex (57/5) Northina (57/5) Canol Road (57/5) Big Thing (57/5) Silver Bear (57/5) Alaska Highway (38/5) Canol Road (38/5) Port Burwell (30/5) Baay Island (57/4) Barnard Harbour (49/4) Kivitoo (45/4) Ross Point (37/4)	Pumping Stations (34/6) Silver Seven (29/6) Laforme (25/6) Union (21/6) Wernecke (21/6) Tom Mine (21/6) Hope Bay (21/6) Plata & Inca (17/6) PEG (21/5) Matheson Point (19/5) Hidden Lake (17/5) West Bay (17/5) Pensive (17/5) Beaver Crow (13/5) Thompson (33/4) Ruth (33/4) Keith (30/4) Bear Island (30/4) Simpson Lake (29/4) Hat Island (29/4) Cape Peel (29/4) NAD (29/4) Ekalugak (29/4) Durban Island (29/4) Stuart Point (17/5) Tanunuk (15/4)
	4			

Northern Environmental Risk Assessment Strategy

RISK

Ability to Manage Risk

		RISK		
		99 HIGH	67 MODERATE	24 LOW 11
HIGH	12	Bar E. Horton River (76/12)	Pearce Point (42/11) Coral Harbour (39/11)	Old Mayo (16/12) Dawson (16/12) Choutia (22/11)
	11			
MODERATE	10	Jqaliut (89/8) Venus (80/8) Discovery (74/8) Snag (71/8) Aishsihik (70/8) Sarcpe (68/8) Resolution (68/8)	Atkinson Point (37/10) Peel River (54/8) Clifton Point (40/8) Haimes Refinery (35/8)	
	8			
LOW	7	Ray Rock (71/6) Cape Christian (68/6) Watson Lake (68/6)	Dawson NE (54/7) Fox 1 (50/7) Pumping Stations (34/6) Silver Seven (29/5) Laforma (25/6) Contact Lake (61/5) Indore (61/5) Smallwood (57/5) Hope Bay (57/5) Norex (57/5) Northina (57/5) Canol Road (57/5) Big Thing (57/5) Silver Bear (57/5) Alaska Highway (38/5) Canol Road (38/5) Port Burwell (30/5) Bray Island (57/4) Barnard Harbour (49/4) Kivitoo (45/4) Ross Point (37/4) Thompson (33/4) Ruth (33/4) Keith (30/4) Bear Island (30/4) Simpson Lake (29/4) Hat Island (29/4) Cape Peel (29/4) NAD (29/4) Ekalugak (29/4) Durban Island (29/4)	Union (21/6) Werneck (21/6) Tom Mine (21/6) Hope Bay (21/6) Plata & Inca (17/6) PEG (21/5) Matheson Point (19/5) Hidden Lake (17/5) West Bay (17/5) Pensive (17/5) Beaver Crow (13/5) Stuart Point (17/5) Tanunuk (15/4)
	4			

5.2 Using the NERAS Matrix

The matrix provides a way of deciding which particular type (and intensity) of remediation is appropriate for a particular site. The Matrix should most properly be interpreted in the following way:

- **Sites Located in RED Area:** Sites in this area are obvious candidates for immediate managerial attention. The specific nature of the action will be situation specific. Sometimes, further investigation of the nature, breadth and root of exposure may be needed before any remedial action can be taken. In other cases, the nature of the needed "fix" will be self-evident, and action can be taken without further review.
- **Sites Located in ORANGE Area:** Sites in this area are also candidates for action. The options are to reduce the risk or increase DIAND's ability to manage the risk. This would suggest that if the highest risk factors for the site can be identified and remediated then the level of risk will be reduced. Alternatively DIAND can improve its ability to manage the risk by carrying out appropriate programs.
- **Sites Located in the YELLOW Area:** Sites in this area are candidates for periodic review. DIAND has, or perceives that it has in place good plans and activities to manage the sites, so the key is to monitor the ongoing status of the sites and ensure that the risk associated with them is not worsening.
- **Sites Located in the GREEN Area:** Sites ranked in this area should be monitored. There is no priority need to improve on the actions and plans here, because the exposure is low. However, this is likely the area from which most "new risk sites" will emerge. Sites that are low risk and high ability to manage should be aggressively managed to ensure that DIAND receives value for money. Current resources allocated to management of these sites should be periodically reviewed in view of their low risk to the Department.

There are, of course, many definitions of remediation. The development of policies and procedures for both people and property is, for example, an important aspect of good site management. These policies and procedures transcend cleanup and include emergency preparedness, contingency planning, education and training also investigation, treatment, in situ bioremediation and encapsulation.

6.0 CONCLUSION

The NERAS will help DIAND establish priorities for remediation at waste sites in Northern Canada. The approach is consistent with the objectives of the Action on Waste Program under the Arctic Environmental Strategy.

The NERAS will help DIAND managers and staff to:

- Establish an objective and transparent process for setting clean up priorities;
- Rank northern waste sites based on risk and the ability to manage risk; and
- Provide demonstrable evidence of due diligence.

The NERAS Matrix can be a useful management tool because it explicitly organizes, and sets priorities for, all of the sites that have been assessed. The matrix is, of course, only a tool and there may be important mitigating circumstances that cause DIAND to investigate and remediate certain sites in a way other than suggested by the matrix. It should be used as a guide to focus management attention on the following:

- Sites requiring immediate investigation or remedial attention because of the issues present;
- Sites that are candidates for an audit or more detailed assessment;
- Sites that should be monitored to ensure that environmental conditions do not worsen; and
- Sites that should be carefully managed to ensure that DIAND receives value for money.

APPENDIX 1

NERAS SITE SUMMARY WORKSHEET

NERAS SITE SUMMARY WORKSHEET

Author:	Title:
Original Assessment (Y/N): Date:	Amendment (Y/N): Date:
1. SITE LOCATION	
Site Name:	Location:
Territory:	District:
Land Ownership/Status:	Land Use(s):

2. PHYSICAL DESCRIPTION	
Historic Land Use(s):	
Visual Impact:	
Distance to nearest community:	Size:
Distance to nearest water:	Type and size:

3. WORK DONE TO DATE:			
Assessments Done:	Date:	Public Consultation ?	Date:
(i) Inventory			
(ii) Env. Audit			
(iii) Eng. Design			
(iv) Clean-up Protocol			

NERAS SITE SUMMARY WORKSHEET

Non-Hazardous Materials Present:	Amount:	Condition:
Barrels Construction Equipment Vehicles Solid Waste Other Other Other		

4. IMPACT ON ENVIRONMENT			
Type of Wildlife, Vegetation, etc.	Impact	Endangered	Part of Food Chain
1.			
2.			
3.			
4.			
5.			

