# Health Aspects of Environmental Impact Assessment Volume I

## Overview of Current Practice, Findings, and Recommendations

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## ACKNOWLEDGEMENTS

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# EXECUTIVE SUMMARY

Environmental impact assessment (EIA) is a valuable tool for assessing and mltigating potential environmental impacts of planned developments. EIA may also be used to assess the potential health Impacts of proposed projects. To some extent, this is already being done In countries around the world, including Canada. To fully integrate health and EIA, however, specific actlons need to be taken

Based on an analysis of survey responses, guidance materials, and case environmental Impact statements (EISs), the following conclusions illustrate the degree to which Canada currently addresses health in EIA:

1. Most provincial governments and federal ministries address health issues in EIA when they are identified as a concern. However, their coverage of health in EIA may be considered sporadic; that Is, very few provincial governments and federal ministries have sufficient procedures and mechanisms to ensure that health issues are Identified and addressed consistently and adequately.

2. Most EIA mandates in Canada (e.g., statutes, policies, etc.) do not require health to be considered in EIAs when health issues are identified as a concern. On the same token, these mandates do not prevent provincial governments and federal ministries from Integrating health and EIA more fully.

3. Widespread support exists among survey participants to integrate health and EIA. They recognize that health should be considered when It Is identified as a concern.

4. All provincial governments and federal ministries have some sort of screening process to determine whether an EIA is needed for a project. However, most provincial governments and federal ministrles do not include human health as an explicit criterion for consideration when making this decision.

5. Once an EIA is required, a scoping of issues to be addressed in the EIA usually occurs. When health Is a concern, if It has not been identified in the screening phase, It Is most likely identified here and appropriate terms of reference are drafted.

6. Most provincial governments and federal ministries Involve health professionals in an EIA if health Is identified as a concern. They may be asked to review a draft EIS, suggest terms of reference, or provide advice on specific issues. However, current linkages between environment and health ministries in most provinces are weak. As such, resources are often insufficient to enable health professionals to play a more active role in EIA and provide technical assistance in assessing certain issues.

7. All provincial governments and federal ministries involve the public in major projects which may have potential effects on the environment or on nearby human settlements. The public Is allowed at least one opportunity to provide input into the preparation of an EIS and to raise their health and environmental concerns.

8. While many provincial governments and federal ministries have EIAs which address human health risks, the total number of EIAs with an actual health study appears to be low. Also, analyses are largely qualitative in nature. Federal and provincial ministries conducting EIAs often consider health to be adequately addressed through the application of environmental standards and objectives which are in part health-based.

To improve the degree to which health considerations are addressed in Canadian EIA processes, a number of recommendations are proposed to CEARC in five issue areas: 1) EIA policy and process, 2) education, 3) guidance, 4) information management, and 5) research. The recommendations are as foi lows:

I. EIA POLICY AND PROCESS

Recommendation 1:

Establish a federal-provincial task group to:

A) Develop a policy or agreement between health and environment ministries with an explicit mandate:

- Requiring the consideration of human health issues in EIAs for projects where health is identified as a concern;

- Establishing a formal EIA-health relationship between environment and health ministries;

- Clearly defining terms, goals, and objectives regarding the integration of health and EIA, roles and resource commitments for health professionals (for guidance development and technical assistance), among other relevant issues;

- Refining EIA to include health in the following procedural steps:

    1) Health should be established as a mandatory screening criterion;
    2) Health professionals should be involved in screening proposals and/or in scoping of issues and establishing terms of reference;
    3) Health professionals should be consulted to provide advice and technical assisstance in assessments of various health issues;

4) The public should be ensured of opportunities to raise health concerns (in addition to environmental and social concerns) and to provide input into the preparation of EISs;
5) Health professionals should be involved in the review of draft EISs;
6) Health professionals should be Involved In decisions on EIAs with health concerns;
7) An auditing phase should be established to review completed EIAs. The process, the accuracy of predictions, and the effectiveness of mitigation measures to protect health and the environment should be assessed so that the knowledge gained may be applied to future EIAs.

B) Develop and implement a strategy to secure the support of ministers of environment and health for approval of this policy or agreement.

Recommendation 2:

Conduct a federal-provincial workshop to:

Develop EIA goals in relation to health (to be included in the EIA-health policy or agreement) which are carefully balanced wlth pre-existing goals.

Recommendation 3:

Conduct a federal-provincial workshop to:

Develop thorough definitions of "human health," "human health impacts," and "human health Impact assessment" which are acceptable by all affected parties and which will be included in the EIA-health policy of agreement.

## II. EDUCATION

Recommendation 4:

Establish task groups or sponsor research projects to:

A) **Develop educational programs and materials for health professionals to Inform them of EIA** and their potential roles In EIA. These educational programs should be applicable to health professionals in both the public and private sectors;

B) Develop educational programs and workshops similar to those above to be included in required curriculum for students In health programs at higher educational institutions;

C) Develop educational programs and materials for environmentministries and EIA practitioners to inform them of health aspects of EIA.

## III. GUIDANCE

Recommendation 5:

Establish provincial-federal task groups or sponsor research projects to:

Develop guidance documents and guidelines on screening, methodologies, health impact assessment, industry-specific health issues, standards and objectives, and other relevant topics to assist practitioners in conducting the health impact assessment component of EIA.

## IV. INFORMATION MANAGEMENT

Recommendation 6:

Sponsor a research project to:

A) Conduct a worldwide search to locate resource and information centres which collect, manage, disseminate, and allow access to relevant studies, reports, data banks, and other useful information;

B) Develop and distribute a directory listing resource and information sources, types of information available, and means of access. The directory should be periodically updated.

Recommendation 7:

Sponsor an international conference to:

A) Identify resource people in canada and other countries with expertise in relevant environmental health and EIA professions;
B) Develop an international network with the purpose of sharing information and expertise in research projects and actual EIA studies.

## V. RESEARCH

Recommendation 8:

Provide grants and establish programs to sponsor research in the following areas:

A) General environmental health subjects

- Research on the behaviour of toxic chemicals in the environment and on their effects on the environment and human health;

- Research to obtain better Information on chemicals used in production processes and on the by-products that are generated and discharged into the environment (e.g., how chemicals react together, how by-products affect the environment and human health, etc.);

- Research to develop simulation models, rlsk analysis, toxicology analysls, toxicology data bases, and "an approach which looks at the total human env i ronment ;"

- Research to obtain more precise data on dose-effect relatlonships. Research on long-term exposures to low doses of pollutants and associated effects on the environment and human health;

- Research to develop methodologies to assess cumulative exposures and associated health effects, potential health effects to future generations, and baseline health status;

- Research to develop simple and acceptable assessment methodologies;

- Research to develop standards and objectives for varlous envlronments (e.g., acceptable levels of a substance for more than one setting - for a home, a mine, etc.);

Research to Improve abllity to accurately analyze and Interpret test results and empirical data;

- Research to Improve knowledge of background levels of various substances;

- Research of "mul t i-media sources;" that Is, how health may be affected by a substance which has been exposed to the environment and to humans through more than one medium (e.g., air, water, soil, food).

B) Specific EIA-health subjects

- Research to identify agency procedures other than EIA (e.g., regulatory, licensing, and permitting procedures) In which health components are already addressed. Evaluate their effectiveness In protecting health, and where effective, Incorporate Into guidance so that EIA practitioners do not have to duplicate work done elsewhere.

- Research to Identify and analyze health assessment procedures such as those required In the U.S. Toxic Substances Control Act (TSCA) and the U.S. Comprehensive Emergency Response, Compensation, and Liabillity Act (CERCLA), and those conducted by Saskatchewan to assess baseline health, and by Health and Welfare Canada to assist other ministries. Determine their applicability to the health component of EIA and how they may be adapted;

- Research to examine ways In which more accountability may be integrated into screening of proposals, so that checks and balances are strengthened and projects with potentially significant environmental and/or health impacts do not escape review;

- Research to examine EIA exemption lists and decision-making rules applied in the screening phase to ensure that projects with potent/ally significant environmental and health risks are required to conduct an EIA;

- Research to evaluate federal and provincial standards and objectives for their consistency and applicability to their respective regions and for their equitable consideration of envlronmental and health criteria as well as economic and technological Criteria. Review future reports of the federal-provincial Multi-Media Guidelines Advisory Committee to assess Implications for current environmental standards and objectives and to recommend changes where necessary;

- Research to examine public participation requirements to ensure that the affected public is adequately notified of a pending EIA or of an application for a license or permit (If no EIA process exists) and that sufficient opportunities are available for the public to raise concerns for the environment and human health.

- Research to comprehensively review completed EISs across Canada. The purpose of such a study would be two-fold: to determine the consistency with which Canadian EISs (federal and provincial) address similar health issues for a similar set of parameters (e.g., type of industry, proximity to a human settlement, etc.), and to identify the parameters which ought to trigger assessment of health risks across the country.

The Canadian Environmental Assessment Research Council (CEARC) may implement these recommendations with the assistance of several government and non-government organlzations. Work should be initiated as soon as possible on developing an EIA-health policy, educating and informing environmental and health professionals, and developing certain guidance materials. By implementing these and the other recommendations, more effective integration of health and EIA will be promoted.

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# 1. INTRODUCTION

Environmental impact assessment (EIA), whether implemented through legislation or policy or as part of a separate permitting procedure, is a valuable tool used In the planning and development of projects which may have a significant Impact on the environment. Human health, which to a large extent is dependent upon the health of the environment, may receive varying degrees of attention in EIA depending on the project's potential Impact on health. Health concerns may be addressed through the application of health-based standards during the planning and development of a proposed project, or they may be addressed through an actual analysis (e.g., risk assessment) of the potential health impacts. When a health assessment is necessary, the process is often completely integrated with the rest of the EIA and it may contain any degree of complexity.

Environmental health and the assessment of human health impacts in EIA are receiving increased attention worldwide and are being recognized as legltimate fields of study and practice. The World Health Organization has published a number of reports (Working Group on the Health and Safety Component of Environmental Impact Assessment, 1986; Health and Safety Component of Environmental Impact Assessment, 1987) discussing the concept of Environmental Health Impact Assessment, a term used to describe the health component of EIA. In Ottawa, a national workshop on the subject (held May 1987), which was attended by EIA and health professionals from across the country and world, concluded that when potentially significant health impacts may be caused by a proposed project, the EIA should include an assessment of the risks to human health as part of the assessment of risks to the environment.

This research project, sponsored by the Canadian Environmental Assessment Research Council (CEARC), was initiated to find out the extent to which current EIA practices In Canada, the United States, and several European countries address human health rlsks.

This report is divided into three volumes. Volume I contains an overview of current practice for Canada, the United States, and Europe, major trends and findings In Canada, recommendations for future work, and a strategy for implementation of the recommendations. Volume II contains a more detailed discussion of current practice and Volume III contains the appendices.

## 2. TERMS OF REFERENCE

The purpose of this research project was to assess the current level of attention given to human health impacts In EIA processes in Canada, the Unlted States, and Europe. CEARC, in Its continuing effort to Improve the scientlflc, technical, and procedural basls for EIA, sponsored the project to provide the following information:

a) Whether potential human health Impacts are considered in EIA processes in Canada, the United States, and Europe;

b) To what extent and how potential human health effects are considered In EIA processes;

c) Current and possible components of an assessment of potentlal health impacts In EIA;

d) Suggestions for establlshlng and/or improving the assessment of potential health impacts In EIA and

e) Suggestions for CEARC's future research activities in health aspects of EIA.

CEARC established the following terms of reference to guide this project's work:

a) Research of the subject shal l be conducted at the federal and provincial evels of government In Canada;

b) For comparative purposes, research of the subject shall be conducted at the federal and several state governments in the United States and In several European countries;

c) To provide a balance to perspectives provided by government, perspectives on the subject shall be obtained from the health profession;

d) The major work for the project shall involve the following steps:

1) Preparation of a draft survey;

2) Initial review of survey by EIA coordinators and health professionals in selected provinces;

3) Incorporation of comments into revised survey;

4) Development of a list of people In government and the health profession to whom the survey would be administered;

5) Administration of the survey in Canada and the United States;

6) Compilation and analysis of survey results;

7) For Europe, a review of EIAs to assess how potential health impacts are addressed;

8) Preparation and submission of final report.

## 3. METHODOLOGY

The contract began June 15, 1987. A full account of the project's schedule appears in Appendix A.

The primary tools used for the Canadian and the United States portions Of the project were the survey and personal interviews. The survey (see Volume III, Appendix B) was developed by gathering suggestions for questions from professionals in the environmental and health fields. A draft of the survey was distributed for review to EIA and health professionals in Nova Scotia, Ontario, and British Columbia. Their comments were incorporated into the survey and a final draft prepared.

At the same time, a list of survey participants was generated and interview appointments made. A total of 55 people (36 environmental professionals and 19 health professionals) were interviewed. More environmental professionals than health professionals were interviewed because a limited number of health professionals had experience in EIA and were able to participate. Also, because of the limited input, the information presented in this report may be indicative but not representative of current practice.

In the provinces and territories, 24 environmental professionals and 19 health professionals from government, universities, and hospitals were interviewed. A copy of the survey was sent to each participant prior to the meeting. Each Interview was a personal interview except for the two participants in the Yukon and Northwest Territories. In these cases, the participants mailed their responses. The only province which did not participate in the survey was Alberta. Alberta decided to cooperate in the study by providing a separate report on the role of health in EIA in the province. At the time of writing, the report had not been completed.

In the United States, 12 environmental professionals in government were interviewed. Personal Interviews were conducted in Washington, D.C. while participants from the other locations completed the survey by mail. During interviews In both Canada and the United States, supporting materials such as case environmental impact statements (EISs) and guidance documents were collected.

Three people conducted the interviews. Angela Poirier was responsible for Prince Edward Island, Nova Scotia, Newfoundland, and Quebec; John Higham was responsible for British Columbia, Saskatchewan, Manitoba, and the Yukon and

Northwest Territories; and Jennifer Simon was responsible for Ontario, Ottawa, Washington, D.C., California, New York, and Wisconsin. After the interviews were completed, the three contractors reveiwed the survey responses and prepared a framework for reporting the findings. Analysis of the surveys was based on the participants' responses to the questions, information obtained during follow-up phone calls, and supportlng materlals gathered during the information collection phase of the study.