NERAS SITE SUMMARY WORKSHEET

5. ENVIRONMENTAL ASSESSMENT

Summary of Environmental Assessment:

NERAS SITE SUMMARY WORKSHEET

Issue:	Form:	Quantity:	Risk: (e.g. CEPA or Fisheries Act violation)
<p>1. Chemicals PCBs Dioxins Pesticides Other</p> <p>2. Inorganic Elements Arsenic Cadmium Chromium Cobalt Copper Lead Mercury Nickel Zinc Silver Other</p> <p>3. Past Waste Disposal Sewage Landfills Dumps Fuel Spills USTs ASTs Other</p> <p>4. In or Adjacent to Water? Haz. Mat'ls. Non-Haz.</p> <p>5. Radio-Activity</p> <p>6. Physical Hazards Mine Shafts Buildings Other Form: Quantity: Risk: (e.g. CEPA or Fisheries Act Violation)</p>			

APPENDIX II

**NERAS SITE ASSESSMENT
WORKSHEET**

NERAS SITE ASSESSMENT WORKSHEET

1. SITE LOCATION

Site Name:

Location:

Territory:

District:

2. PROBABILITY High (3) Moderate (2) Low (1)

2.1 Legal Reason: Probability Score:

2.2 Health & Safety Reason: Probability Score:

2.3 Public Reason: Probability Score:

2.4 Land Claim Reason: Probability Score:

3. SEVERITY High (3) Moderate (2) Low (1)

3.1 Legal Reason: Severity Score:

3.2 Health & Safety Reason: Severity Score:

3.3 Public Reason: Severity Score:

3.4 Land Claim Reason: Severity Score:

APPENDIX III

NERAS ABILITY TO MANAGE RISK WORKSHEET

NERAS ABILITY TO MANAGE RISK WORKSHEET

1. SITE LOCATION	
Site Name:	Location:
Territory:	District:
2. RATING High (3) Moderate (2) Low (1)	
3.1 Purpose	Score:
Reason:	
3.2 Commitment	Score:
Reason:	
3.3 Capability	Score:
Reason:	
3.4 Learning	Score:
Reason:	

APPENDIX IV

NERAS SITE ASSESSMENT WORKSHEET

NERAS SITE ASSESSMENT WORKSHEET

SCORE	Probability	Severity	Weight	Total Score	Comments
Legal			4		
Health & Safety			4		
Public			1		
Land Claim			2		
TOTAL SITE SCORE					

ABILITY TO MANAGE RISK	High (3)	Moderate (2)	Low (1)	Total
Purpose				
Commitment				
Capability				
Learning				
OVERALL RATING				

Jury Members:

Name:

Title:

Signature:

(a)

(b)

(c)

APPENDIX V

EXAMPLES

**SARCPA
NERAS SITE ASSESSMENT WORKSHEET**

SCORE	Probability	Severity	Weight	Total Score	Comments
Legal	3	3	4	36	
Health & Safety	2	3	4	24	
Public	2	2	1	4	
Land Claim	1	2	2	4	
TOTAL SITE SCORE				68	

ABILITY TO MANAGE RISK	High (3)	Moderate (2)	Low (1)	Total
Purpose		X		2
Commitment		X		2
Capability			X	1
Learning	X			3
OVERALL RATING				8

Jury Members:

Name:

Title:

Signature:

(a)

(b)

(c)

**HAINES JUNCTION REFINERY
NERAS SITE ASSESSMENT WORKSHEET**

SCORE	Probability	Severity	Weight	Total Score	Comments
Legal	2	0	4	0	
Health & Safety	2	2	4	16	
Public	2	1	1	2	
Land Claim	3	2	2	12	
TOTAL SITE SCORE				30	

ABILITY TO MANAGE RISK	High (3)	Moderate (2)	Low (1)	Total
Purpose		X		2
Commitment		X		2
Capability			X	1
Learning	X			3
OVERALL RATING				8

Jury Members:

Name:

Title:

Signature:

(a)

(b)

(c)

**CONTACT LAKE
NERAS SITE ASSESSMENT WORKSHEET**

SCORE	Probability	Severity	Weight	Total Score	Comments
Legal	3	3	4	36	
Health & Safety	2	2	4	16	
Public	1	1	1	1	
Land Claim	2	2	2	8	
TOTAL SITE SCORE				61	

ABILITY TO MANAGE RISK	High (3)	Moderate (2)	Low (1)	Total
Purpose			X	1
Commitment			X	1
Capability			X	1
Learning		X		2
OVERALL RATING				5

Jury Members:

Name:

Title:

Signature:

(a)

(b)

(c)

**Environmental Management Systems - General Guidelines on Principles,
Systems and Supporting Techniques**

Committee Draft

**Prepared by
ISO/TC207/SC1/WG2**

February, 1995

TABLE OF CONTENTS

0	INTRODUCTION
0.1	Overview
0.2	Benefits of Having an Environmental Management System
1	SCOPE
2	NORMATIVE REFERENCES
3	DEFINITIONS
4	ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) PRINCIPLES AND ELEMENTS
4.1	HOW TO START: COMMITMENT AND POLICY
4.1.1	General
4.1.2	Top Management Commitment and Leadership
4.1.3	Initial Environmental Review
4.1.4	Environmental Policy
4.2	PLANNING
4.2.1	General
4.2.2	Identification of Environmental Aspects and Evaluation of Associated Environmental Impacts
4.2.3	Legal Requirements
4.2.4	Internal Performance Criteria
4.2.5	Environmental Objectives and Targets
4.2.6	Environmental Plans and Management Program
4.3	IMPLEMENTATION
4.3.1	General
4.3.2	Ensure Capability
4.3.2.1	Resources - Human, Physical, and Financial
4.3.2.2	Environmental Management System Alignment and Integration
4.3.2.3	Accountability and Responsibility
4.3.2.4	Environmental Values and Motivation
4.3.2.5	Knowledge, Skills and Training
4.3.3	Support Action
4.3.3.1	Communication and Reporting
4.3.3.2	Environmental Management System Documentation
4.3.3.3	Environmental Management System Records and Information Management
4.3.3.4	Operational Controls
4.3.3.5	Emergency Preparedness and Response
4.4	MEASUREMENT AND EVALUATION
4.4.1	General

- 4.4.2 Measuring and Monitoring (Ongoing Performance)
- 4.4.3 Audit of the Environmental Management System

- 4.5 REVIEW AND IMPROVEMENT
- 4.5.1 General
- 4.5.2 Review of the Environmental Management System
- 4.5.3 Corrective and Preventive Action
- 4.5.4 Continual Improvement

Appendix

- A Examples of International Environmental Guiding Principles
 - A1 Rio Declaration
 - A2 ICC Business Charter for Sustainable Development

0 INTRODUCTION

0.1 Overview

As concern grows for maintaining and improving the quality of the environment and protecting human health, organisations of all sizes are increasingly turning their attention to the potential impacts of their activities, products and services. The environmental performance of an organisation is of increasing importance to internal and external interested parties. Achieving sound environmental performance requires organisational commitment to a systematic approach and to continual improvement.

The general purpose of this Guideline is to provide assistance to organisations implementing or improving an Environmental Management System (EMS). It is consistent with the goal of "Sustainable Development" and is compatible with diverse cultural, social and organisational frameworks.

An EMS provides order and consistency for organisational efforts to address environmental concerns through the allocation of resources, assignment of responsibilities, and ongoing evaluation of practices, procedures and processes.

This Guideline outlines the elements of an EMS and provides practical advice on implementing or enhancing such a system. It also provides organisations with advice on how to effectively initiate, improve or sustain an environmental management system. Such a system is essential to an organisation's ability to anticipate and meet growing environmental performance expectations and to ensure ongoing compliance with national and/or international requirements.

Environmental management is an integral part of an organisation's overall management system. The structure, responsibilities, practices, procedures, processes and resources for implementing environmental policies, objectives, and targets should be co-ordinated with existing efforts in other areas (e.g., operations, finance, quality, occupational health and safety). The design of an EMS is an ongoing, interactive process that consists of defining, documenting and continually improving on the required capabilities.

Key principles for managers implementing an Environmental Management System include, but are not limited to the following:

- Recognise that environmental management is among the highest corporate priorities.
- Establish and maintain communications with internal and external interested parties.
- Determine the legislative requirements and environmental aspects associated with the organisation's activities, products and services.
- Develop management and employee commitment to the protection of the environment, with clear assignment of accountability and responsibility.

- Encourage environmental planning throughout the product or process life cycle.
- Establish a disciplined management process for achieving targeted performance levels.
- Provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an ongoing basis.
- Evaluate environmental performance against appropriate policies, objectives and targets and seek improvement where appropriate.
- Establish a management process to review and audit the Environmental Management System and to identify opportunities for improvement of the system and resulting environmental performance.
- Encourage contractors and suppliers to establish an EMS.

ISO 14001 includes the core elements of the EMS to be used for certification/registration. ISO 14000 includes additional principles and elements that an organisation may consider. ISO 14010-12 and ISO 14031 support both ISO 14000 and ISO 14001. This relationship is shown in figure 1.

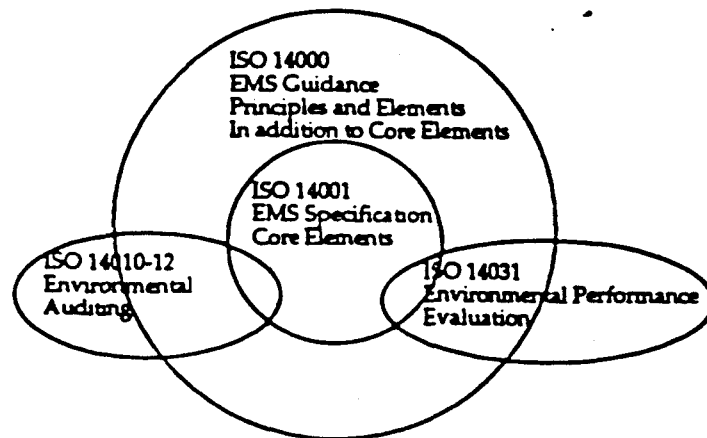


Figure 1 Relation of Some ISO 14000 Documents

Organisations can consider different uses of the ISO 14000 series.

- Using this ISO 14000 Guideline to Environmental Management Principles, Systems and Supporting Techniques, or parts of it, to initiate and/or improve its environmental management system. ISO 14000 is not intended for use by registration bodies.
- Using the ISO 14001 Environmental Management System Specification to achieve third party certification. ISO 14001 is intended for use by registration bodies.

- Using this ISO 14000 Guideline or the ISO 4001 Specification for second party recognition between contracting parties, which may be suitable for some business relationships.
- Using related ISO documents.

The choice will depend on factors such as:

- organisation policy;
- level of maturity of the organisation: whether there is already systematic management in place that can facilitate the introduction of systematic environmental management;
- possible advantages and disadvantages, influenced by such things as market position, existing reputations, external relations;
- size of the organisation.

This guideline can be used by organisations of any size. None-the-less, the importance of small and medium-sized enterprises (SMEs) is being increasingly recognised by governments and business. This guideline acknowledges and accommodates the needs of SMEs.

0.2 Benefits of Having an Environmental Management System

An organisation should implement an effective environmental management system in order to help protect human health and the environment from the potential impacts of its activities, products and services; and to assist in maintaining and improving the quality of the environment.

Having an EMS can help an organisation provide confidence to its interested parties that

- policies, objectives, and targets are met;
- emphasis is placed on prevention rather than corrective action;
- evidence of reasonable care and regulatory compliance can be provided; and
- the systems design incorporates the concept of continual improvement.

An organisation whose management system incorporates an EMS has a framework to balance and integrate economic and environmental interests. An organisation that has implemented an EMS can achieve significant competitive advantage.

Economic benefits can be gained from implementing an environmental management system. These should be identified in order to demonstrate to interested parties, especially shareholders, the value to the organisation of good environmental management. It also provides the organisation with the opportunity to link environmental objectives and targets with specific financial outcomes and thus to ensure that resources are made available where they provide the most

benefit in both financial and environmental terms.

The potential benefits associated with an effective EMS include:

- meeting customers' environmental expectations;
- maintaining good public/community relations;
- satisfying investor criteria and improving access to capital;
- obtaining insurance at reasonable cost;
- enhanced image and market share;
- meeting vendor certification criteria;
- improving cost control;
- liability limitation;
- demonstration of reasonable care;
- conservation of input materials and energy;
- facilitate obtaining permits and authorisations;
- technology development and transfer; and
- improved industry-government relations.

1. SCOPE

This International Standard provides guidance on the development and implementation of environmental management systems and principles, and their co-ordination with other management systems.

The guidelines are applicable to any organisation, regardless of size, type, or level of maturity, that is interested in developing, implementing and/or improving an environmental management system.

The guidelines are intended for use as a voluntary, internal management tool and are not intended for use by EMS Certification/Registration bodies as a specification standard.

The guidelines build on the core elements of the EMS specification found in ISO 14001 and include additional elements important to a comprehensive Environmental Management System.

2. NORMATIVE REFERENCES

The following standards contain provisions which, through reference in the text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 14001:199X Environmental Management Systems – Specification with
Guidance for Use

ISO 14010.2:199X Guidelines for Environmental Auditing – General
Principles of Environmental Auditing

ISO 14011.1:199X Guidelines for Environmental Auditing – Audit Procedures
-- Part 1: Auditing of Environmental Management Systems

ISO 14012:199X Guidelines for Environmental Auditing – Qualification Criteria
for Environmental Auditors

3. DEFINITIONS

The following definitions apply in this Guideline:

3.1 continual improvement – process of enhancing the environmental management system, with the purpose of achieving improvements in overall environmental performance, not necessarily in all areas of activity simultaneously, resulting from continuous efforts to improve in line with an organisation's environmental policy.

3.2 environment – surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation. The environment in this context extends from within an organisation to the global system.

3.3 environmental aspect – elements of an organisation's activities, products and services which are likely to interact with the environment.

3.4 environmental impact – any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities products and services.

3.5 environmental management – parts of the overall management function of an organisation that develop, implement, achieve, review and maintain the environmental policy.

3.6 environmental management system – organisational structure, responsibilities, practices, procedures, processes and resources for implementing and maintaining environmental management.

3.7 environmental management system audit – systematic and documented verification process to objectively obtain and evaluate evidence to determine whether an organisation's environmental management system conforms to the EMS audit criteria. (align with SC2)

3.8 environmental objectives – overall environmental goals, arising from the environmental policy and significant impacts, that an organisation sets itself to achieve, and which are quantified wherever practicable.

3.9 environmental performance – measurable outputs of the environmental management system, relating to the organisation's control of the impact of its activities, products and services on the environment, based on its environmental policy, objectives and targets. (align with SC4)

3.10 environmental policy – statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.

3.11 environmental target – detailed performance requirement, quantified wherever practicable, applicable to the organisation or parts thereof, that arise from the environmental objectives and that need to be set and met in order to achieve those objectives.

3.12 interested party – individual or group concerned with or affected by the performance of an organisation.

3.13 organisation – company, operation, firm, enterprise, institution, or association, or part thereof, whether incorporated or not, public or private, that has its own functions and administration.

4 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) PRINCIPLES AND ELEMENTS

The environmental management system model (see Figure 2) follows the basic view of an organisation which subscribes to the following principles:

Principle 1

An organisation should focus on what needs to be done -- it should ensure commitment to the EMS and define its policy.

Principle 2

An organisation should formulate a plan to fulfil its environmental policy.

Principle 3

For effective implementation an organisation should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

Principle 4

An organisation should measure, monitor and evaluate its environmental performance.

Principle 5

An organisation should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

With this in mind, the EMS is best viewed as an organising framework that should be continually monitored and reviewed to provide effective direction for an organisation's environmental activities in response to changing internal and external factors. Every individual in an organisation should accept responsibility for environmental improvements.