The European portion of this project consisted of the review and analysis of case EIA documents. The subcontractor at the Centre for Environmental Management and Planning (CEMP) at the University of Aberdeen, Scotland, collected and reviewed EISs and summary EISs from a variety of industries in several European countries, including England, Federal Republic of Germany, Finland, France, Ireland, Italy, Netherlands, Norway, and Scotland. CEMP used the survey for the Canadian and the United States portions of the project as the basis for its review of the European EISs and prepared a report presenting the results of this review.

An interim report with a summary of current practice and initial findings was submitted September 4, 1987. A first draft of the final report, which included a summary of current practice, findings, and recommendations was submitted October 26, 1987. Preparation of the final report began after comments were received November 25, 1987.

# 4. OVERVIEW OF CURRENT PRACTICE

## 4.1 Introduction

Thls section provides an overview of current practice for Canada, the United States, and Europe. The degree to which health is currently addressed in each government's EIA process is indicated in the following tables. Current practice is further described in the accompanying text. In addition, a brief comparative analysis of Canada and the United States and of Canada and Europe is provided. A more detailed account of each government's current practice may be found in Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice." The reader is cautioned to keep in mind the following points when reading this section:

- EIA has been defined in this project as broadly as possible. That is, EIA refers to any process that can be considered an assessment of potential environmental impacts for a proposed project, whether the assessment Is formally promulgated as EIA through policy or legislation or informally implemented as part of a permitting procedure. The following terms are used frequently throughout the report. A term's definition In this report may not be consistent with its usage in a particular province or agency but for the purposes of consistency and clarity, these standardized definitions are used:

  **"Environmental Impact Assessment" (EIA) -** refers to the process followed to develop an initial environmental evaluation (IEE) or environmental impact statement (EIS);

  **"Initial Environmental Evaluation" (IEE) -** refers to a report which may be requested to address certain unknowns associated with potential Impacts or mitigation possibilities. The IEE Is not an EIS but may be required to provide information needed to make the decision whether or not to require an EIS;

  **"Environmental Impact Statement" (EIS) -** refers to the detailed report on the proposed action, alternatives to the proposed action, the affected environment, environmental impacts, and mitigation measures, among other topics;

  **"Human Health Impacts" -** potential acute or chronic impacts on human health which may be caused by direct, indirect, or cumulative exposures to a contaminant or contaminants;

  **"Health Impact Assessment" -** an assessment which may be part of an EIA and which specifically addresses potential human health impacts.

  **"Environmental Health" -** the subject dealing with human health as it may be affected by the condition of the natural environment;

**"Proponent"** - the organization, company, or the department planning to undertake a proposal;

**"Initiating Department"** - any government department or agency that Is a decision-making authority for a proposal.

- Because generalizations cannot be made regarding how EIA may be Implemented, the tables do not reflect any particular EIA procedure. Rather, a list of possible components of a health impact assessment, as integrated into EIA, is used. For example, in the tables preceding the written text, the left hand column displays components that may be included In a health impact assessment, and the right hand column displays the responses that may be considered indicators of the government's current practice for each component, regardless of the EIA process followed.

- References to appendices in Volume III are made throughout this report. One appendix is devoted to each government. For example, all accompanying materials for British Columbia are located In Volume III, Appendix D; all accompanying materials for Ontario are located in Volume III, Appendix G; and accompanying materials for the federal government and territories are located in Volume III, Appendix L. The contents of appendices are provided for illustrative as well as reference purposes.

- Upon their request, the Northwest and Yukon Territories do not have sections of their own. Both territories note that their projects most often, if not always, follow the federal Environmental Assessment and Review Process.

- Because of the limited input to thls report (55 interviews in total), the following tables may be indicative but not representative of how risks to human health are currently addressed in EIA.

Following the tables are descriptions providing further insight into current practice and are organized according to the following headings:

**"Mandate"** - refers to the legal authority for a government's EIA process. It may be a statute, an Order-in-Council, or a policy statement. Some provinces do not have specific EIA mandates. In these cases, EIA may be Incorporated as a potential requirement of a permitting or licensing procedure.

**"Screening"** - refers to a process used to review project applications to determine if an IEE or EIS should be required. Provinces and agencies may have their own procedures or set of criteria to make thls decision.

**"Terms of Reference'** - identifies whether health Issues have been addressed in specific terms of reference. Terms of reference are issues which are required to be addressed in the IEE or EIS. These usually arise out of a scoping phase and may include requirements to conduct studies and/or address concerns which have been identified regarding potential impacts, alternatives, and mitigation, among other issues.

**"Involvement of Health Professionals" -** discusses whether health professlonals have been involved in an EIA, the types of health professionals, and their specific roles In the process.

**"Components of Health Impact Assessment" -** list the specific health issues which have been addressed in an EIA. Appendix C In Volume III provides definitions of each component as they are used in this report and Volume II provides more detail on how each government has addressed the specific components.

**"Environmental Standards and Objectives" -** discusses whether and how standards and objectives are used in EIA and on what factors they are based (e.g., health, environmental, technical, economic factors, etc.).

**"Public Part lclpat lon" -** provides a brief description of how the public may be Involved in an EIA and whether citizens have an opportunity to raise their environmental and health concerns.

TABLE 4.1 Overview of Current Practice in Canada

| | EIA contained in:[1] | Is health explicitly considered in screening phase?[2] | Project-specific terms of reference are developed by:[3] | Health professionals involved in EIA by:[4] | % of health components addressed in at least one EIA:[5] | Health-based environmental standards/objectives used in EIA as:[6] | Public participates in[7] |
|---|---|---|---|---|---|---|---|
| British Columbia | S,P,R | No, but initiating department reviews applications and determines if any issues (i.e., health) exist which may be of concern to other agencies | Initiating department in consultation with the Ministry of Environment and Parks; other agencies may have input | Reviewing applications, suggesting terms of reference, giving opinions | 8/ 9 | Screening criteria, targets for performance | Preparation and review of documents, hearings |
| Saskatchewan | S | No, Interdepartmental Review Board reviews applications. No health representative sits on Board | Saskatchewan Environment and Public Safety's Environmental Assessment Branch in consultation with proponent and initiating department | Not involved in EIA but may be involved in licensing procedures, special inquiries | 10/19 | Determinants of EIS's acceptability | Review of documents |
| Manitoba | S,P | Yes, screening criteria include health issues (generic guidelines include health) | Technical Advisory Committee (TAC, an ad hoc committee which may include a health representative) in consultation with proponent and initiating department | Establishing terms of reference, sitting on TAC, participating in special studies | 11/19 | Targets for performance | Review of documents, meetings and surveys |
| Ontario | S,R | No, but to consider health is a standard component of Ontario's EIA process (generic guidelines include health) | Ministry of Environment's Environmental Assessment Branch (EAB) in consultation with proponent, initiating department, and other agencies | Reviewing applications, giving opinions | 17/19 | Criteria for evaluating alternatives, conditions for approval | Review of documents, hearings |
| Quebec | S,R | No, but initiating department recommends addressing health if it is a concern | Ministry of Environment in consultation with proponent and other government agencies (such as Ministry of Health) | Providing advice, providing input into final decision | 16/19 | Targets for performance | public meetings, review of documents |
| Newfoundland | S,R | No, although a seat for Ministry of Health exists on screening committee; health representative rarely comes to meetings | Proponent in consultation with screening committee and Department of Environment | Sitting on screening committee, reviewing EISs | 5/19 | Development of mitigation measures | public meetings, review of documents |

TABLE 4.1 Overview of Current Practice in Canada (continued)

| | EIA contained in:[1] | Is health explicitly considered in screening phase?[2] | Project-specific terms of reference are developed by:[3] | Health professionals involved in EIA by:[4] | # of health components addressed in at least one EIA:[5] | Health-based environmental standards/objectives used in EIA as:[6] | Public participates in:[7] |
|---|---|---|---|---|---|---|---|
| New Brunswick | S,ø | No, projects are screened by a multi-disciplinary team; health representative may sit on team at initiating department's discretion | Ministry of Municipal Affairs and Environment with input from public, other agencies, proponent, initiating department | Reviewing terms of reference, guidelines, reviewing studies, screening proposals | 15/19 | Basis for preliminary design objectives, basis for establishing emission limits | public meetings, review of draft terms of reference, guidelines, and documents |
| Nova Scotia | - | No; person reviewing application may or may not identify health as an issue | Ministry of Environment in consultation with proponent and other agencies; to date, terms of reference regarding health have not been established | Sitting on Ministry of Environment's Environment Control Council | 5/ 9 | Targets for performance | hearings |
| Prince Edward Island | P | No, PEI relies more heavily on enforcement of health and environmental regulations than on compliance with EIA policy | Ministry of Community and Cultural Affairs in consultation with proponent, initiating department | Providing advice | 6/ 9 | Criteria for evaluating projects | Review of documents, meetings, hearings |
| Federal government, Yukon and Northwest Territories | S,P | Yes, some agencies include health as a screening criterion; some do not | Initiating department in consultation with other agencies or, upon referral to the Federal Environmental Assessment Review Office, an Environmental Assessment Panel | Providing opinions, reviewing documents, giving testimony | 17/ 9 | Targets for performance | meetings, hearings, review of documents |

Footnotes to Tables 4.1, 4.2, and 4.3

1 EIA may be contained in statute(s) = S, policy = P, and/or regulations = ø or EIA may be informally implemented through a licensing or permitting procedure in which case a dash ("-") is designated. For further explanation, please refer to the description for each province, state, or country in this section or in Volume II of this report. Volume II contains a more detailed summary of current practice.

2 Screening refers to a process used to review project applications to determine if an initial environmental evaluation (IEE) or environmental impact statement (EIS) should be required. Each government may have its own procedures or screening criteria to make this decision.

3 Terms of reference list issues which are required subjects to be addressed in the IEE or EIS. Generic terms of reference may exist in regulations or guidelines and apply to designated cases. Project-specific terms of reference may be developed and usually arise out of a scoping process during which the proponent, initiating department, other agencies, and/or the public may be consulted. Each government may have its own procedures.

4 Health professionals may be involved in EIA in a variety of ways, such as screening applications, suggesting terms of reference, providing advice, reviewing draft EISs, and assisting in other activities. The extent to which they are involved depends on the particular government's procedures.

**TABLE 4.2** Overview of Current Practice in the United States

| | EIA contained in:[1] | Is health explicitly considered in screening phase?[2] | Project-specific terms of reference are developed by:[3] | Health professionals involved in EIA by:[4] | # of health components addressed in at least one EIA:[5] | Health-based environmental standards/objectives used in EIA as:[6] | Public participates in:[7] |
|---|---|---|---|---|---|---|---|
| United States | S,R | Yes, some agencies do; others do not | Initiating department in consultation with the Environmental Protection Agency, the public, other agencies, and local and state governments | Suggesting terms of reference, providing advice. conducting studies, writing sections of EIS | 18/19 | Targets for performance and compliance, guidelines for development and evaluation of alternatives | Review of documents, meetings, hearings |
| California | S,R | Yes, health is included as an explicit criterion on screening checklists | Environmental agency in consultation with initiating department; preexisting guidelines exist | Reviewing EISs, providing advice | 3/19 | Criteria for evaluating impacts | Review of documents, hearings |
| New York | S,R,P | No | Department of Environmental Conservation in consultation with initiating department and input from public | Providing advice, conducting health assessments and writing portions of EISs | 12/19 | Criteria for evaluating impacts | Review of documents, issue conferences, hearings |
| Wisconsin | S,R | No | Department of Natural Resources in consultation with other agencies, opposition groups, public, and proponent | Providing comments, reviewing documents | 15/19 | Targets for performance, bases for evaluating predicted impacts | Review of documents, scoping issues |

**Footnotes to Tables 4.1, 4.2, and 4.3 (continued)**

[5] Nineteen health components were identified in the survey:

a) exposure per lod
b) area of impingement
c) baseline health study
d) impacts to critical subpopulations
e) impacts to future generations
f) impacts to residents during construction
g) impacts to workers during construction
h) impacts to residents during plant operation
i) impacts to workers during plant operation
j) acute, short-term impacts
k) chronic, long-term impacts
l) positive health impacts
m) cumulative health exposures/effects
n) impacts to health care facilities
o) review of existing literature
p) methods to mitigate health impacts
q) accident scenarios and emergency response procedures
r) waste disposal methods
s) on-going monitoring of health status

Each component is defined in Volume III, Appendix C, of this report. The numbers in the table represent the number of health components which have been addressed in at least one (but not necessarily the same) EIA.

[6] All provinces, states, and federal governments use environmental standards and/or objectives which are in part health-based. The manner in which they are used in EIA varies. The descriptions in the table are some, if not all, of the possible uses employed by the governments.

[7] All provinces, states, and federal governments involve the public at some point in the EIA process. The public is provided with at least one opportunity to raise health, environmental, social and economic concerns. The methods of public involvement listed in the table are some, if not all, of the possible methods employed by the governments.

**TABLE** 4.3 **Overview** of **Current Practice in Europe***

| | EIA contained In:[1] | # of health components addressed in at least one EIA:[5] | Was the public involved In the EIA(s) reviewed in this study? |
|---|---|---|---|
| England | European Economic Community (EEC) EIA Directive | 8/19 | No |
| Federal Republic of Germany | | 5/19 | Yes |
| Finland | | 9/19 | Yes |
| France | | 11/19 | No |
| Ireland | | 6/19 | No |
| Italy | | 6/19 | Yes |
| Netherlands | | 14/19 | Yes |
| Norway | | 8/19 | Yes |
| Scot land | | 12/19 | Yes |

* This table is formatted dlfferentiy from Tables 4.1 and 4.2 because the case. study method, which was used for the European portion of the study, produced different information from the survey, which was used for both the Canadian and United States portions.

### 4.2 British Columbia

**Mandate.** EIA in British Columbia is contained in numerous policies and statutes as part of project review processes. The processes vary according to the specific mandate. Some of the processes and mandates are:

- The Energy Project Review Process under the Utilities Commission Act, S.B.C. 1980, c. 60;
- The Guidelines for Linear Development under the Environment and Land Use Act (ELUA), R.S.B.C. 1979, c. 110;
- The Mine Development Review Process under the ELUA; and
- The waste discharge approval process under the Waste Management Act, R.S.B.C. 1979, c. 41, the Environment Management Act, S.B.C. 1981, c. 14, and the Ministry of Environment Act, S.B.C. 1980, c. 30.

Many of the statutes and policies contain a direct reference to protecting human health. For example, the Pesticide Control Act, c. 322, defines an "adverse effect" as "an effect that results in damage to man or the environment."

**Screening.** Once a proponent submits an application for some form of approval to a permitting or initiating department, the office reviews the proposal for conformance with its mandate and for issues that may be of concern to other management agencies. Once a proposal is screened by the initiating department and the decision for further review is made, the proposal is referred to other agencies, including when applicable, the Ministry of Health and/or the public health engineers within the Ministry of Environment and Parks (MEP).

**Terms of Reference.** When health is identified as a concern along with other environmental issues during the screening of an application, terms of reference to direct a closer examination of these concerns are established. Depending on the case and the specific procedures being followed, the terms of reference may be negotiated with the proponent, set for the proponent by the initiating department, MEP, and other agencies, or established in regulations and guidelines (such as standard information requirements) which apply to ail cases. Where no terms of reference are established, a revlew of health and environmental concerns may be conducted "through inspection and discussion with responsible agencies."

**Involvement of Health Professionals.** When health is raised as a potentially significant concern, the application is referred to the appropriate agency, whether it is the Medical Health Officers and other health professionals in the

Minlstry of Health or public health engineers in the MEP. The point at which they are involved and the length of their involvement depends on the level of health concern in each case. They may be asked to review the application, suggest terms of reference, contribute opinions on issues, or they may be consulted in the final decision to award or not award a permit.

**Components of Health impact Assessment.**

The eight components which British Columbia has addressed in at least one, but not necessarily the same, EIA are:

Exposure perlod
Area of Impingement
Impacts to residents durlng construction
Impacts to workers during construction
Impacts to health care facilities
Methods to mitigate health Impacts
Accident scenarios and emergency response procedures
Waste disposal procedures

Further explanation of the extent to which British Columbia addresses each of these is provlded In Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Envlronmental Standards and Objectives.** Environmental standards and objectives are applied throughout an assessment of environmental impacts. Some of these are in part based on public health considerations. They are used as criteria In screening applications and as targets for performance.

**Public Partlclpatlon.** The level of involvement varies based on the procedures being followed and on the specific application. The public may revlew and comment on documents, provide input Into the preparation of the documents, or participate In public hearings.

## 4.3 Saskatchewan

**Mandate.** Saskatchewan EIA Is legislated In the Environmental Assessment Act (Statutes of Saskatchewan, c. E-10.1, 1979-80). Direct reference to health Is made In definitions of "contaminant" [Sect Ion 2(b)] and "pol lut ion" [Sect Ion 2(l)(l)]: "Contaminant" means "any substance, whether gaseous, liquid, or solid, that ... is or may be injurious to the health or safety of persons ..." "Pol lut ion" means "alteration of the physical, chemical, biological or aesthetic properties of the environment ... that ... will render the environment harmful to public health ..."

**Screening.** Saskatchewan Environment and Public Safety revlews project proposals to determine whether an EIA Is necessary. Usually members of a standing Interdepartmental Review Panel (IRP) receive a copy of the proposal and provlde Input Into the decision, which Is made by the Dlrector of the Environmental Assessment Branch. The following departments and agencies serve on the Panel:

Saskatchewan Environment and Public Safety
Human Resources, Labour, and Employment
Social Services
Parks, Recreation, and Culture
Northern Affairs Secretariat
Tourism, Small Business, and Cooperatives
Energy and Mines
Agriculture
Rural Development
Educat Ion
Urban Affairs
Highways and Transportation
Economic Development and Trade
Saskatchewan Water Corporation

No health officials have sat on the Panel to date. Health concerns, therefore, may not be formally "screened" during this review. However, at the time of wrlting, steps were underway to secure the involvement of a health ministry representative In the screening process.

Terms of Reference. Terms of reference for an EIA are documented In project-specific "Impact Assessment Guidelines." These are usually discussed with the proponent before finalization. If a health concern exists, It will be addressed in the guidelines. For example, in the University of Saskatchewan Proposed Waste Incinerator Environmental Assessment Guidelines, the proponent is directed to ".. . address the quest Ion of risks to human health associated with operation of the facility" (see Volume III, Appendix E).

**Involvement of Health Professionals.** As previously mentioned, health professionals have not been Involved In screening project proposals but steps are being taken to Instate a health representative on the IRP. In other phases of EIA, health professionals have rarely been consulted. Usually, they are involved in a licensing process or in special inquiries.

**Components of Health Impact Assessment.**

The thirteen health components which Saskatchewan has addressed in at least one, but not necessarily the same, EIA are:

Exposure period
Area of Impingement
impacts to residents during construction
Impacts to workers during construction
Impacts to residents during plant operation
Impacts to workers during plant operatlon
Acute, short-term impacts
Chronic, long-term impacts
Positive health impacts
Impacts to health care facilities
Methods to mitigate health impacts
Accident scenarios and emergency response procedures
Waste disposal procedures

Further explanation of each of these Is provided in Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Many objectives used in Saskatchewan are based in part on health considerations. One way they are applied in EIA Is by the technical review panel which reviews EISs for acceptability.

**Public Partlclpatlon.** Public participation is required in all EIAs pursuant to Section 11.2(a) of the Environmental Assessment Act. The method of involvement is quite flexible but the minimum requirements include public notice of a pending EIA and public inspection of reports. The proponent must document the public's concerns regarding the project and must address them In the report. If health is a public concern, citizens may raise relevant issues along with other environmental and socio-economic Issues. Saskatchewan Environment and Public Safety encourages proponents to involve the public at appropriate points throughout the process.

## 4.4 Manitoba

**Mandate.** In 1975, the Cabinet of the Province of Manitoba formally approved the policy promulgating the Manitoba Environmental Assessment and Review Process (MEARP). The policy defines environment to include air, water, and soil. Humans and human health are not mentioned directly. Implementation

documentation, however, states that the Department of Health is represented on the Manitoba Environmental Assessment and **Review Agency, the agency responsible** for administering the **MEARP.**

The Cabinet policy was replaced January 1, 1988 by a newly enacted law, The Environment Act (Bill 26). The Environmental Assessment and Review Process has been incorporated Into the statute and has been expanded significantly. For example, a number of definitions in the act directly address human health [Section **1(2)].** "Development" means "... any project ... which causes or is I ikeiy to cause . . . a significant effect on the ... environmental health and cultural conditions that influence the lives of people or a community. .." "Environmental health" means "... those aspects of human health that are or can be affected by pollutants or changes in the environment. .." Also, "pollutant" means "... any solid, liquid, gas ... that ...Is or is likely to be injurious to the health or safety of persons ..."

Along with other sections of the statute, Section **2(1)** serves to heighten the significance of the relationship between the environment and human health:

> The aims and objectives of the [Department of Environment and Workplace Safety and Health] are to protect the quality of the environment and environmental health of present and future generations of Manitobans and to provide the opportunity for ail citizens to exercise influence over the quality of their living environment.

Screening. Proponents screen projects to determine which ones will be submitted to the Manitoba Environmental Assessment and Review Agency (MEARA). One of the screening criteria used relates to potential health effects (see Volume III, Appendix F). Project proposals which are submitted to MEARA are reviewed by the interdepartmental Planning Board **(IPB)** to determine if a project is subject to the MEARP. The **IPB** consists of representatives from the following departments and agencies:

Agriculture
Department of Environment
Highways and Transportation
Natural Resources
Municipal Affairs
Energy and Mines
Cultural Affairs and Historic Resources
Economic Development and Tourism
Northern Affairs

Manitoba Hydro
Manltoba Telephone System
Manitoba Housing and Renewal Corporation
Land Titles Office

No representatives from the Department of Health sit on the IPB but they are members of the MEARA and they may be appointed to a Technical Advisory Committee (TAC) for a particular project. The TAC reviews project reports which are prepared by proponents. A TAC then prepares an initial environmental evaluation (IEE) and decides whether an EIS should be required. If health Is a concern, Itwlll be raised as an issue by either the IPB or TAC.

**Terms of Reference.** If health is a concern, terms of reference relating to relevant issues will be developed. Terms of reference are often developed by the TAC or IPB In consultation with the proponent. Also, the MEARA has published a general set Environmental Impact Assessment Guidelines (1986) to be followed when conducting an EIA (see Volume III, Appendix F). All provincial departments, agencies, and crown corporations required to conduct an EIA for a proposed project are required to comply with the guidelines, one of which directly addresses health: "Special attention should be devoted to those effects which ... pose long-term risk to health or property."

**Involvement of Health Professionals.** Whenever health issues arise, health professionals are Involved. Usually they are consulted on an as-needed basls. Health professionals may be requested to review guidelines, help establish terms of reference, and/or review EISs. They may also be requested to serve on TACs. Both Departments of Health and Community Services were involved In the potash mine and generating station EIAs and served on the TACs. The types of health professionals usually Involved. include public health inspection officials of the Ministry of Environment and Workplace Health and Safety, environmental health officials from the Department of Health, and approprlate regional Medical Health Officers.

Components **of Health Impact Assessment.**

The ten health components which Manitoba has addressed in at least one, but not necessarily the same, EIA are:

Area of impingement
Impacts to residents during construction
impacts to workers during construction
Impacts to residents during plant operation
Impacts to workers during plant operation
Acute, short-term impacts

Chronic, long-term impacts
Impacts to health care facilities
Methods to mitigate health impacts
On-going monitoring of health status

Further explanation of each of these components is provided in Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Many environmental standards and objectives used in the EIA process are in part health-based. Standards and objectives are developed by the Department of Environment's Environmental Control Branch and are accepted or rejected by the Department's Clean Environment Commission. In EIA, proponents consider environmental standards and objectives when preparing portions of the EIS. Provincial EIA approval depends on the proponent's ability to mitigate Impacts and meet applicable standards and objectives.

**Public Participation.** Public participation is required in all EIA processes. The IPB establishes a certain level of public participation, and the proponent may do more if desired. Usually, information regarding the project Is made available for general distribution and public comment, public meetings are held, and surveys may be conducted. if health is a public concern, citizens have a number of opportunities to raise and discuss relevant issues.

## 4.5 Ontario

**Mandate.** The Environmental Assessment Act (R.S.O. 1980, c. 140) was enacted in 1975. The reference to health In the act is indirect; it is inferred from the definition of "environment" in Section 1(c)(ii) which includes "man" and from the purpose of the act as stated in Section 2: "The' purpose of this Act is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment" (emphasis added).

Direct reference to health is made in guidelines. A set of General Guidelines for the Preparation of Envlronmental Assessments was prepared In 1981 and is currently being updated. It contains "examples of some of the factors to be considered in environmental assessment studies" (see Volume III, Appendix G). Health is listed as one of the factors.

Screening. All proposed public Projects in Ontario are subject to the EIA process unless they apply for and receive an order which exempts them from conducting an EIA. While no screening procedures relating to health exist, all proposals are reviewed In a Pre-Submission Consultation (PSC) and potential concerns, Including those related to health, are identified. Even those proposed projects which apply for an exemption order are screened for potential concerns needing further study before an exemption is granted. Examples of types of projects which may obtain exemptions include hospitals, police stat ions, colleges and universities, and other essential services.

Terms of Reference. Terms of reference are developed during the PSC. Usual iy, the initiating department terms of reference in consultation with the Ministry of Environment (MOE), the Environmental Assessment Branch (EAB) in MOE, and other agencies who identify specific concerns which need to be addressed. if health is a concern, terms of reference addressing the relevant health issues will be developed.

involvement of Health Professionals. Health professionals are involved in many, if not ail, EIAs in Ontario. At the least, the Ministry of Health (MOH) is involved in the PSC; that is, a copy of the proposal and application is distributed to MOH as well as to other agencies for review and comment. If MOH identifies any health concerns, the issues are included in the terms of reference. MOH personnel include toxicologists, Medical Health Officers, Public Health inspectors, as well as other health professionals. If needed, they may be involved at other points of the EIA to provide opinions, answer questions, or provide any other assistance needed.

Components of Health Impact Assessment.

The seventeen health components which Ontario has addressed in at least one, but not necessarily the same, EIA are:

Exposure period
Area of impingement
Impacts to critical subpopulations
impacts to residents during construction
impacts to workers during construction
Impacts to residents during plant operation
impacts to workers during plant operation
Acute, short-term impacts
Chronic, long-term impacts
Positive health impacts
Cumulative health exposures/effects
Impacts to health care facilities

Review of existing literature
Methods to mitigate health impacts
Accident scenarios and emergency response procedures
Waste disposal procedures
On-golng monitorlng of health status

**Environmental Standards and Objectives.** Ontario's environmental standards and objectives are based on a mixture of health, natural environment, and technical considerations. The standards and objectives are used In EIA In a number of ways. They may be used to evaluate various alternatives; they may be used at hearings when discussing the abillty of a proposed alternative to meet the standards and objectives; and, in addition to other possible uses, they may be included in the conditions for approval.

**Public Partlclpatlon.** The public is involved or informed in all EAs. By law, the Minister of Environment must give notice to the public that an EIS is available for review and comment. The public may access the documents and provide written submissions commenting on them and/or they may request a hearing. If a hearing is held, the public may participate in it by giving test imonles.

The proponent is given the freedom to decide if and how it will involve the public in the preparation of the EIS. The EAB, however, strongly encourages the proponent to allow the public to participate. Such participation may be in the form of holding public meetings, forming public liaison groups, and providing input into each stage of the EIA. If citizens have specific health concerns they would like to raise, they have a number of opportunities to do so.

## 4.6 Quebec

**Mandate.** The Envlronmental Quality Act (R.S.Q. 1980, c-2) was passed In 1978 and contains a section outlining Quebec's Envlronmental Impact Assessment and Review Process (DlvlslonIV.1). Regulations 1 and 9, passed in 1980, supplement the legislation and provide further details regarding the preparation and content of an EIS. While no direct mention of health is made in Division IV.1 of the Act or in the accompanying regulations, section 20 of the Environmental Quality Act states that nothing may be discharged to the environment that "... is likely to affect the life, health, safety, welfare or comfort of human beings. . ." Also, in Quebec's General Guide for the

Environmental Assessment of Industrial Projects (May 19871, human health is explicitly listed as a criterion to check when identifying and evaluating potential environmental impacts (see Volume III, Appendix H).

During the winter and sprlng of 1986-87, the Minlstrles of Health and Social Servlces and Environment met to develop an Interdepartmental agreement requiring collaboration on subjects affecting both minlstrles (see Volume III, Appendix H). The agreement was signed April 21, 1987 and states that the two ministries will consult each other and collaborate on a number of issues, including the preparation and review of EISs for projects having potential health impacts.