Continual Improvement

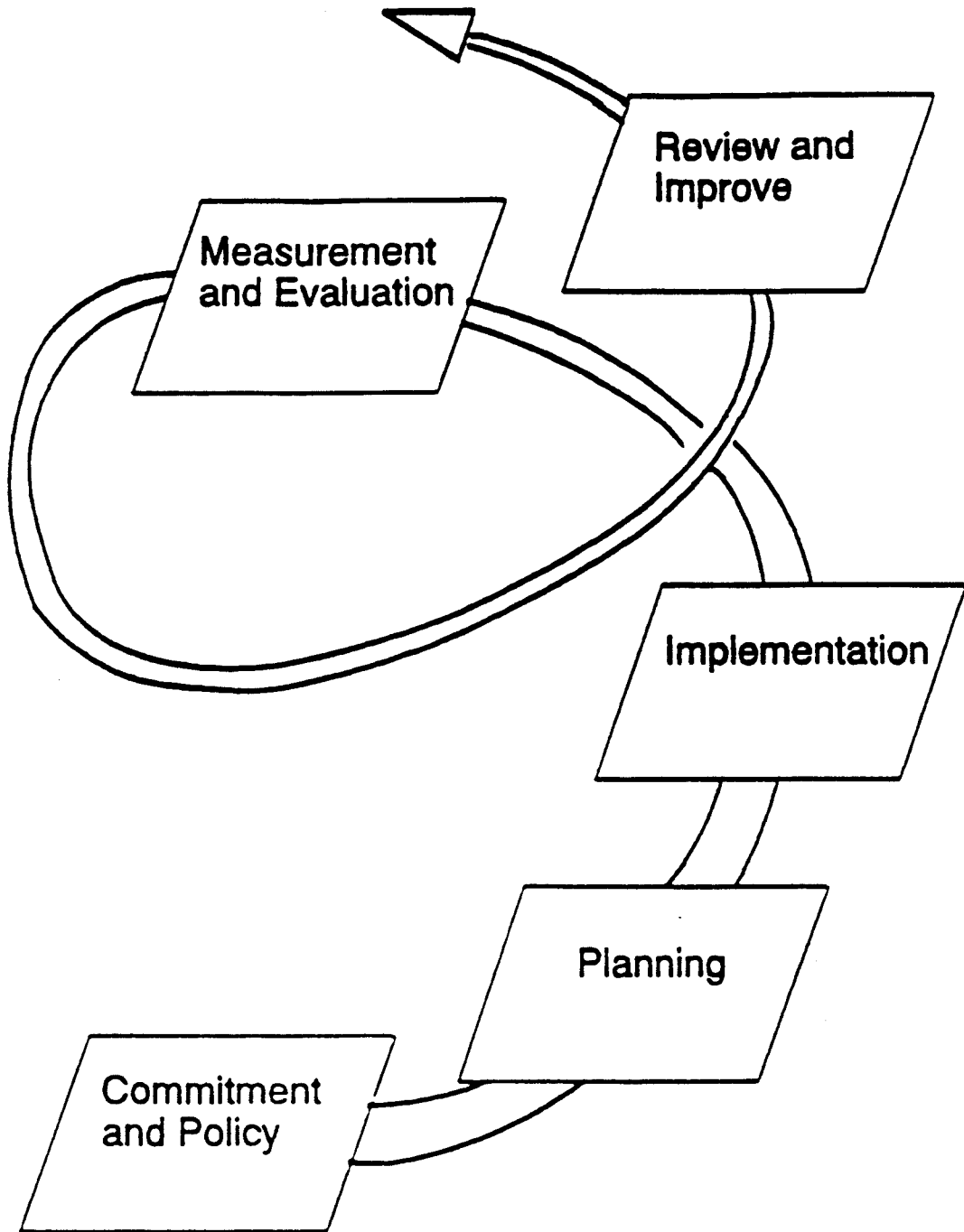


Figure 2 EMS Model

4.1 HOW TO START: COMMITMENT AND POLICY

Principle 1

An organisation should focus on what needs to be done -- it should ensure commitment to the EMS and define its policy.

4.1.1 General

The organisation should begin where there is obvious benefit, for example, by focusing on regulatory compliance, by limiting sources of liability or by making more efficient use of materials.

As the organisation grows in experience, and its EMS starts to take shape, procedures, programs and technologies can be put in place to further improve environmental performance. Then, as the EMS matures, environmental considerations can be integrated into all business decisions.

4.1.2 Top Management Commitment and Leadership

To ensure success, the first step in developing or improving an Environmental Management System is obtaining commitment from the top management of the organisation to improve the environmental performance of the organisation in managing its activities, products and services. The ongoing commitment and leadership of the top management is crucial.

4.1.3 Initial Environmental Review

The current position of an organisation with regard to the environment can be established by means of an initial environmental review. The initial review can cover the following areas:

- identification of legislative and regulatory requirements;
- identification of environmental aspects, significant environmental impacts and liabilities;
- evaluation and documentation of significant environmental issues;
- evaluation of performance compared with relevant internal criteria, external standards, regulations, codes of practice and sets of principles and guidelines;
- existing environmental management practices and procedures;
- identification of the policies and procedures dealing with procurement and contracting activities;
- feedback from the investigation of previous incidents of non-compliance;
 - opportunities for competitive advantage;
- the views of interested parties; and

- functions or activities of other organisational systems that can enable or impede environmental performance.

In all cases, consideration should be given to the full range of operating conditions, including possible incidents and emergency situations.

The process and results of the initial environmental review should be documented and opportunities for EMS development should be identified.

Practical Help Initial Environmental Review

An important first step is to develop the list of areas to be reviewed. This can include organisation activities, specific operations or a specific site.

Some common techniques for conducting a review include:

- questionnaires
- interviews
- checklists
- direct inspection and measurement
- records review
- benchmarking

Organisations, including SMEs, can look to a number of outside sources such as:

- enforcement agencies in relation to laws and permits
- local or regional libraries or databases
- other organisations for exchange of information
- industry associations
- larger customer organisations
- manufacturers of machinery in use
- business relations (e.g., with those who transport and dispose of waste)
- professional help

4.1.4 Environmental Policy

An environmental policy establishes an overall sense of direction and sets the parameters of action for an organisation. It sets the overarching goal as to the level of environmental performance required of the organisation, against which all subsequent actions will be judged.

A growing number of international organisations including government, industry associations and citizens groups have developed guiding principles (see Appendix A). Such guiding principles have helped organisations define the overall scope of their commitment to the environment. They also help to give different organisations a common set of values. Based on these comprehensive principles, any organisation can then develop its policy, which can be as individual as the organisation for which it is written.

The responsibility for setting environmental policy rests with those with proprietary interest in the organisation, or with their delegates, (e.g., a board of directors or another governing body). The organisation's management is responsible for implementing the policy and for providing input to the formulation and modification of the policy.

An environmental policy should consider the following:

- the organisation's mission, vision, core values and beliefs;
- requirements of and communication with interested parties;
- continual improvement;
- guiding principles;
- alignment with other organisational policies (e.g., Quality, Health & Safety); and
- specific local or regional conditions.

Issues to be Considered in Environmental Policy

1. Does the organisation have an environmental policy?
2. Does the policy reflect the organisation's values and guiding principles?
3. Has the environmental policy been approved by the Board of Directors or other governing body and has someone been identified and given the authority to oversee and implement the policy?
4. Does the policy drive the setting of environmental objectives and targets?
5. Does the policy guide the organisation towards monitoring best available technology and management practices?
6. Does the policy support continual improvement?
7. Does the policy state the organisation's commitment to monitor, and meet or exceed legal requirements and to consider the expectations of its interested parties?

Practical Help Environmental Policy

All activities, products and services can give rise to impacts on the environment. The environmental policy should recognise this.

A detailed review of the guiding principles in Appendix A can help in drafting an appropriate policy. The issues addressed in the policy depend on the nature of the organisation. In addition to compliance with environmental regulations, the policy can state commitments to:

- minimise the environmental impacts of new developments through the use of the integrated environmental management procedures and planning
- development of environmental performance evaluation procedures and associated indicators
- embody life cycle thinking
- design products in such a way as to minimise their environmental impacts in production, use and disposal
- prevent pollution, reduce waste and the consumption of resources (materials, fuel and energy), and commit to recovery and recycling, as opposed to disposal where feasible
- education and training
- technology transfer
- effective involvement of and communication with interested parties
- work towards the achievement of sustainable development
- encourage the use of EMS by suppliers and contractors

4.2 PLANNING

Principle 2

An organisation should formulate a plan to fulfil its environmental policy.