**Screening.** No screening procedures relating specifically to health exist. The initiating department is responsible for identifying projects which require an EIA and will recommend that a health study be Integrated into the EIA if health is identified as an issue. The initiating department's decision is based on past experience, professional judgment, and consultation with colleagues in other departments (e.g., Ministry of Health and Social Services, Ministry of Environment, etc.).

Terms of Reference. Terms of reference addressing health issues are developed when specific concerns are identified. The terms of reference are established based on input from a number of departments, including the Ministry of Health and Social Services. Other parties which may be consulted include private organizations, research groups, and Environment Canada.

**Involvement of Health Professionals.** Health professionals are involved when potential health impacts from a proposed project are anticipated. A variety of health professionals may be consulted throughout the process and include toxicologists, physicians specializing in environmental health, epidemiologists, and other health professionals from the Ministry of Health and Social Services, Local Centres for Community Health, and other agencies. Health professionals are available for consultation and, according to the interdepartmental agreement, they may be involved in the final decision for a project in one of three ways:

1. The Ministers of Health and Social Services and Environment both decide on the project; both must agree.

2. One Minister makes the decision, the other gives advice and a recommendation.

3. One Minister decides alone and informs the other Minister of the decision.

**Components of Health Impact Assessment.**

The sixteen health components which Quebec has addressed in at least one, but not necessarily the same, EIA are:

Exposure period
Area of Impingement
Impacts to critical subpopulations
Impacts to future generations
Impacts to workers during construction
Impacts to residents during plant operation
Impacts to workers during plant operation
Acute, short-term impacts
Chronic, long-term impacts
Cumulative health exposures/effects
Impacts to health care facilities
Review of existing literature
Methods to mitigate health impacts
Accident scenarios and emergency response procedures
Waste disposal procedures
On-going monitoring of health status

Further explanation of each of these components is provided In Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Envlronmental Standards and Objectives.** Standards and objectives are used in Quebec EIAs. They are generally adapted from the Environmental Protection Act or federal agency legislation from Environment Canada, Agriculture, or Health and Welfare. Many of the standards and objectives are in part health-based and are used as general rules to be adhered to by proponents.

**Public Partlclpatlon.** Administrative procedures include a phase for public participation. A separate government office, the Public Information Office (Bureau d'Audience Publique), is responsible for holding public meetings and gathering information from the public to be considered in the decision-making process. In addition to the public participation organized by the Public Information Office, the proponent may organize programs for informing and consulting with the public. For example, Hydro Quebec has set up public meetings outside that which is required In an EIA.

### 4.7 Newfoundland

**Mandate.** Newfoundland enacted EIA in the Environmental Assessment Act of 1980 (S.N. 1980, c.3) and promulgated accompanying regulations in 1984 (O.C. 961-84). No direct mention of health is made In either the act or regulations. The definition of "environment" [Section 2(e)(ii)] implies human health: "plant and animal life, including human life," and is used as the basis for addressing health if it becomes an issue. Many of Newfoundland's projects are federally supported, in which case they are subject to the federal Environmental Assessment and Review Process (see Section 4.11).

**Screening.** A list of all projects to be screened is included in the regulations (Schedule One of the Regulations, "Undertakings Subject to Reglstrat ion"). Proposals are reviewed by a screening committee to determine whether or not an EIA should be required. No screening criteria related to health issues exist. However, the Ministry of Health (MOH) holds a seat on the screening committee and, therefore, has the potential to be Involved In screening proposals. To date, however, MOH has attended only a few, if any, screening sessions.

**Terms of Reference.** Based on concerns raised by the screening committee, the proponent drafts specific terms of reference which are subject to the approval of the Minister of Consumer Affairs and Environment. To date, no terms of reference relating specifically to health have been developed. This Is due primarily to the remoteness of projects subject to EIA.

**Involvement of Health Professionals.** MOH may sit on the initial screening committee. As noted above, however, an MOH representative has appeared only a few times. This is the extent of the. involvement of health professionals in Newfoundland's EIA process. However, if the MOH considers It necessary, health professionals may be involved at other points in the process. For example, they may sit on the Department of Environment's Environmental Assessment Commlttee whichisresponsible for reviewlng EISs.

**Components of Health Impact Assessment.**

The five health components which Newfoundland has addressed in at least one, but not necessarily the same, EIA are:

Exposure period
Area of Impingement
impacts to health cafe facilities
Accident scenarios and emergency response procedures
Waste disposal procedures

Further explanation of each of these Is provided In Volume II Of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Newfoundland uses envlronmental standards and objectives In EIA. For the most part, It uses standards and objectives, which are In part health-based, from other provinces and the federal government. One way in which they are used in EIA is In the development of mitigation measures.

Public Participation. The public is involved at a number of polnts in the EIA process. The documents are made available for public review and comment. Also, the proponent Is required by law to hold public Information sessions In communities near the project site prior to submission of the EIS. In addition, public hearings may be held. While health impacts are rarely an Issue, the public may raise them during any of these opportunities.

## 4.8 New Brunswick

**Mandate.** In July 1987 New Brunswick promulgated the Environmental Impact Assessment regulation under the Clean Environment Act. Previously, EIA was contained In a Cabinet directive. The regulation describes New Brunswick's EIA requirements and outlines the process. Although human health Is not mentioned directly, the mandate to address health issues is implied in the deflnltion of "environment," which includes "... plant and animal life, Including human life. . ."

Screening. Each project which Is subject to registration under legislation is reviewed by a multidisciplinary team of professionals to determine whether an EIA should be required. Thls team is composed of New Brunswick government employees from relevant departments. No standing review commlttee exists; that Is, the composltion of the team varies according to the nature of the project. If deemed necessary, health professionals may be included on the team. The final decision whether an EIA should be required and should include discussion

of potential health concerns, rests with the Minister of Municipal Affairs and Environment. However, no specific criteria relating to potential health impacts have been established to provide a basis for this decision.

**Terms of Reference.** Projects which undergo an EIA follow issue-oriented, project-specific guidelines. These guidelines are drafted by the Ministry of Municipal Affairs and Environment and are released for comment. The public, government, and proponent are solicited for comments. The Mlnistry reviews the comments and makes any changes necessary. Specific terms of reference proposing methodologies for the various studies are established by the proponent in consultation with the Ministry and must be submitted prior to initiating the EIA studies. The guidelines for the second reactor at the Point Lepreau Nuclear Generating Station -- Lepreau II -- contain a number of requirements to study health risks associated with radiation exposure, and the EIS reports the results of the studies in such sections as "Radiation Protection of Employees," "Emergency Planning,'* "Potential Health Risks from Radiation Exposure," and "Monitoring of Plant Employees for Radiation Exposure" (see Volume III, Appendix J).

**involvement of Health Professionals.** Health professionals are involved at a number of points in the EIA process and are most often district Medical Health Officers and provincial Public Health Inspectors. As necessary, they are involved In the initial screening of a proposal. Also, they may be involved In reviewing guidelines and environmental studies.

**Components of Health Impact Assessment.**

The fifteen health components which New Brunswick has addressed In at least one, but not necessarily the same, EIA are:

Exposure period
Area of impingement
Baseline health study
Impacts to residents during construction
Impacts to residents during plant operation
Impacts to workers during plant operation
Acute, short-term impacts
Chronic, long-term impacts
Cumulative health exposures/effects
impacts to health care facilities
Review of existing literature
Methods to mitigate health Impacts

Accident scenarios and emergency response procedures
Waste disposal procedures
On-going monitoring for health status

Further explanation of each of these is provided in Volume II Of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Environmental standards and objectives are used in the EIA process. Most, If not all, are in part health-based. That is, the standards and objectives are based on a number of environmental, economic, and technical factors, and gives consideration to human health and human comfort levels. These environmental standards and objectives are used as a basis for preliminary design objectives in order to establish the nature of an undertaking. They are also used to help establish emission limits, but limit-setting may be a regulatory rather than EIA condition. For example, in the Lepreau II EIS, "Derived Emission Limits" (DELs) were discussed for gaseous and liquid effients and for the combined discharges of the first and second reactor. No DELs were set but proposed levels were used as guidelines for performance.

**Public Participation.** The proponent is required to consult the public In all EIAs, although the nature and degree of consultation is not specified. The province must hold at least one mandatory public meeting after the EIS has been reviewed by the government. If health is an issue, the public will have sufficient opportunity to raise any concerns. In the Lepreau II EIS, for example, the public provided input on a number of issues, including concerns regarding public health.

## 4.9 Nova Scotia

**Mandate.** Nova Scotia has no legislation or policy on EIA. The Environmental Protection Act (EPA, S.N.S., c. 6, 1973, as amended by c. 66, 1975), however, gives the Minister of the Envlronment the authority to "require additional plans or other information" [Section 23(8)(a)] when applications for waste discharge permits or mining permits are submitted. Also, the Planning Act (S.N.S., c. 9, 1983, as amended by c. 41, 1985 and c. 51, 1987) contains provisions for developing municipal or intermunicipal planning strategies, One provision states that these strategies may contain "requirements for environmental studies to be carried out prior to undertaking specified developments or development in specified areas" [Section 38(2)(f)]. While

these are not explicit EIA mandates, the opportunity exists for Nova Scotia to require an investigation of potential environmental impacts.

No mention of health is made in the Planning Act; however, the EPA mentions health in Its definitlon of "detrimental variation or alteration" to the environment (e.g., pollution or mining): It Is ". . . a change ... that causes or Is likely to cause ... physlcal Injury or serious discomfort to any person ..." [Sectlon 2(f)(i)(B)].

Many projects In Nova Scotia are federally supported and are, therefore, subject to the federal Environmental Assessment and Revlew Process (see Section 4.11).

**Screening.** No formalized screening procedures or criteria relating to health used In Nova Scotia. The need to revlew potentlal health Impacts is determined on a project-by-project basis during the application review process. If health (public or occupational) or environmental impacts are not Identlfled by the person reviewing the application, they may be identifled by the public or interest groups on an ad hoc basis.

**Terms of Reference.** No terms of reference relating to health concerns have been establlshed to date. Generally, health issues are "the exception rather than the rule" in Nova Scotia. Specific concerns may be identified during the revlew process; however, they may not be explicitly addressed, at least In a public fashion. The exceptions to this are the Herbicide Trial and Uranium inquiry.

Involvement of **Health Professionals.** A health professional is required by law [EPA, Section 9(1)(a)(i)] to be a member of the Ministry of Environment's Environmental Control Council which, in addition to other duties, holds public hearings when requested by the Minister of Environment. Not many hearings have been held, and the Involvement of health professionals at other points in a review of an application has been limited. Usually, they are Involved as a result of public pressure. Even then, however, medical and other health professionals "appear to [be] reluctant to participate."

**Components of Health Impact Assessment.**

The five components which Nova Scotia has addressed In at least one, but not necessarily the same, environmental study are:

Exposure period
Area of impingement
Impacts to health care facilities
Accident scenarios and emergency response procedures
Waste disposal procedures

Further explanation of each of these components Is provided In Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Nova Scotia uses environmental standards and objectives which have been developed by other jurisdictions. Many of these standards and objectives are In part based on human health considerations. When applying for a permit, the proponent must demonstrate its ability to comply with applicable standards and objectives.

**Public Partlclpatlon.** Because no formal EIA procedure exists, the public Is usually not involved in the permit application review process. The decision to involve the publi is made on a case-by-case basis by the Ministry of Environment. The public may participate in hearings held by the Environmentai Control Council but these have been few in number. On the other hand, if informed of a proposed project, the public may apply pressure to the government to hold a hearing. Public pressure resulted In the Herbicide Trial and Uranium Inquiry.

### 4.10 Prince Edward Island

**Mandate.** Prince Edward Island (PEI) has no EIA legislation. A set of Minutes-in-Council (dated February 14, 1973) "directs provincial departments and agencies to screen all developments for potentially significant adverse environmental Impacts." No reference Is made to examine proposed developments for potential human health impacts. However, any indivldual (private citizen or government agent) may request that a project be reviewed for potential impacts (e.g., environmental, human health, or social related) through the appeal process of the Land Use Commission (Planning Act, R.S.P.E.I. 1974, c.P-6, revised January 1984, July 1987).

Many projects in PEI are small and are not reviewed for potential impacts to any great extent. Also, many larger projects in PEI are partially funded by the federal government and are, therefore, subject to the federal Environmental Assessment and Review Process (see Section 4.11).

**Screening.** As no EIA process exists, no screening procedures have been developed. Each department determines the extent to which it will comply with the Mlnutes-in-Council from 1973. As such, PEI ministries tend to rely more heavily on the enforcement of its health and environmental regulations to ensure that human health and the environment are protected rather than on compl lance wlth the Minutes-in-Council.

**Terms of Reference.** No terms of reference associatedwlthEIA exist or are developed; however, PEI is involved In establishing terms of reference with the federal government when projects are subject to the federal Envlronmental Assessment and Review Process. For the few projects which are entirely provincially funded, the Ministry of Community and Cultural Affairs usually identifies Issues to be examined and handles each case Indlvldually.

**Involvement of Health Professionals.** Health professionals may be involved in a review in a consulting or advisory capacity. Whether and to what extent they are involved depends on the specific case. Physicians, toxicologists, immunologists, chemists, and other health professionals at the Department of Health have been involved in a review of health issues. Most often, their role is advisory. Sometimes, however, they may play a more central role if the issue has received significant public attention. For example, a toxicologist from Ottawa was involved in the review of the proposed Parkdale Waste Incineration Project.

**Components of Health Impact Assessment.**

The six health components which Prince Edward island has addressed in at least one, but not necessarily the same, environmental study are:

Exposure period
Area of impingement
Impacts to critical subpopulations
Cumulative health exposures/effects
Accident scenarios and emergency response procedures
Waste disposal procedures

**Envlronmental Standards and Objectives.** If there is a revlew of a project, environmental standards and objectives are applied. PEI uses standards and objectives developed by other provinces and the federal government, of which many are in part health-based.

Public Participation. Under the Planning Act, the public Is allowed access to any of the documents pertaining to an application. Also, public information meetings are held, and public hearings may be held if an appeal is requested.

If health Is a concern, the public has a number of opportunities to raise pertinent Issues, either during public meetlngs, through review of documents or through the appeal process.

### 4.11 The Federal Government and Yukon and Northwest Territories

**Mandate.** The federal Environmental Assessment and Review Process (EARP) was established by federal Cabinet policy in 1973 and amended in 1977. In 1984, the federal EARP was strengthened and updated in an Order-in-Council under the Government Organization Act (S.O.R.84-467). No direct reference to health is made In the policy. However, itis currently under review for further improvement. A Cablnet memorandum has been drafted and proposes a number of changes. It has been distributed to several agencies for review and comment. Based on the responses received, the Federal Environmental Assessment Review Office(FEARO), the agency responsible for policy development and for overseeing the administration of the federal EARP, wrote a Green Paper for further dlscussion. Health is being explicitly included in the Green Paper so that no doubt remains about the importance of addressing human health issues in EAs If they are a concern.

**Screening.** Each Initiating department screens its own proposals to determine whether an initial environmental evaluation (IEE) or an EIS is needed or If the project may proceed without preparatlon of elther report. Many agencies and ministries have developed their own set of screening procedures and agency-specific criteria. Usually they are heavily based on FEARO's screening publications, the Guide for Environmental Screening (1979) and the Initial Assessment Guide (1986). Although the 1979 publication contains no reference to human health as an essential screening criterion, Appendix 1 In the 1986 publication discusses "additional considerations to aid initial assessment. " One of the considerations included under "socio-economic measures" Is "... biophysical impacts which affect residents and users of resources. Examplesinclude impacts on atmosphere, soil and water resources, flsh habitat, and populations of sport and commercial fish species." Although human health Is not explicitly named, it may be inferred from this category as an important consideration.

Agency-specific screening procedures may or may not include human health as an essential criterion. For example, the procedures for the Northern Environmental Protection Branch in the Department of Indian Affairs and Northern Development (DIAND) use FEARO's screening matrices which do not mention human health. The screening procedures for the Department of Energy, Mines, and Resources (EMR), on the other hand, list "health and safety" as a criterion to be considered when screening proposals for potential environmental impacts.

**Terms of** Reference. When an IEE is required, the initiating department establishes the terms of reference in consultation with other agencies, Including FEARO. When an EIS Is required, the Environmental Assessment Panel appointed by FEAR0 negotiates the terms of reference with the department(s) involved. When health is a concern, specific terms of reference for an EIS are set to address relevant issues. For example, the terms of reference for the review of military flying operations based at Goose Bay, Labrador, refer to health. The terms state that, "The [FEARO] Panel will also review the public health effects of low flying aircraft on the affected populations in the region" (see Volume III, Appendix L).

**Involvement of Health Professionals.** Health professionals from Health and Welfare Canada have been involved In a number of EIAs. Usually, they become Involved at the point at which an EIS is required and health input Is needed. While they are not involved in the screening of projects, health professionals may be involved in setting terms of reference, offering opinions on potential health Impacts, reviewing a proposal's EIS and evaluating it, and giving testimony at hearings.

The types of health professionals who involved from Health and Welfare Canada include chemists, physicists, health physicists, medical doctors, toxicologists, and epidemiologists, among others. When developing opinions and reviewing draft EISs, health professionals have been known to address such issues as impacts to critical subpopulations and future generations, acute and chronic impacts to public and employee health, cumulative exposures, mitigation methods, waste disposal methods, and emergency response procedures. Rarely do they conduct original studies for an EIA. Often, they rely on existing literature and their past experiences and professional judgment to form the basis of their oplnions. While they do not organize their own public

Information programs, they take advantage of FEARO's public participation efforts to meet with the public and identify the public health concerns.

**Components of Health Impact Assessment.**

The seventeen health components which the federal government has addressed In at least one, but not necessarily the same, EIA are:

Exposure period
Area of impingement
Impacts to critical subpopulations
Impacts to future generatlons
Impacts to residents during construction
Impacts to workers durlng construction
Impacts to residents during plant operation
Impacts to workers during plant operation
Acute, short-term impacts
Chronic, long-term impacts
Positlve health Impacts
Cumulative health exposures/effects
Impacts to health care facilities
Review of existing literature
Methods to mitigate health Impacts
Accident scenarios and emergency response procedures
Waste disposal procedures

Further explanation of each of these health components is provided in Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental** Standards and **Objectives.** Many national environmental standards and objectives are in part health-based and are developed by Environment Canada, Health and Welfare Canada, and Occupational Health and Safety (Labour Canada). Most often they are used In EIA as targets for performance and compliance.

Some agencies develop regulations which are project-specific. For example, COGLA and Occupatlonal Health and Safety collaborated on a set of regulations for oil and gas development projects. These regulations, In addition to non-health related regulations, delineate noise standards, building safety codes, emergency response procedures, and mitigation and protective measures to safeguard employee health. They are applied not only in the construction and operation of oil rigs but also in the planning and environmental assessment of proposed rigs as criteria for evaluation and decision-making.

Public Participation. Dependlng on the level of assessment, the public may or may not be involved. For example, the public is usually not involved at the screening stage. Most projects at EMR and COGLA, for example, are subject to

thorough screening which Is often deemed sufficient. IEEs are prepared when a Important question exists but only a few EISs have been required.

If an IEE or EIS Is prepared, the public will be consulted. The level of public Involvement varies. For example, In both Territories, hearings are usually held either at the territorial or federal level of government. Also, initiating departments may hold public meetings or organize working groups and are required to make documentation available for public review and comment. Finally, If a project is referred to FEARO, FEAR0 will establish a panel which will hold a set of public hearlngs. The public is provided with a number of opportunities to raise and discuss their environmental, social, and health concerns.

### 4.12 United States

**Mandate.** The National Environmental Policy Act (NEPA) was passed In 1969. Part of its purpose Is to "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings." Sect ion 102 of the Act outlines the environmental Impact statement (EIS) process. While no direct requirement to examine risks to human health exists in NEPA, the regulations make direct reference to healthin the definition of "effects." Section 1508.8 In Title 40 of the Code of Federal Regulations (CFR) defines the types of "effects" to be examined In EIA. These include "... ecological, . . . aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative ..."

In addition to the general set of regulatlons outlining the EIA process and content, each federal agency promulgated its own set of implementing regulations, detailing agency-specific procedures for conducting an EIA and elaborating on the content of an EIS. Some agencies directly require the axaminatlon of potential health effects of proposed projects. For example, the implementing regulations for the Food and Drug Admlnlstratlon In Health and Human Services (Federal Register Vol. 50, No. 81) state that the applicant must ". . . use any relevant toxicologlcal data or other appropriate measures to predict, to the extent applicable, effects on animals, plants, humans, other organisms ..." Other regulations, such as those for the U.S. Forest Service

and the U.S. Department of Agriculture, adopt the terms in the general set of regulations (40 CFR Sect Ions 1500-1508), including the definition of "effects" and thereby implying the requirement to examine potential health effects.

The Envlronmental Protection Agency (U.S. EPA), the agency responsible for administering NEPA, developed a set of "Environmental impact Guidelines for New Sources." These guidelines are Industry-speclflc, providing proponents wlth guidance on the type of Information to include in an EIS and presenting the impact assessment considerations that are characteristic of each industry. Some contain explicit remarks on health considerations, others do not. For example, the guidelines for New Source Underground Coal Mines and Coal Cleaning Facilities (1981) review human health impacts generally associated with coal mine and coal cleaning wastes. While the discussion is not all-inclusive (i.e., it addresses health considerations associated with industry wastes but not with industry operations such as long-term exposure to coal dust particles which may cause black lung disease), It provides the reader with an account of the public health Issues to address In an EIA and the types of mitigation and pollution control measures to adopt to minimize adverse health impacts from Industry wastes. Likewise, the guldelines for New Source Phosphate Fertlllzer Manufacturing Facllities (1981) discuss potential human health impacts from and mitigation measures for its industry wastes. Other guidelines, such as those for New Source Leather Tanning and Finishing Industries (1980) do not discuss specific human health impacts but recommend that:

> company policy should provide and maintain safe and healthful conditions for employees and establish operating practices that will result In safe working conditions and efficient operations. All proposed plans to maximlze health and safety should be described In the EID [environmental impact document].

In addition to providing industry-specific information, each set of guidelines lists other government agencies which have legislation and regulations affecting the development and approval of an industry site. This list may include, among others, the Occupational Safety and Health Administration (OSHA), the State Board of Health, and U.S. EPA regional offices (for pollutant discharge and other permits, Spill Prevention, Control, and Countermeasure plan, and/or hazardous and toxic waste disposal plans).

**Screening.** The Council on Environmental Quality (CEQ), the agency responsible for policy development and oversight of NEPA, has developed a list of "Indicators of Environmental Significance" to be used as criteria when determining whether an EIA should be required (see Volume Iii, Appendix M). The list is based on what the CEQ considers significant and on what specific agencies have Included in their regulations. One of the indicators proposed by the CEQ as a general criterion for preparation of an EIS (applicable to all agencies) is "the degree to which the proposed action affects public health or safety."

In addition to CEQ guidelines, some agencies have developed forms and checklists to facilitate screening; others review proposals on a case-by-case basls. For example, the U.S. EPA reviews each project's circumstances and conditions. While no specific procedure exists to review health Impacts, the potential for health concerns is examined along with other potential concerns. If a potential health risk is Identified, the issue Is noted for further study.

Terms of Reference. Each agency has developed its own set of Implementing regulations which may include a minimum set of issues to be addressed In an EIA. In addition, proposals are subject to a scoping period, during which case-specific Issues and areas of concern are Identified by the public, local, state, and federal agencies, outside interests, U.S. EPA, and the proponent and initiating department. The terms of reference to be followed when preparing an EIS are established based on findings during this scoping period and are developed by the Initiating department in consultation with the U.S. EPA. If health is raised as a concern during scoping, It will be included In the terms of reference for the EIA.

**Involvement of Health Professionals.** Health professionals may or may not be involved In an EIA depending on the significance of the health concern. The type of health professional involved varies from case-to-case. Often, special staff consultants or outside contractors who are toxicologists, epidemiologists, industrial hygienists, public health officials, or university professors in the health field are involved, and they are usually consulted only when needed. They may be involved in the scoping phase to help Identify significant health issues, or in the preparation of the report as technical advisors or actual preparers of relevant portions of the report. Health professionals may also be involved In the review of a draft EIS.

**Components of Health Impact Assessment.**

The eighteen health components which the United States has addressed In at least one, but not necessarily the same, EIA are: .

Exposure period
Area of impingement
Impacts to critical subpopulations
Impacts to future generations
Impacts to residents during construction
Impacts to workers during construction
Impacts to residents during plant operation
impacts to workers during plant operation
Acute, short-term impacts
Chronic, long-term impacts
Positive health impacts
Cumulative health exposures/effects
impacts to health care facilities
Review of existing literature
Methods to mitigate health Impacts
Accident scenarios and emergency response procedures
Waste disposal procedures
On-going monitoring of health status

Further explanation of each of these components Is provided In Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Many standards are based in part on health considerations. For example, National Ambient Air Quality Standards (NAAQS) are based on potential health effects and associated threshold levels while water quality standards are based on characteristics of the receiving body as well as health considerations. Effluent limitations, however, are primarily based on economic and engineering criteria but do not exceed the standards that have been set. These standards are used in the NEPA EIA process in that all federally funded projects must not violate or cause violations of applicable air, water quality, pesticide regulation, or other standards. Compliance with such standards Is always addressed in an EIA, and they are used as guidelines for the development and evaluation of alternatives.

**Public Partlcipatlon.** The public has many opportunities to provide input into the EIA process and to raise issues of concern. For example, public meetings may be held during the scoping phase. Here, citizens may raise specific issues to be included in the EIA's terms of reference. Also, public hearings may be held, and a public comment period is a standard feature of all EIAs.

### 4.13 California

**Mandate.** EIA is embodied In the California Environmental Quality Act (CEQA) which was enacted in 1970. Health is mentioned In the Act at least twice: in the policy statement [Section 21000(d)] and in the section requiring the state to prepare EIA guidelines [Section 21083(c)].

The CEQA Guidelines make a number of references to health. For example, section 15065 describes the basis for "Mandatory findings of significance:"

> A lead agency shall find that a project may have a significant effect on the environment and thereby require an [EIS] to be prepared for the project where ... the environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

The guidelines outlining required components of EISs and the issues to be addressed also mention health directly. Section 15126(a) states:

> An [EIS] shall identify and focus on the significant environmental effects of the proposed project... The discussion shall include ... health and safety problems caused by the physical changes. ..

**Screening.** Screening personnel review each application to determine If an EIA should be required. They use varlous checklists and forms to assist them In this process. The CEQA Guidelines contains two forms for use In screening proposals, a list of "Significant Effects" and an "Environmental Checklist Form." Health is listed in each as a criterion for determining the significance of potential effects (see Volume III, Appendix N).

**Terms of Reference.** The CEQA guidelines list required subjects to be addressed in EIAs. Human health and safety are Included In this list (see Volume III, Appendix N). Additional terms may be set on case-by-case basis.

**Involvement of Health Professionals.** Health professionals may be involved In the EIA and are usually among those who review and comment on draft EISs. The types of health professionals involved may range from accoustrians and sanitary engineers to risk managers and Health Department representatives.

**Components of Health Impact Assessment.**

The three health components which California has addressed In at least one, but not necessarily the same, EIA are:

Area of implngement
Impacts to health care facilities
Waste disposal procedures

Further explanation of each of these components is provided in Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Standards used in the EIA process are In part health-based. When conducting a preliminary review of a project application, staff use standards to help determine the significance of each potential Impact. Initiating departments appear to rely heavily on environmental standards as an effective means to protect human health; discussion of human health issues in EISs Is often limited to the discussion of applicable environmental standards.

**Public Participation.** The public is involved in the EIA process. In addition to reviewing EISs and submitting comments, the public may request a public hearing and, If one is held, give testimony. If health Is a concern, the public has a number of opportunities to discuss relevant issues.

### 4.14 New York

**Mandate.** EIA In New York is legislated In the State Environmental Quality Review Act which is supplemented by a set of Rules and Regulations (6 NYCRR Part 617). No direct mention of human health is made in the Act. However, In the regulations the definition of "environment" includes human health: "'Env I ronment' means the physical conditions which will be affected by a proposed action, Including land, air, water, minerals, flora, fauna, ... and human health" [Section 617.2(I)].