4.2.1 General

The environmental management system elements relating to planning include: identification of environmental aspects and evaluation of associated environmental impacts; environmental policy; internal criteria; environmental objectives and targets, and environmental plans and management program.

4.2.2 Identification of Environmental Aspects and Evaluation of Associated Environmental Impacts

Before an organisation can establish its policies and prioritise its objectives and targets, it should identify the environmental aspects and significant environmental impacts associated with its activities, products and services. The purpose of doing so is to ensure that the significant environmental impacts associated with these aspects are taken into account in setting the environmental objectives.

The identification of the environmental aspects is an ongoing process that determines the past, current and potential impact (positive or negative) of an organisation's activities on the environment. This process also includes the identification of the potential regulatory, legal and business exposure affecting the organisation. It can also include identification of impacts on the health and safety of people, and environmental risk assessment.

Issues to be Considered in Identification of Environmental Aspects and Evaluation of Environmental Impacts

1. Have potential environmental aspects of the organisation's activities, products, and services been identified?
2. Do the organisation's activities, products or services create any change (positive or negative) to or in the environment?
3. Does the location of the organisation require special environmental consideration?
4. Will any intended changes or additions to activities, products

or services alter the environmental aspects and impacts?

5. How significant or severe are the potential environmental impacts should a process failure occur?

6. How frequently will the situation arise that could lead to the impact?

7. What are the significant environmental impacts, considering aspects, likelihood, severity and frequency?

3. Are procedures developed to track the costs and benefits (Return On Investment) of environmental activities?

Practical Help Human, Physical and Financial Resources

The resource base and the organisation structure of the SME can impose certain limitations on implementation. In order to manage these constraints the SME should, wherever possible, consider co-operative strategies with

- larger client organisations to share technology and know-how
- other SMEs on a supply chain or local basis to define and address common issues, to share know-how, to facilitate technical development, to use facilities jointly, to establish a way to study the EMS, to collectively engage consultants
- standardisation organisations, SME associations, Chambers of Commerce, for training and awareness programs
- universities and other research centres to support production and innovation

4.3.2.2 EMS Alignment and Integration

To effectively manage environmental concerns the EMS elements should be designed or revised so that they are effectively aligned and integrated with existing management elements.

Management system elements that can require integration include

- organisation policies
- resource allocation
- operational controls and documentation
- information and support systems
- training and development
- organisation and accountability structure
- reward and appraisal systems
- measuring and monitoring systems
- communication and reporting

Issues to be Considered in Organisational Alignment and Integration

1. Has the environmental management system been integrated into the overall business management process?
2. Is there a process to balance and resolve conflicts between environmental and other business objectives and priorities?

4.3.2.3 Accountability and Responsibility

Responsibility for the overall effectiveness of the EMS should be assigned to a senior person or function(s) with sufficient authority, competence and resources.

Operational managers should clearly define the responsibilities of relevant personnel and be responsible and accountable for effective implementation of the EMS and environmental performance. Employees at all levels should be accountable, within the scope of their responsibilities, for environmental performance in support of the overall environmental management system.

Issues to be Considered in Accountability and Responsibility

1. Are the responsibilities and accountability of key personnel who manage, perform and verify work affecting the environment, defined and documented?
2. Do these personnel
 - provide sufficient training, resources and personnel for implementation?
 - initiate action to ensure compliance with environmental policy?
 - anticipate, identify and record any environmental problems?
 - initiate, recommend, or provide solutions to those problems?
 - verify the implementation of such solutions?
 - control further activities until any environmental deficiency or unsatisfactory condition has been corrected?
 - know how to act in emergency situations?
 - understand the consequences of non-compliance?
 - understand the accountability that applies to them?
 - encourage voluntary action and initiatives?
 - have environmental responsibilities and performance recognised in their reward and recognition systems?

Practical Help Accountability and Responsibility

To ensure effective development and implementation of an EMS, it is necessary to assign appropriate responsibilities and authorities. One possible approach for developing environmental responsibilities is indicated below. It should be recognised that companies and institutions have different organisational structures, and need to understand and define environmental responsibilities based upon their own work processes.

Sample Environmental Responsibilities	Typical Person Responsible
Establish overall direction	President, CEO, Board of Directors
Develop environment policy	President, CEO, Chief Environment Manager
Monitor overall EMS performance	Chief Environment Manager, Environment Committee
Assure regulatory compliance (external)	Senior Operating Manager
Ensure EMS compliance (internal)	All Managers, Chief Environment Manager
Ensure continual improvement	All Managers
Identify customers' expectations	Sales and Marketing Staff
Identify suppliers' expectations	Purchasers, Buyers
Develop and maintain accounting procedures	Finance/Accounting Managers
Comply with defined procedures	All Staff

Note: In the case of SMEs the person responsible can be the owner.

4.3.2.4 Environmental Values and Motivation

A common set of environmental values should be developed and reinforced for the organisation, taking into account views of interested parties.

Senior management has a key role in communicating values and motivating employees. It is the commitment of the individual people, in the context of shared values, that transform an environmental management system from paperwork into an effective process.

All members of the organisation should understand and be encouraged to accept the importance of achieving the environmental objectives and targets for which they are responsible and/or accountable. They in turn should encourage where necessary the other members of their organisation to respond in a similar manner.

Motivation to continually improve can be enhanced when employees are recognised and rewarded for achieving environmental objectives and targets and encouraged to make suggestions that can lead to improved environmental performance.

Issues to be Considered in Environmental Values

1. Has management taken action to establish, reinforce and communicate organisational environmental values?
2. To what extent do employees understand, accept and share the environmental values of the organisations?
3. To what extent do shared environmental values serve to motivate environmentally responsible action?
4. Do performance reviews and reward and recognition systems include environmental activities?

4.3.2.5 Knowledge, Skills and Training

The knowledge and skills necessary to achieve environmental objectives should be identified. These should be considered in personnel selection, recruitment, training, skills development and ongoing education.

Appropriate training relevant to the achievement of environmental policies, objectives and targets should be provided to all personnel within an organisation. Employees should have an appropriate knowledge base, which includes training in the methods and skills required to perform their tasks in an efficient and competent fashion and knowledge of the impact their activities can have on the environment if performed incorrectly.

The organisation should also ensure that contractors working at the site provide evidence that they have the requisite knowledge and skills to perform the work in an environmentally responsible manner."

Since the level and detail of training varies according to the task, education and training is needed to ensure that employees' knowledge of regulatory requirements, internal standards and the organisation's policies and objectives is current.

Training programs typically have the following elements:

- identification of employee training needs;
- development of a training plan to address defined needs;
- verification of conformance of training program to regulatory or organisational requirements;
- training of target employee groups; and,
- documentation of training received.

Getting Started in Knowledge, Skills, and Training

1. Does the organisation identify environmental training needs?
2. Are the training needs of specific job functions analysed?
3. Is a training program developed and reviewed regularly?
4. Does this process include documentation and evaluation

Practical Help Identification of Environmental Aspects and Evaluation of Associated Environmental Impacts

This is a procedure that can be dealt with in four stages.

Step 1 Select an Activity or Process

The selected activity or process should be large enough for meaningful examination and small enough to be sufficiently understood.

Example: Product Design

Step 2 Identify Environmental Aspects of the Activity or Process

Identify as many environmental aspects as possible associated with the selected activity or process.

Example: Product Design can have the following aspects:

- packaging
- raw materials
- processing energy
- etc.