A June 25, 1987 policy memorandum distributed to various offices in the Department of Environmental Conservation (DEC) states that EISs for constructing municipal solid waste incinerators should Include "an evaluation of the health risks associated with emissions of air contaminants of most concern from such plants." The memorandum provides a procedure to follow when conducting this type of evaluation (see Volume III, Appendix O).

**Screening.** New York has no screening procedures or criteria for health. The initiating department is responsible for screening proposed projects to determine If an EIA should be required. The DEC is currently developing a formal screening procedure.

**Terms of Reference.** Terms of reference are developed by the initiating department and accepted by the DEC. Often, Issue conferences are held with the public to Identify Issues which are of specific concern to the public and which

need to be Included in the terms of reference. While a scoping checklist used In this process does not include potential human health issues, if health Is an issue, It is usually identified In the issue conferences and included in the terms of reference.

**Involvement of Health Professlonals.** Health professionals may be involved In EIAs depending on the specific case. The Initiating department Is responsible for involving appropriate health professionals in the process. Usual ly, they are involved in preparlng requlred health assessment documents. They may be involved In other points of the EIA process as well.

**Components of** Health **Impact Assessment.**

The twelve health components which New York has addressed in at least one, but not necessarily the same, EIA are:

Exposure period
Area of impingement
Impacts to critical subpopulations
Impacts to residents during plant operation
Impacts to workers during plant operation
Acute, short-term impacts
Chronic, long-term impacts
Cumulative health exposures/effects
Impacts to health care facilities
Review of existing literature
Methods to mitigate health impacts
Waste disposal procedures

Further explanation of each of these components is provided in Volume II of this report, “Health Aspects of EIA: A Summary of Current Practice.”

**Environmental Standards and Objectives.** New York DEC uses U.S. EPA standards of which many are health-based and EPA health assessment criteria documents to develop its own standards. The standards are used in EIA to evaluate potential health and environmental impacts from proposed actions.

**Public Particlpatlon.** The initiating department Is requlred by legislation to involve the public in EIAs. The public is informed of a proposed project and is allowed to review and comment on EIA documents. They may also be involved in issue conferences to help identify concerns which need to be addressed in the EIA and in public hearings to provide testimony on specific issues.

### 4.15 Wisconsin

**Mandate.** Wisconsin's EIA mandate is contained in the Wisconsin Environmental Policy Act. The Act is supplemented by Regulation 150 of the Wisconsin Administrative Code. No direct reference to health is made in either of these documents. The need to review health issues is implied in the implementation of EIA and the need to review "all relevant environmental issues."

**Screening.** Each proposal is reviewed by personnel in the Program Planning and Evaluation Branch and regulatory branches in the Department of Natural Resources (DNR). No specific procedures or criteria exist for identifying either environmental or health issues. Decisions are based primarily on professional Judgment.

**Terms of Reference.** When an EIA Is required, the Program Planning and Evaluation Branch Identifies Issues to be addressed through brainstorming and consultation with other agencies, opposition groups, the proponent, and the public. If health is identified as a concern, It will be included in the terms of reference.

Involvement of **Health Professionals.** Health professionals are involved in an EIA if they are needed. For example, the Department of Health was involved In the EIA to set groundwater standards because It was a co-sponsor of the project. If not directly linked with a proposed project, the Department of Health may still become involved by reviewing and commenting on EIA documents.

**Components of Health Impact Assessment.** In Wisconsin the DNR, rather than the proponent or initiating department, is responsible for preparing an IEE or EIS. The proponent supplies the necessary information upon DNR's request. The fifteen health components which Wisconsin has addressed In at least one, but not necessarily the same, EIA are:

Exposure period
Area of impingement
Impacts to critical subpopulations
Impacts to residents during constructlon
Impacts to workers during constructlon
Impacts to residents durlng plant operatlon
Impacts to workers during plant operatlon
Acute, short-term Impacts
Chronic, long-term Impacts
Cumulative health exposures/effects
Impacts to health care facilities
Revlew of existlng literature
Methods to mitigate health Impacts
Accident scenarios and emergency response procedures
Waste disposal procedures

Further explanation of each of these components Is provided In Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

**Environmental Standards and Objectives.** Wisconsin uses federally derived standards of which many are based on public welfare and health factors. In EIA, standards are usually used as both targets for performance and bases for comparison of predicted Impacts.

**Publlc Partlclpatlon.** DNR is required to Issue a news release informing the public of a pending EIA. The public is allowed to review documents (Including drafts) and provide comments. DNR also involves the public in scoping procedures and public hearings for EISs but not for IEEs. Other public partlcipation, such as workshops and newsletters, are optional.

### 4.16 Europe

The table for Europe is a simplified version of the tables for Canada and the United States. Because a case study approach was used, the amount of Information available, other than what Is contained In the documents, was I imi ted. EISs do not disclose details regarding the EIA mandate, screening procedures, scoping procedures for developlng terms of reference, involvement of health professionals, or the use of environmental standards and objectives. The data in the table and the following discussion are based on observations

made by the Centre for Environmental Management and Planning KEMP), the subcontractor for this portion of the study, and information found in the EIS documents. EISs were collected for the following projects:

| | |
|---|---|
| - Combined heat and power plant | England |
| - Proposed deep shaft colliery | England |
| * New reservoir for drinking water | Fed Rep of Germany |
| * Proposed city by-pass | Fed Rep of Germany |
| * New reservoir for power generation | Finland |
| * Proposal for major road development | Finland |
| - Cross channel fixed link (rail terminal) | Franc8 |
| - Electrical powered steel production plant | Franc8 |
| - Lead recovery refinery | Franc8 |
| - Proposed oil refinery | Ireland |
| * Major new highway | Italy |
| - Disposal of radioactive waste on a national basis | Netherlands |
| * Proposed new route for major road | Nether lands |
| * Storage of Contaminated sludge from lower Rhine | Netherlands |
| - Water extraction for drinking and industrial US8 | Netherlands |
| * New reservoir for power generation | Norway |
| * New section of main national road | Norway |
| - Proposed demonstration nuclear fuel reprocessing Installation | Scot I and |
| - Proposed paper mill | Scot land |

"*" = Considerations are confined to summary documents.
"-" = Considerations are based on review of complete EIS.

Further details regarding the degree to which health was considered in each case may be found in Volume II of this report, "Health Aspects of EIA: A Summary of Current Practice."

Because details Of each Country's EIA process were not available, Europe will be treated as a whole. The discussion which follows presents general findings which apply to the majority of cases reviewed. The bases for this discussion are a covering note and letter prepared by CEMP.

As the table Indicates, a European Economic Community (EEC) directive serves as the primary EIA mandate for Europe. While EIA has just become mandatory for EEC member states (as of January 1, 1988), the directive has been a strong Influence on the development of EIA procedures in not Only EEC member states but also Scandinavia.

As the primary EIA mandate in Europe, the EEC directive contains a number of points worth noting. For example, the preamble to the directive states:

" . . . the effects of a project on the environment must be assessed in order to take account of concerns to protect human health .. ● " Article 3 requires the EIA to identify, describe, and assess the direct and indirect effects of, among other things,"... human beings, fauna and flora .." However, the specific requirements for addressing health-related considerations is confined by Article 5, Annex III to "... an estimate ... of expected residues and emissions ..." and a "description of the aspects of the environment likely to be significantly affected ... including population, fauna, flora ..."

Although this directive exists and gives attention to human health considerations, CEMP stresses that the legislative context of EIA within Europe is not, as yet, well-established. Efforts in Europe will most likely be focussed on establishing EIA firmly, postponing attention to the Incorporation of health until a later date.

While health may not be considered during the course of an EIA, CEMP comments that health considerations may not be omitted from the planning process altogether. Health considerations may be addressed through a permlttlng or regulatory process. Also, they may be included in programs which are more safety than environment oriented, as traditionally in Europe health has been linked with safety more than environmental issues.

Where health is considered in EIA, a few general findings may be made. First, there is a general tendency in Europe to consider health factors related to the day to day operation of a project rather than to potential incidents which may have a far greater effect on human health. On the other hand, no clear evidence exists regarding greater consideration to health effects "within the factory fence" than to effects arising from exposure of humans outside the facility boundaries.

Second, through Its research, CEMP discovered that separate documentation on health exlsts for many EISs. However, It was impossible to obtain any such documentation. For example, CEMP knows of a number of documents on environmental health issues produced by members of the petrochemical industry, but they are not available to the public.

Final ly, health has not been identified as a major issue in preliminary "scoping" of EIAs where scoping was undertaken and it has not emerged as an issue during public consultation.

## 4.17 Comparative Analysis

Based on the above overview of current practice, a number of comparisons may be drawn between Canada and the United States and between Canada and Europe.

Roth Canada and the United States exhlbit strong variations in the degree to which health Is addressed in EIA. While both countries rely on the application of environmental standards and objectives to protect public health, some governments have developed mechanisms to address health more directly. For example, Quebec has promulgated an agreement between the Ministries of Envlronment and Health and Social Services. This agreement formally recognizes the Integral relationship between human health and the environment and creates a coooperative procedure whereby each ministry Is consulted on certain matters, such as EIA. Similarly, New York has developed a policy requiring quantitative health risk assessments in EIAs for certain projects such as proposals for waste incinerators.

On the other hand, Nova Scotia and Prince Edward Island possess ad hoc procedures whereby environmental assessments may be conducted as part of permitting or licensing procedures. In these provinces, health has rarely been identified as a concern. issues such as unemployment and the welfare of the fishing industry have received greater attention. Similar-y, although Californla has EIA legislation and extensive guidance which includes consideration of health Issues, In practice the state appears to rely more heavily on the application of environmental standards to protect health than on a direct examination of health issues.

At the federal level of government, both Canada and the United States have designated agencies which oversee the implementation of EIA by the several ministries and departments. In Canada, FEAR0 Is responsible for the federal EARP and In the United States, both CEQ and the EPA are responsible for the federal EIA process. Thls oversight role allows for a certain degree of flexibility In the ministrles and departments. For example, In both countries, the ministries and departments conduct their own screening to determine which proposals require an IEE or EIS. Only when an EIS Is deemed necessary, do FEAR0 and EPA mandatorily become Involved. In screening and preparlng IEEs, however, their involvement is at the request of the initiating departments,

Even with these similarities, the findings In this study indicate that the United States is more advanced than Canada In addressing health concerns in EIA. This conclusion may be attributed to a number of findings. First, the U.S. EIA process is eight years older than Canada's federal EARP. Eight years is a significant length of time considering the relatively young age of both Canadian and U.S. processes, and they have provided the U.S. wlth a headstart in developing the expertise and support needed for comprehensive work in EIA.

Second, both environmental and public and occupational health professionals work side-by-side in the U.S. EPA, the agency responsible for providing technical assistance and EIA guidance to federal departments. Cooperation between these professions in EIA and other environmental endeavors Is facilitated by their physical proximity and the agency's inherent recognition of the integral relationship between public and environmental health.

Contrastingly, In Canada, while some formal linkages exist between Environment Canada, Health and Welfare Canada, and Labour Canada, most of these relationships In EIA-related projects are Informal. This suggests that sufficient personnel and financial resources and the political will for a more formalized and active correspondence between these ministries in EIA do not exist.

Third, the United States has devoted more resources to the sole task of assisting other agencies and departments in preparing EISs than Canada. The Office of Federal Activities In the U.S. EPA Is charged with providing technical assistance while the CEQ is charged with developing EIA policy. In comparison, Canada's FEAR0 is responsible for both technical assistance and policy development. Given its resource constraints, FEAR0 does a commendable job. However, whether FEAR0 will be able to coninue to do so with Its current resources and, at the same time, effectively respond to new initiatives, such as the integration of health and EIA, is questionable.

Fourth, in the U.S., the public has the authority to take a case to court if it claims that the initiating department has not addressed certain Issues adequately. With this threat hanging over the government, EPA is careful to be as comprehensive as possible when scoping issues with initiating departments. As health is a primary public concern, EPA at least considers it as a potential issue. In Canada, on the other hand, the public does not have this same authority. While it is unclear whether this has a direct bearlng on the

likelihood of health being considered in Canadian EIAs, the lack of this accountability measure may have some significance.

Finally, the United States has generated a great deal of guidance for preparing EISs. For example, the U.S. EPA has developed general and industry-specific guidelines identifying important issues for consideration in EIA. Some of these documents identlfy health concerns. Although they may not be as comprehensive as possible, they provide explicit direction to proponents and initiating departments to consider health Issues. Canada has yet to develop Industry-specific guidance with reference to health. Although this may be due to fewer resources or a shorter history, It supports the finding that emphasis on health in EIA is more developed in the United States than in Canada.

A final indication of this finding is that at both the federal and state levels, the U.S. is conducting more quantitative health risk assessments than Canada. A number of U.S. Forest Service, Bureau of Land Management, Department of Defense, and New York and Wisconsin EISs contain such quantitative analyses. Very few federal and provincial EISs in Canada do.

When comparing Europe with Canada, however, the trend Is reversed. Canada is more advanced than Europe in addresslng health. The major reason for this finding is that EIA in Europe is relatively new. The European Economic Community EIA directive became mandatory for EEC member states January 1, 1988. This is the primary EIA mandate in Europe. All of the case studies revealed qualitative discussions of health concerns and were primarily limited to issues pertaining to noise and dust. Also, case studies were more concerned with employee health than public health. Finally, public access to EISs and EIA processes appears to be more limited in Europe than in Canada. Some countries do not involve the public at critical stages, such as "scoping," while others keep the completed EISs confidential and unavallable to the public.

With the EEC directive coming into force, European practices may change. However, itwlll take time for EIA to become firmly established. Most llkely, health wlll continue to be given little attention In European EIAs until this is accomplished. This is unfortunate as it seems that one of the simplest ways to include health in EIA is to integrate them from the start rather than after procedures have become routine.

This brief analysis shows that while Canada has made strides in addressing health in EIA, additional changes are needed to develop this capability further. The next section explores this conclusion in more detail.

# 5. FINDINGS AND RECOMMENDATIONS

## 5.1 Introduction

Based on the overview and comparative analysis of the previous section and participant responses to the survey (which are compiled in Appendix R), this section presents a more detailed analysis of Canadian EIA processes. Major trends and findings are discussed improvements to strengthen the health component of EIA identified. Final ly, recommendations are proposed outlining steps which should be taken to more effectively integrate health and EIA.