Step 4 Evaluate Significance of Impacts

The significance of each of the identified environmental impacts can be different for each organisation. Quantification can aid judgement.

Evaluation can be facilitated by considering:

Environmental Concerns:

- the scale of the impact
- the severity of the impact
- probability of occurrence
- permanence of impact

Business Concerns:

- potential regulatory and legal exposure
- difficulty of changing the impact
- cost of changing the impact
- effect of change on other activities and processes
- concerns of interested parties
- effect on the public image of the organisation

4.2.3 Legal Requirements

The organisation should establish and maintain procedures to identify, have access to and understand all legal and other requirements to which it subscribes, directly applicable to the environmental aspects of its activities, products and services.

Practical Help Legal Requirements

To maintain regulatory compliance, an organisation should identify and understand regulatory requirements applicable to its activities products and services. Regulations can exist in several forms.

- those specific to the activity (site operating permits)
- those specific to the organisation's products and services
- those specific to the organisation's industry
- general environmental laws
- authorisations, licenses and permits

Several sources can be used to identify environmental regulations and ongoing changes, including:

- all levels of government
- industry associations or groups
- commercial databases
- professional services

To facilitate keeping track of legal requirements, an organisation can establish and maintain a list of all laws and regulations pertaining to its activities, products and services.

4.2.4 Internal Performance Criteria

Internal priorities and criteria should be developed and implemented where external standards do not meet the needs of the organisation or are non-existent. Internal criteria, together with external standards where they exist, define the performance required to fulfil the organisation's policies, objectives and targets.

Practical Help Internal Performance Criteria

A typical list of areas where an organisation can have internal performance criteria might include:

- management systems
- employee responsibilities
- acquisition, property management and divestiture
- suppliers
- contractors
- product stewardship
- environmental communications
- regulatory relationships
- environmental incident response and preparedness
- environmental awareness and training
- environmental measurement and improvement
- process risk reduction
- pollution prevention and resource conservation
- capital projects
- process change
- hazardous material management
- waste management
- water management (e.g., waste, storm, ground)
- air quality management
- energy management
- transportation

4.2.5 Environmental Objectives and Targets

Objectives should be established to meet the organisation's environmental policy. These objectives are the broad overall goals for environmental performance identified in the environmental policy. When establishing its objectives an organisation should also take into account the relevant findings from environmental reviews, and the identified environmental aspects and associated environmental impacts.

These reviews should lead to the identification of specific, measurable environmental performance indicators. These indicators can be used to describe the organisation's performance or become the basis for objectives or targets.

Environmental targets can then be set to achieve these objectives within a specified time-frame. The targets should be specific and measurable.

Objectives and targets can apply broadly across an organisation or more narrowly to site-specific or individual activities. Appropriate levels of management should define the objectives and targets. Objectives and targets should be periodically reviewed and revised, and should take into consideration the views of interested parties.

Issues to be Considered in Environmental Objectives and Targets

1. Are the organisation's environmental objectives and targets established:

- within the context of the policy ?
- reflecting the environmental aspects and the significant environmental impacts?
- in terms of specific, measurable indicators?
- with the involvement of the people who are responsible for achieving them?
- considering the views of interested parties?

2. Are objectives and targets regularly reviewed and revised to reflect desired improvements in environmental performance?

Practical Help Objectives and Targets

Objectives can include commitments to:

- reduce waste and the depletion of resources
- reduce or eliminate the release of pollutants into the environment
- design products to minimise their environmental impact in production, use and disposal
- control the environmental impact of raw material sourcing
- minimise the environmental impact of new developments
- promote environmental awareness among employees and the community

Progress towards an objective can generally be measured using environmental performance indicators such as:

- quantity of raw material or energy used
- quantity of emissions such as CO₂
- waste produced per quantity of finished product
- efficiency of material and energy use
- number of environmental incidents/accidents
- % waste recycled
- % recycled material used in packaging
- number of vehicle miles per unit of production
- specific pollutant concentrations, e.g. NO_x, SO₂, CO, HC, Pb, CFCs
- investment in environmental protection
- number of prosecutions
- land area set aside for wildlife habitat

An Integrated Example:

Objective: reduce energy required in manufacturing operations

Indicator: quantity of fuels and electricity per unit production

Target: achieve 10% reduction during 1995

4.2.6 Environmental Management Plans and Program

Within the general planning of activities an organisation should establish environmental management plans and programs addressing schedules, resources and responsibilities for achieving the organisation's environmental policy, objectives and targets.

An environmental management plan provides the long term framework for the organisation to improve environmental performance. Environmental management plans can be free standing or integrated into the organisation's strategic plan.

Within the framework provided by the environmental management plan, an environmental management program identifies specific action steps, schedules, resources and responsibilities required to achieve the stated targets, in order of their priority to the organisation.

An environmental management plan should be dynamic and should be revised regularly to reflect changes in organisational objectives and targets. The environmental management program can be divided into a series of more specific action plans to deal with individual processes, projects, products, services, sites or facilities within a site.

Issues to be Considered in Environmental Management Plans and Program

1. Does the organisation have an environmental management planning process?
2. Does the environmental management planning process involve all responsible parties?
3. Is the environmental management plan linked to the policies and objectives of the organisation?
4. Is there a process for periodic reviews of the plan?
5. Does the organisation have a process for developing environmental management programs?
6. Do these programs address the issues of resources, responsibility, timing and priority?
7. Is the environmental management program fully integrated with the environmental policy and environmental management plan?
8. Is the environmental management program monitored on a ongoing basis as part of the operational review process.

Practical Help Environmental Management Plans and Program

A useful distinction can be made between a longer term environmental management plan and a shorter term environmental management program.

Long-term planning is useful in mapping out the application of the continual improvement of environmental performance, and provides the basis for future details of an environmental management program.

A long-term environmental management plan can include:

- a description of the current situation of the organisation's environmental performance at the time the plan is released;
- a description of the proposed improvements of the organisation's environmental performance over the planned period;
- consideration of technology requirements to implement the proposed improvements;
- awareness of internal and external factors influencing the proposed improvements (e.g., financial resources, capital projects, facility location, market needs/developments, legislative and regulatory developments, expectations of interested parties).

A short term environmental management program can include:

- prioritisation of environmental issues
- development of options for priority issue resolution
- a cost/benefit review of these options and selection of the preferred approach
- identification of responsibility for implementation
- provision for post-implementation review and assessment

Practical Help Environmental Management Plans and Program

Example of Objectives and Targets Linked in Environmental Management Plans and Program

Policy: To conserve natural resources.

Objective: To minimise the use of water wherever technologically and commercially viable.

Target: To reduce water consumption by 15% of present levels within one year.

Such a target would in turn have to be translated into a number of action plans, including for example:

Action plan: Install equipment to recycle rinse water for Process A for re-use in Process B which does not require water of the same high quality.

Person responsible: John Waters

Resources: existing operations staff
new water recycling technology
100K from capital budget

Completion Date: November X, 19XX.

4.3 IMPLEMENTATION

Principle 3

For effective implementation an organisation should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

4.3.1 General

The capabilities and support required by the organisation constantly evolve in response to the changing requirements of interested parties, a dynamic business environment, and the process of continual improvement. To achieve its environmental objectives an organisation should focus and align its people, systems, strategy, resources and structure.

For many organisations, implementing environmental management can be approached in stages and should be based on the level of awareness of requirements, aspects, expectations and benefits, and the availability of resources.

4.3.2 ENSURING CAPABILITY

4.3.2.1 Resources - Human, Physical, and Financial

The appropriate human, physical (e.g., facilities, equipment), and financial resources essential to the implementation of an organisation's environmental policies and the achievement of its objectives should be defined and made available. In allocating resources, organisations can develop procedures to track the benefits as well as the costs of their activities, products and services, such as the cost of pollution control, wastes and disposal.

Issues to be Considered in Human, Physical, and Financial Resources

1. How does the organisation identify and allocate the human, technical and financial resources necessary to meet its objectives and targets?
2. Does the organisation have a process to evaluate the environmental resource requirements (human, technical, financial) associated with capital projects?

Practical Help**Knowledge, Skills and Training**

The following types of environmental training can be provided:

Type of Training	Audience	Purpose
Raising awareness of the strategic importance of environmental management	Senior Management	To gain the commitment and alignment to the organisation's environmental policy
Raising general environmental awareness	All employees	To gain commitment to the environmental policy, objectives and targets and to instil a sense of individual responsibility
Skills Enhancement	Employees with environmental responsibilities	Improve performance in specific areas - operations, R&D, engineering
Compliance	Employees whose actions can affect compliance	Ensure regulatory and internal requirements for training are met.

4.3.3 SUPPORT ACTION

4.3.3.1 Communication and Reporting

Communication includes establishing processes and plans to report internally and externally on the environmental activities of the organisation in order to

- demonstrate management commitment to the environment;
- deal with concerns and questions about the environmental issues of the organisation's activities, products and services;
- raise awareness of the organisation's environmental policies, objectives, targets and programs; and,
- inform internal or external interested parties about the organisation's environmental management system and performance as appropriate.

Results from EMS monitoring, audit and management review should be communicated to those within the organisation who are responsible for improvement.

The provision of appropriate information to the organisation's employees and other interested parties serves to motivate employees and encourage public understanding and acceptance of the organisation's efforts to improve its environmental performance.

Issues to be Considered in Communication and Reporting

1. Is there a system for receiving and responding to concerns?
2. Is there a process for communicating the organisation's environmental policy and performance?
3. Are the results from EMS audits and reviews communicated to all appropriate people in the organisation?
4. Are internal communications adequate to support continual improvement around environmental issues?

Practical Help Communication and Reporting

a) Items that can be included in reports:

- organisation's profile;
- environmental policy, objectives and targets;
- environmental management processes (including interested party involvement and employee recognition);
- environmental performance evaluation (including releases, resource conservation, compliance, product stewardship and risk);
- opportunities for improvement;
- supplementary information, such as glossaries;
- independent verification of the contents.

b) Important things to remember for both internal and external environmental communication and reporting include:

- two-way communication should be encouraged;
- information should be understandable and adequately explained;
- information should be verifiable;
- the organisation should present an accurate picture of its performance;
- information should be presented in a consistent form (e.g., similar units of measurement to allow for comparison between one period and another).

c) An organisation can communicate environmental information in a variety of ways:

- externally, through an annual report, regulatory submissions, public government records, industry association publications, the media, and paid advertising;
- organisation of open days, the publication of telephone numbers where complaints and questions can be directed;
- internally, through bulletin board postings, internal newspapers, meetings and electronic mail messages;

4.3.3.2 EMS Documentation

Operational processes and procedures should be defined and appropriately documented and updated as necessary. The organisation should clearly define the various types of documents which establish and specify effective operational procedures and control.

The existence of EMS documentation supports employee awareness of what is required to achieve the organisation's environmental objectives and enables the evaluation of the system and environmental performance.

Often the key item of EMS documentation is an Environmental Management Manual. The nature of this can vary depending on the size and complexity of the organisation. Where elements of the EMS are integrated with an organisation's overall management system the environmental documentation should be integrated into existing documentation. For ease of use, the organisation can consider organising and maintaining a summary of the documentation to

- collate the environmental policy, objectives, and targets;
- describe the means of achieving environmental objectives and targets;
- document the key roles, responsibilities and procedures;
- provide direction to related documentation and describe other aspects of the organisation's management system, where appropriate; and
- demonstrate that the environmental management system elements appropriate for the organisation are implemented.

Such a summary document can serve as a permanent reference to the implementation and maintenance of the organisation's environmental management system.

Issues to be Considered in EMS Documentation

1. Are environmental management procedures identified, documented, and communicated?
2. Does the organisation have a permanent reference to the existence, implementation and maintenance of the EMS?
3. Is EMS documentation integrated with existing documentation where appropriate?

Practical Help EMS Documentation

All documentation should be dated (with dates of revision), readily identifiable, organised, and retained for a specified period. The organisation should ensure that

- documents can be identified with the appropriate organisation, division, function, activity, and/or contact person;
- documents are periodically reviewed, revised as necessary and approved by authorised personnel prior to issue;
- the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the system are performed;
- obsolete documents are promptly removed from all points of issue and points of use.

4.3.3.3 EMS Records and Information Management

Records are the evidence of the ongoing operation of the EMS and should cover:

- legislative and regulatory requirements;
- permits;
- environmental aspects and impacts;
- environmental training activity;
- inspection, calibration and maintenance activity;
- monitoring data;
- details of non-conformance: incidents, complaints and follow-up action;
- product identification: composition and property data;
- supplier and contractor information; and
- environmental audits and reviews.

A complex range of information can result. The effective management of these records is essential to the successful implementation of the EMS. The key features of good environmental information management include: means of identification, collection, indexing, filing, storage, maintenance, retrieval, retention and disposition of pertinent EMS documentation and records.

Issues to be Considered in EMS Records and Information Management

1. Does the organisation have the environmental information it needs to manage effectively?
2. Does the organisation have the capability to identify and track key indicators of performance and other data necessary to achieve its objectives?
3. Does the organisation have a record /information management system that makes information available to the people who need it when they need it?

4.3.3.4 Operational Controls

Implementation is accomplished through the establishment and maintenance of operational procedures and controls to ensure that the level of environmental performance is consistent with the organisation's policies, objectives and targets.

Practical Help Operational Controls

The organisation should consider the different functions contributing to its significant impacts when developing operational controls and procedures, for example:

- R&D design and engineering
- purchasing
- contractors
- raw materials storage
- production processes
- laboratories
- storage of final products
- transport
- marketing, advertising
- customer service
- final disposal of product

Activities can be divided into three categories:

- activities to prevent pollution and conserve resources in new capital projects, process changes and resources management, property (acquisitions, divestitures, and property management), and new products and packaging;
- daily management activities to assure conformance to internal and external corporate requirements, to increase efficiency of these activities, and to continuously improve performance; and
- strategic management activities to anticipate and respond to changing environmental requirements.

4.3.3.5 Emergency Preparedness and Response

Emergency plans and procedures should be established to ensure that there will be an appropriate response to unexpected or accidental incidents.

The organisation should define and maintain procedures for dealing with environmental incidents and potential emergency situations. The operating procedures and controls should include, where appropriate, consideration of:

- accidental emissions to atmosphere;
- accidental discharges to water and land; and
- specific environment and ecosystem effects from accidental releases.

The procedures should take into account incidents arising, or likely to arise, as consequences of:

- abnormal operating conditions; and
- accidents and potential emergency situations.

Practical Help Emergency Preparedness and Response

Emergency plans can include:

- emergency organisation and responsibilities and, in particular, who have overall authority
- details of emergency services (e.g.. fire department, spill clean-up services)
- an internal and external communication plan
- actions taken in the event of different types of emergencies
- information on hazardous materials, including each material's potential impact on the environment, and measures to be taken in the event of accidental release
- training plans and, testing for effectiveness

4.4 MEASUREMENT AND EVALUATION

Principle 4

An organisation should measure, monitor and evaluate its environmental performance.

4.4.1 General

Measuring, monitoring and evaluating are key activities of an environmental management system which ensure that the organisation is performing in accordance with the stated environmental management program.

4.4.2 Measuring and Monitoring (Ongoing Performance)

There should be a system in place for measuring and monitoring actual performance against the organisation's environmental objectives and targets in the areas of management systems and environmental effectiveness of the operational processes. The results should be analysed and used to determine areas of success and to identify activities requiring corrective action and improvement.