## 5.2 Major Trends and Findings

The Overview of Current Practice In Sectlon 4 indicates that most provinces and federal ministries address health issues when they are identified as a concern. The degree to which they are addressed, however, varies widely across the nation and is dependent upon a number of considerations, some of which are:

- whether EIA is formally promulgated through legislation or policy or informally initiated through permit application procedures. Those provinces with a strong EIA mandate tend to have a developed infrastructure which facilitates the identification of significant issues, including health;

- the proximity of a proposed project to a human settlement. The closer a proposed site is to a population, the greater the potential for public health impacts and the more likely they will be raised as an issue in an EIA;

- the permanence of a proposed project. Projects of short duration, such as oil and gas exploration sites which are in operation for an average of 100 to 150 days, are expected to have temporary, unenduring impacts;

- the nature of the proposed project. Some projects pose greater human health risks and warrant more attention and analysis in an EIA than others.

Evidence in support of the above conclusion may be found upon examination of how health is currently integrated into EIA mandates and actual practice. First, many statutes and policies directly mention human health In preambles or definitions. However, health is not explicitly included in these mandates or procedural manuals as a required component of IEEs or EISs. Still, the broad acknowledgement of health in EIA mandates gives governments considerable flexibility In the degree to which they address health in practice. In actuality, health tends to be given only general consideration in EIA processes

and reports. Yet the mandates, as they are currently worded, do not prevent governments from taking steps to integrate health and EIA more fully.

Second, a look at actual processes further supports the above Conclusion. In screening, for example, very few provinces and federal agencies have established a mechanism to ensure that health is considered. Examples of such mechanisms may be to include a health representative on a screening committee or to include health as an explicit screening criterion. In British Columbia, Quebec, and New Brunswick, the initiating department has the responsibility to screen proposals for potential issues of concern. Health is not contained In screening criteria and health professionals are not routinely consulted. Therefore, while consideration of health at this crucial stage may occur, it is not ensured. This is also true for some federal agencies, such as DIAND and COGLA. These agencies rely on screening matrlces published by FEAR0 which do not list health explicitly. On the other hand, EMR has developed a set of screening criteria which does include health.

In Saskatchewan, where an Interdepartmental Review Board screens proposals, no representative from the Ministry of Health (MOH) is included. Opposingly, in Newfoundland, a seat on a screening committee is reserved for a representative from the MOH; however, this representative rarely, if ever, attends screening sessions. Likewlse, Ontario has no set screening procedures or criteria, so while proposals may be screened for potential health risks, this is not ensured for all cases. Finally, Nova Scotia and PEI, which do not have required EIA processes, have application review processes to grant licenses and permits. In these instances, screening to flag applications for environmental and/or health concerns occurs on an ad hoc basis. As a result, environmental assessments occur infrequently relative to the number of applications reviewed.

Another stage in which health may be addressed is in developing project-specific terms of reference. The prospects for identifying potential health concerns appear brighter in this stage than In the screening stage. For example, British Columbia, Ontario, Quebec, New Brunswick, and the federal government consider it more or less standard practice to consult a number of agencies, including MOH, in this phase. Nova Scotia Ministry of Environment (MOE), even though it has no formal EIA procedure, may consult other agencies, such as the MOH, when identifying issues for public hearings. In Manitoba, the

Technical Advisory Committee, which among other tasks, is responsible for setting terms of reference, may include a representative from the Manitoba MOH. Also, generic guidelines for the preparation of EISs In Manitoba require that "special attention ... be devoted to those effects which ... pose long-term risk to health or property." In the remaining provinces, involvement of health professionals or reference'to specific health criteria is not required or is not standard practice. Even in the provinces mentioned above where health professionals may be consulted in this phase, no mandatory requirement to do so exists. The consistency with which health professionals are consulted in all cases, therefore, is questionable. Unless generic guidelines including health issues exist (as in Manitoba and Ontario), identification of and attention to health risks is not ensured.

In subsequent stages of an EIA, such as in preparing or reviewing draft EISs, when health issues arise, health professionals are more often than not consulted. The problem here Is three-fold. Often, Ministries of Health do not dedicate enough resources for work in EIA. Associated with this is a general lack of awareness of EIA among health professionals. Final ly, related to both of these problems Is the informal working relationship between many Ministries of Environment and Health. That is, Ministries of Environment in a number of provinces, such as British Columbia, Ontario, and New Brunswick, have developed a small network of one or two contacts In their respective health ministries. However, these networks have existed without formal recognition of the integral relationship between environment and health. As a result, the importance of allocating sufficient resources to support these networks Is not endorsed. In Quebec, this situation has changed. The Ministers of Environment and Health and Social Services signed a formal agreement establishing a clear working relationship between the two ministries in EIA and related endeavors." Such an agreement has strengthened whatever informal links existed and has paved the way for securing sufficient resources in the EIA-health network..-Without-this formal recognition, lack of both resources and awareness of EIA among health professionals Is likely to hinder efforts to integrate health and EIA. __

The range of detail in the health component of EISs provldes another Indication of the variation across the country. Very few provincial EISs Include quantitative analyses of health Issues. Two examples which contain such a quantitative health assessment include the report on British Columbia's

"Royal Commission of inquiry into Uranium Mining" and the EIS for the addition of a second unit at the Point Lepreau Nuclear Generating Station in New Brunswick. Qualitative discussions on health, in varying degrees of comprehensiveness, are much more common. Some provinces, such as Ontario have devoted entire reports to a qualltative assessment of health issues (e.g., in the EIS for sltlng the Brampton landfill). Ontario admits, however, that this is not common practice. More frequently, provinces discuss health-related Issues in paragraphs or sections. For example, a Quebec EIS for an Incinerator project addressed potential health Impacts, accident risks, mitigation measures, and emergency plans in a number of sections. In Newfoundland's EIS for the Hope Brook Gold Mine, the proponents mentioned the potential impact to nearby health care facilities due to an influx of people employed by the mine but gave no detail about the potential Impacts of the mine on worker health. Also, in an EIS for a Manitoba Hydro Generating Station, the proponents did not address health to any great extent except to explain why potential Impacts on health care facilities were not a significant concern.

Another means of assessing the varying degree to which health Is addressed In Canadian EIAs is to examine the current use of environmental standards and objectives. In all provincial and federal governments, participants in the survey stated that, often, they consider health Issues to be adequately accounted for through the application of environmental standards and objectives. That is, health issues may be addressed explicitly. However, where they are not, environmental standards and objectlves, which are in part health-based and are used to protect the environment, also protect human health. This reasoning is based on the assumption that the numeric values established are effective in protecting both the environment and human health.

This indirect method of addressing health may have been adequate in the early development of EIA. However, now it may no longer be sufficient, especially given the Increasing awareness of the Integral relationship between health and the environment. Also, experts are recognizing that current standards and objectlves may not be stringent enough to protect the environment, let alone human health. More direct attentlon to health issues in EIA, therefore, appears to be warranted.

Indeed, support for more conscious integration of health and EIA is widespread. Referring to participants' responses in the survey, most everyone

interviewedfrom environmental and health ministries approved of requiring an assessment of human health risks as part of EIA If potential health impacts appear to be a significant concern. The participants stress that health should be addressed only If it is Identified as a concern because in some instances, health may be a non-issue. The key is to screen for health concerns at the beginning of the process to determine if further study is warranted.

## 5.3 Recommendations

As the Overview of Current Practice in Section 4 and the above discussion indicate, health is already addressed in EIA to some degree. Furthermore, recent initiatives support the general trend that Canadian governments are beginnlng to realize that human health and EIA should become more formally integrated. For example, in Quebec, the Ministries of Environment and Health and Social Services have signed an agreement which solidifies the involvement of the health field in provincial EIAs. Manitoba has passed new legislation, The Environment Act, which explicitly recognlzes health as integrally linked with the environment, and Saskatchewan has initiated steps to involve health professionals In the province's screening process.

Although some steps are being taken by individual provinces and similar actions may be planned by others, a more comprehensive approach is needed to achieve the goal of effectively integrating health and EIA nationwide. Agencies (government and non-government) need to pool resources and cooperate in projects which promote increased attention to health. CEARC Is In a unique position to take a lead role in this endeavor. Having sponsored this research project, which in the following sections provides a blueprint for future work In this area, CEARC can determine the approprlate next step. It can coordinate follow-up initiatives and sponsor new research projects. It can act as a catalyst and solicit government and non-government organizations to support and cooperate in various tasks. Also, CEARC can suggest that organlzations take full responsibility for other tasks. Such organizations may include, but are not l imited to, the Canadian Public Health Association (CPHA), Canadian Medical Association (CMA), as well as federal and provincial Ministries of Health and Environment.

The following recommendations are organlzed according to five Categories: 1) EIA Policy and process, 2) Education, 3) Guidance, 4) Information Management, and 5) Research. These categories represent areas in which existing conditions inhibit the effective integration of health and EIA. The recommendations are designed to Improve these conditions and facilitate such integration efforts. The format for the remainder of this section is a description of existlng conditions In each category accompanied by a set of recommendations. Elght recommendations are presented in the order of their priority. Beside each recommendation, potential implementing organlzations are suggested. All recommendations are proposed to CEARC. This does not mean, however, that CEARC must implement all of them; other organizations are noted. CEARC may determine the best strategy for implementing each recommendation. A proposed strategy is presented in Section 6 where this issue is discussed In more detail.

5.3.1 EIA **Policy and Process**

As discussed above, current wording of EIA statutes and policies allow provincial and federal governments sufficient flexibility to decide the degree to which health is or is not addressed. While nothing in these mandates prevent provincial and federal governments from Increasing their focus on human health, nothing sets a minimum requirement either. If health and EIA are to be effectively integrated, these statutes and policies need to be strengthened and explicit health mandates adopted. This heaith mandate may be a Cabinet policy amending an EIA mandate or a separate agreement between health and environment ministries (such as the agreement signed in Quebec).

In addition to providing a strong statement requiring increased attention to health In EIA, the policy or agreement may be used as a vehicle to solve other problems related to this endeavor. Two of these problems Include the need for better coordination between health and environment ministries and the need for alterations in EIA processes to accommodate the new initiative. As noted earl ier, coordination between health and environment ministries regarding EIA Is insufficient. Through discussions with survey participants, it became apparent that the infrastructure supporting existing EIA linkages between ministries at provincial and federal levels is often shaky. Contact personnel in health ministries may exist but time and personnel commitments may not. This is often the case at the screening, scoping, and/or assessment stages, and It

may be due to either a lack of support from senior health and/or environment officials or a lack of sufficient coordination to use time and resources as efficiently as possible. The policy or agreement could be used to strengthen these linkages and Improve coordination between these ministries. if sufficient resources in government are devoted to screening, scoping, and assessment stages of EIA, the quality of the health component and the ability to protect human health may be significantly improved.

With respect to EIA processes, a few refinements in how EIA Is practiced would facilitate implementation of the policy and integration of health and EIA. For example, health could be designated as a mandatory screening criterion, and involvement of health professionals could be required as early as screening and/or scoping phases. By explicitly including these and other practical modifications in the policy or agreement, provincial and federal governments are given clear directions to ensure that health issues are addressed in EIA when they are identified as a concern.

**Recommendat ion 1:** (CEARC with CPHA)

Establish a federal-provincial task group to:

a) develop a policy or agreement with an explicit mandate:

- requir ing the consideration 0f human health issues in EIAs for projects where health is identified as a concern; [1]
- establishing a formal EIA-health relationship between environment and health ministries;
- clearly defining terms, goals, and objectives regarding the integration of health and EIA, roles and resource commitments for health professionals (for guidance development and technical assistance), and other relevant issues;
- refining EIA to include health in the following procedural steps: [2]

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[1] To reiterate, participants in the survey stressed that health should not be a required component of EIA if it is a non-issue. To determine if health is a concern, consideration of potential health risks should be required durlng proposal screening. Further study should then be required if and only if health issues are identifled as a concern.

[2] Some of these procedural modifications may already be in place in some provincial and federal governments. They are included here to be as comprehensive as possible for those provincial and federal governments which

1) health should be established as a mandatory screening criterion,

2) health professionals should be Involved In screening proposals and/or in scoping issues and establishing terms of reference,

3) health professionals should be consulted to provide advice and technical assistance in assessments of various health issues,

4) the public should be ensured of opportunities to raise health concerns (In addition to envlronmental and social concerns) and to provide Input into the preparation of EISs,

5) health professionals should be involved in the review of draft IEEs and EISs,

6) health professionals should be involved in decisions on EIAs which include health concerns, and

7) an auditing phase should be established in EIA to review completed EISs. The process, the accuracy of predictions, and the effectiveness of mitigation measures to protect health and the environment should be assessed so that the knowledge gained may be applied to future EIAs.

b) develop and implement a strategy to secure the support of Ministers of Environment and Health for this policy or agreement and, if necessary, to obtain Cabinet approval.

As noted in the above recommendation, the policy or agreement should include clear definitions of goals and relevant terms. EIA was first established to protect the biophysical environment from degradation caused by human development. EIA has evolved to include socio-economic considerations and now human health considerations. By explicitly including health in EIA, new goals need to be established. A number of envlronmental and health participants in the survey raised a concern that the initial intention of EIA, that of protecting the blophysical environment, will be compromised or overshadowed by the new emphasis on humans and human health. While Increased attention to health may be warranted, participants warned that protection of health through EIA should not infringe on EIA's ability to protect the biophysical environment.

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have not yet adopted these refinements.

Recommendation 2: (CEARC with CPHA)

Conduct a federal-provincial workshop to:

Develop EIA goals (to be included in the EIA-health policy or agreement) in relation to health which are carefully balanced with preexisting goals.

In addition to new goals, relevant terms need to be defined. Three terms which need definition include "human health," "human health impacts," and "human health impact assessment." "Health," as defined by WHO, is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This or another definition of health needs to be adopted by Canada so that provincial and federal governments strive to achieve and protect similar degrees of health.

The term, "human health impacts," also needs definition. It may be characterized in a number of ways:

- Direct health impacts are those impacts which may occur from direct exposure to a substance through the skin, air, or water.
- Indirect health impacts refer to those effects which may occur from indirect exposure to a substance, for example, through ingestion of foods in which a substance has bioaccumulated.
- Cumulative health impacts describe exposures to a substance from more than one source and through more than one medium (air, water, food, skin) over time.
- Immediate health impacts characterize the acute, short-term impacts such as death, sudden blindness, illness.
- Latent health impacts refer to chronic, long-term impacts such as cancer.