Appropriate processes should be in place to ensure the reliability of data, such as calibration of instruments, test equipment, and software and hardware sampling.

Identifying appropriate environmental performance indicators for the organisation should be an ongoing process. Such indicators should be objective, verifiable and reproducible. They should be relevant to the organisation's activities, consistent with its environmental policy, practical, cost-effective, and technologically feasible.

Issues to be Considered in Measuring and Monitoring

1. Is environmental performance regularly monitored?
2. Have specific environmental performance indicators been established which relate to the organisation's objectives and targets?
3. Are there control processes in place to regularly calibrate and sample measuring and monitoring equipment and systems?

4.4.3 Audits of the Environmental Management System

Audits of the Environmental Management System should be conducted on a periodic basis to determine whether the system conforms to planned arrangements and has been properly implemented and maintained. See ISO 14010, ISO 14011.1 and ISO 14012.

Audits of the EMS can be carried out by organisation personnel, and/or by external parties selected by the organisation. In any case, the person conducting the audit should be in a position to do so objectively and impartially and should be properly trained.

The frequency of audits should be guided by the nature of the operation in terms of its environmental aspects and potential impacts. Also, the results of previous audits should be considered in determining frequency.

The EMS audit report should be submitted in accordance with the audit plan.

4.5 REVIEW AND IMPROVEMENT

Principle 5

An organisation should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

4.5.1 General

A continual improvement process should be applied to an environmental management system to achieve overall improvement in environmental performance. Continual improvement starts with measuring and monitoring.

4.5.2 Review of the Environmental Management System

The organisation's management should, at appropriate intervals, conduct a review of the Environmental Management System to ensure its continuing suitability and effectiveness.

The review of the EMS should be broad enough in scope to address the environmental dimensions of all activities, products and services of the organisation, including their impact on financial performance and possibly competitive position.

Review of the Environmental Management System should include:

- review of environmental objectives, targets and environmental performance;
- findings of the EMS audits;
- an evaluation of its effectiveness;
- an evaluation of the suitability of the environmental policy and the need for changes in the light of
 - changing legislation;
 - changing expectations and requirements of interested parties;
 - changes in the products or activities of the organisation;
 - advances in science and technology;
 - lessons learned from environmental incidents;
 - market preferences;
 - reporting and communication.

Issues to be Considered in the Review of the EMS

1. Are there periodic reviews of the Environmental Management System?
2. Are the appropriate people involved in the review of the Environmental Management System and follow-up?

4.5.3 Corrective and Preventive Action

The findings, conclusions, and recommendations reached as a result of audits and reviews of the Environmental Management System should be documented and the necessary corrective and preventive actions identified. Management should ensure that these corrective and preventive actions have been implemented and that there is systematic follow-up to ensure effectiveness.

4.5.4 Continual Improvement

The concept of continual improvement is embodied in the EMS. It is achieved by continually evaluating the current performance of activities, products and services for the purpose of identifying overall EMS improvement opportunities (see figure 2).

The continual improvement process should:

- identify areas of opportunity for improvement of the environmental management system and/or environmental performance;
- determine the root cause or causes of nonconformances or deficiencies;
- develop and implement a plan of corrective and preventive action to address root causes;
- verify the effectiveness of the corrective and preventive actions;
- document any changes in procedures resulting from process improvement;
- make comparisons with objectives and targets.

Issues to be Considered in Corrective and Preventive Action and Continual Improvement

1. Does the organisation have a process to identify areas for corrective and preventive action and improvement?
2. Does the organisation verify that corrective and preventive actions and improvements are effective and timely?

Appendix A

EXAMPLES OF INTERNATIONAL ENVIRONMENTAL GUIDING PRINCIPLES

Guiding Principles are formal declarations that express the basis on which an environmental policy can be built and which provide a foundation for action.

A1 The Rio Declaration On Environment And Development

The United Nations Conference on Environment and Development, having met at Rio de Janeiro from 3 to 14 June 1992, reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and seeking to build upon it, with the goal of establishing a new and equitable global partnership through the creation of new levels of co-operation among States, key sectors of societies and people, working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system, recognising the integral and interdependent nature of the Earth, our home proclaims that:

Principle 1

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 3

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5

All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

Principle 6

The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

Principle 7

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 8

To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

Principle 9

States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

Principle 10

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Principle 11

States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries can be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

Principle 12

States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing

country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

Principle 13

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 14

States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Principle 16

National authorities should endeavour to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 17

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

Principle 18

States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

Principle 19

States shall provide prior and timely notification and relevant information to potentially affected States on activities that can have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

Principle 20

Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Principle 21

The creativity, ideals and courage of the youth of the world should be mobilised to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

Principle 22

Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognise and duly support their identity, culture and interest and enable their effective participation in the achievement of sustainable development.

Principle 23

The environment and natural resources of people under oppression, domination and occupation shall be protected.

Principle 24

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.

Principle 25

Peace, development and environmental protection are interdependent and indivisible.

Principle 26

States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

Principle 27

States and people shall cooperate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

A2 International Chamber of Commerce (ICC)

Business Charter for Sustainable Development

1. Corporate Priority

To recognise environmental management as among the highest corporate priorities and as a key determinant to sustainable development; to establish policies, programs and practices for conducting operations in an environmentally sound manner.

2. Integrated Management

To integrate these policies, programs and practices fully into each business as an essential element of management in all its functions.

3. Process of Improvement

To continue to improve policies, programs and environmental performance, taking into account technical developments, scientific understanding, consumer needs and community expectations, with legal regulations as starting point; and to apply the same environmental criteria internationally.

4. Employee Education

To educate, train and motivate employees to conduct their activities in an environmentally responsible manner.

5. Prior Assessment

To assess environmental impacts before starting a new activity or project and before decommissioning a facility or leaving a site.

6. Products and Services

To develop and provide products or services that have no undue environmental impact and are safe in their intended use, that are efficient in their consumption of energy and natural resources, and that can be recycled, reused, or disposed of safely.

7. Customer Advice

To advise, and where relevant educate, customers, distributors, and the public in the safe use, transportation, storage and disposal of products provided; and to apply similar considerations to the provisions of services.

8. Facilities and Operations

To develop, design and operate facilities and conduct activities taking into consideration the efficient use of energy and materials, the sustainable use of renewable resources, the minimisation of adverse environmental impact and waste generation, and the safe and responsible disposal of residual wastes.

9. Research

To conduct or support research on the environmental impacts of raw materials, products, processes, emissions, and wastes associated with the enterprise and on the means of minimising such adverse impacts.

10. Precautionary Approach

To modify the manufacture, marketing, or use of products or services or the conduct of activities, consistent with scientific and technical understanding, to prevent serious or irreversible environmental degradation.

11. Contractors and Suppliers

To promote the adoption of these principles by contractors acting on behalf of the enterprise, encouraging and, where appropriate, requiring improvements in their practices to make them consistent with those of the enterprise; and to encourage the wider adoption of these principles by suppliers.

12. Emergency Preparedness

To develop and maintain, where significant hazards exist, emergency preparedness plans in conjunction with the emergency services, relevant authorities and the local community, recognising potential transboundary impacts.

13. Transfer of Technology

To contribute to the transfer of environmentally sound technology and management methods throughout the industrial and public sectors.

14. Contributing to the Common Effect

To contribute to the development of public policy and to business, governmental and intergovernmental programs and educational initiatives that will enhance environmental awareness and protection.

15. Openness to Concerns

To foster openness and dialogue with employees and the public, anticipating and responding to their concerns about potential hazards and impacts of operations, products, wastes or services, including those of transboundary or global significance.

16. Compliance and Reporting

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.