A number of other categories of "human health impacts" exists. A clear definition, including or excluding these and other categories, is needed so that it may be applied in EIA consistently nationwide and so that EIAs may identify all of the relevant health risks presented by a proposed project.

Similarly, "human health impact assessment" in EIA may take a number of forms depending on the specific circumstances of the project. The WHO report, The Health and Safety Component of Environmental Impact Assessment: Case-study Analysis of Environmental Assessments of Chemical Industry Projects (1986) proposes three different types of health impact assessment:

1) extended assessment – a comprehensive, quantified analysis of both a) human exposure to adverse environmental health factors caused by the proposed project, and b) adverse human health effects provoked by such exposure;

2) simplified assessment – a mixture of qualitative and quantitative analyses of expected environmental pollution and consequent human exposures and effects; and

3) rapid-conservative assessment – an immediate assessment of potential health effects based on extremely conservative hypotheses.

Human health impact assessment, or as it is sometimes called, "environmental health impact assessment (EHIA)," may also be defined to be a report totally separate from and in addition to EIA. This definition of health impact assessment and the term EHA have been poorly received. While participants in the survey are in favor of addressing health in EIA, they are opposed to preparing and writing a totally separate assessment (which EHIA has been interpreted to mean) because of the additional workload and resources required. "Health impact assessment," in addition to "health" and "health impacts," therefore, need careful definition so that the scope of this new component of EIA may be understood and any misperceptions erased.

**Recommendation 3:** (CEARC with CPHA)

Conduct a federal-provincial workshop to:

Develop thorough definitions of "human health," "human health impacts," and "human health impact assessment" which are acceptable by all provincial and federal governments and which will be included in the EIA-health policy or agreement.

### 5.3.2 Education

A number of participants in the survey noted a general lack of relevant expertise in the environmental health field. That is, a majority of health professionals (e.g., medical doctors, toxicologists, epidemiologists, public health officials, etc.) have not been sufficiently educated in EIA or in environmental issues affecting human health. Only a fraction of the health field is familiar with EIA -- its purposes, principles, and procedures; and only a fraction of those possesses the skills and knowledge necessary to contribute useful input to EIA.

Similarly, just as the health profession lacks awareness of EIA, a significant number in the EIA profession lacks awareness of the possibilities

for Integrating health InEIA. First, environmental professionals may not be aware of why or how health should be addressed. Second, If they are aware, they may be concerned about the additional workload accompanying health assessment in EIA.

The following recommendations address these gaps in knowledge. Once educational programs are Implemented, the greater awareness of health aspects of EIA may promote greater support for their integration.

Recommendation 4: (CEARC with CPHA, CMA)

Establish federal-provincial task groups or sponsor research projects to:

a) develop educational programs and materials for health professionals in the public and private sectors to inform them of EIA and their potential roles in EIA.

b) develop educational programs and workshops to be established as required curriculum for students in higher educational institutions (e.g., unlversitles, colleges, professional schools) seeking degrees in relevant health fields.

c) develop educational programs for environmental professionals in the public and private sectors to inform them of health aspects of EIA.

More than one type of educational program may be necessary different target groups within each of the above categories. For example, a workshop may be the appropriate forum for educating health and environmental experts while a conference may be appropriate for informing health and environment ministers.

### 5.3.3 Guidance

Participants in the survey noted a general need for guidance materials. Specific suggestions Include:

- Screening checklists or matrices which include health-related issues;
- Reference manual containing a list of industries which are likely and unlikely to require a health impact assessment In EIA;
- Industry-specific guidelines and manuals outlining the types of health issues which may need addressing for proposed projects in each industrial category;
- Implementation Manuals and Methodology Guidelines which provide instructions on how to conduct a health risk assessment or how to evaluate various health components;

- Reference Manual of Standards and Objectives which contain a variety of criteria and explain how the standards were developed, how they may be used, in what regions they are most applicable, and to what populations they may and may not apply;

- An Introduction to Health Impact Assessment In EIA which introduces the general principles of health impact assessment and purposes for integrating health in EIA;

- Guidance for health and environmental minlstrles and professionals which include practical examples illustrating how health may be integrated into EIA.

The following recommendation suggests a means for developing these and other guidance materials.

**Recommendation 5**: (CEARC with CPHA)

Establish federal-provincial task groups or sponsor research projects to:

Develop guidance documents and guidelines on screening, methodologies, health impact assessment, industry-specIfIc information, standards and objectives and other relevant topics to assist practitioners in conducting the health impact assessment component of EIA.

### 5.3.4 Information Management

A great deal of information and information sources pertaining to health, the environment, and EIA already exists. Examples of information sources include:

- Statlstlcs Canada, Health and Welfare Canada, Canadian Centre for Occupational Health and Safety;

- U.S. National Institute for Occupational Health and Safety, U.S. Department of Energy's Health and Environmental Rlsk Analysis Program, U.S. Department of Energy's Health and Environmental Effects Documents;

- And other provincial, federal, and international data sources.

Examples of relevant reports and manuals which have been published include:

- The Panel of Experts on Envlronmental Management (PEEM) health assessment manual for water resource projects (1983);

- The Envlronmental Resources Limited health assessment manuals for irrigated agricultural development projects (1983) and urban development projects (1983);

- The U.S. Agency for International Development (US AID) checklist with health criteria, as published in its report on Environmental Design Conslderatlons for Rural Development Projects (1980);

- The WHO Enviromental Health Report#15, The Health and Safety Component of Environmental Impact Assessment (1987).

These and other publications provide a Starting point for assessing the suitability of current procedures and for developing new ones.

In addition to existing literature on health impact assessment in EIA, guidance for other planning and assessment procedures may prove helpful. These information sources may prove provide ideas on concepts and methodologies which may be adapted for use In the health component of EIA. Several examples have surfaced:

- Health and Welfare Canada provides assistance to various ministries which relate to the assessment of human health risks In government activities other than EIA (e.g., assessment of contaminants for Environment Canada under the Environmental Contaminants Act; establishment of occupatlonal health and safety regulations with the Labour Canada; and assessment of pesticides for Ministry of Agriculture under the Pesticides Control Act; and others);

- Saskatchewan Ministry of Health has conducted baseline health studies upon the request of Saskatchewan Environment and Public Safety;

- United States Toxic Substances Control Act and the Comprehensive Emergency Response, Compensation, and Liability Act contain health assessment and hazard assessment procedures; and

- California General Plans include public health and safety requirements with which proponents preparing EISs must comply.

Final ly, many experts in environmental health and EIA in Canada and from other countries have developed a wide body of knowledge and experience. These experts are important resources and could provide Canada with useful insights, techniques, procedures, and other relevant information.

While all of these resources may exist, three major problems prevent their ful l use:

- Pertinent information is scattered worldwide In libraries, data banks and resource centres;

- No effort has been made to compile a comprehensive listing of useful information sources; and

- Potential beneficiaries, such as EIA professionals, have been Insufficiently informed about existing resource and information centres, their location, contents, and means of access.

In short, an effective mechanism which locates useful Information and publiclzes Its location to appropriate Parties in the EIA profession is needed. Once this mechanism Is established, the information can be easily accessed and used in at least two initiatives regarding the integration of health and EIA:

- The resources may be used as references for research so that work already done will not be duplicated. Also, the information may be used as startlng points for further research.

- The resources may be used as references to be consulted when conducting health impact assessments and preparing IEEs and EISs.

The following recommendations propose steps aimed at establishing an effectlve mechanism for making useful information available to environmental and health professionals in EIA:

Recommendation 6: (CEARC with CPHA)

Sponsor a research project to:

a) conduct a worldwide search to locate resource and information centres which collect, manage, disseminate, and allow access to relevant studies, reports, data banks, and other useful information;

b) develop and distribute a directory listlng resource and Informatlon sources, types of information available, and means of access. The directory should be periodically updated.

Recommendation 7: (CEARC with CPHA, CMA)

Sponsor an international conference to:

a) identify resource people with expertise in relevant health and environmental fields;

b) develop an international network with the purpose of sharing information and expertlse in research projects and actual EIA studies.

### 5.3.5 Research

Finally, participants in the survey provided many suggestions for research. The following recommendation is aimed at continuing and starting new research intltiatives to close gaps in knowledge, further progress In the environmental health field, and investigate specific concerns which have surfaced during the course of this study. The first set of issues are recognized to be at the root or many environmental health problems. Research in these general areas is on-going; the topics are included here to be as complete as possible in

Identifying research needs. The latter set of issues are more specific to the integration of health and EIA.

**Recommendation 8:** (CEARC WITH CPHA, CMA, federal and provincial ministrles, universlt ies)

Provide grants and establish programs to sponsor research in the following areas:

**A) General environmental health subjects**

- Research on the behaviour of toxic chemicals In the environment and on their effects on the environment and human health;

- Research to obtain better information on chemicals used in production processes and on the by-products that are generated and discharged Into the environment (e.g., how chemicals react together, how by-products affect the environment and human health, etc.);

- Research to develop simulation models, risk analysis, toxicology analysis, toxicology data bases, and "an approach which looks at the total human env i ronment ;"

- Research to obtaln more precise data on dose-effect relationships. Research on long-term exposures to low doses of pollutants and associated effects on the envlronment and human health;

- Research to develop methodologies to assess cumulative exposures and associated health effects, potential health effects to future generations, and baseline health status;

- Research to develop simple and acceptable assessment methodologies;

- Research to develop standards and objectives for various environments (e.g., acceptable levels of a substance for more than one setting - for a home, a mine, etc.);

- **Research to improve ability to** accurately analyze and interpret test results and empirical data;

- Research to improve knowledge of background levels of various substances;

- Research of "mutt i-media sources;" that Is, how health may be affected by a substance which has been exposed to the environment and to humans through more than one medium (e.g., air, water, soil, food).

**B) Specific EIA-health subjects**

- Research to identify agency procedures other than EIA (e.g., regulatory, licensing, and permitting procedures) in which health components are already addressed. Evaluate their effectiveness In protecting health and, where effective, Incorporate In guidance for EIA practitioners so that work is not duplicated;

- Research to Identlfy and analyze health assessment procedures such as those required In the U.S. Toxic Substances Control Act (TSCA) and the U.S. Comprehenslve Emergency Response, Compensation, and Liability Act (CERCLA), and those conducted by Saskatchewan to assess baseline health, and by Health and Welfare Canada to assist other ministries. Determlne their applicability to the health component of EIA and how they may be adapted;

- Research to examine ways In which more accountability may be integrated Into screening of proposals, so that checks and balances are strengthened and projects with potentially significant environmental and/or health impacts do not escape review;

- Research to examine EIA exemption lists and decision-maklng rules applied In the screening phase to ensure that projects with potentially significant environmental and health risks are requlred to conduct an EIA;

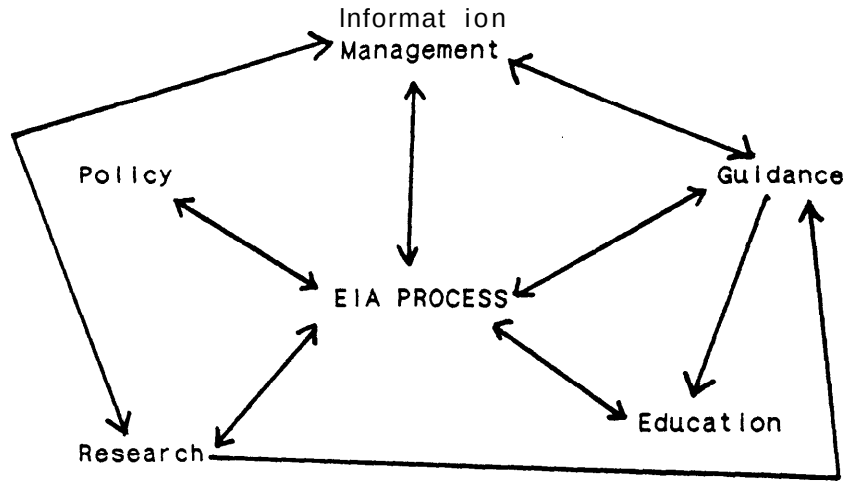
- Research to evaluate federal and provincial standards and objectives for their consistency and applicability to thelr respective regions and for their equitable consideration of environmental and health criteria as well as economic and technological criteria. Review future reports of the federal-provincial Multi-Media Guidelines Advlsory Committee to assess Implications for current environmental standards and objectives and to recommend changes where necessary;

- Research to examine public participation requirements to ensure that the affected public Is adequately notified of a pending EIA or of an application for a license or permit (If no EIA process exists) and that sufficient opportunities are available for the public to raise concerns for the envlronment and human health;

- Research to comprehensively review completed EISs across Canada. The purpose of such a study would be two-fold: 1) to determine the consistency with which Canadian EISs (federal and provincial) address similar health Issues for similar sets of parameters (such as type of Industry, proximity to a human settlement, etc.), and 2) to Identify the parameters (such as type of Industry, proximity to a human settlement, etc.) which ought to trigger assessment of health risks across the country.

# 6. IMPLEMENTATION STRATEGY

**Figure 6.1 Integrating Health and EIA**




## 6.1 Introduction

The above diagram illustrates how implementing the recommendations in each of these categories will facilitate integration of health and EIA. Strong policy will provide resources to help direct changes In the EIA process. Knowledge gained through research will also improve the process by improving the information base and contributing to the development of guidance. The information base can be accessed by both researchers (to provide a starting point for research studies) and EIA practitioners (to provide useful information and resources for actual assessments). In addition, an information base can supply guidance development with useful resources and, In turn, once guidance Is developed it can be added to the Information base. Guidance can also be developed for educational programs which will work to improve knowledge of health aspects of EIA among environmental and health professionals. LIkewise, experience gained through EIA processes can contribute to further policy refinement, knowledge in information bases, Improvements In gutdance, and programs in education and research.

So that each of these benefits may be realized and the Integration of health and EIA facilitated, this section outlines a proposed strategy for implementing this study's recommendations. When developing such a strategy, two questions

need answering: who will implement the recommendations and how should they be implemented?

CEARC has several options in deciding who will be Involved. It may choose to work on certain projectsalone,for example, awarding a contract to develop certain guidance materials; or CEARC may seek the assistance of other organizations either to cooperate in a joint effort on certain projects or to assume sole responsiblity for other projects. For example, a cooperative effort is needed for developing an EIA-health policy or agreement while other organitations may be asked to assist In guidance development by assuming full responsibility for one or two manuals. The manner in which CEARC proceeds will depend on CEARC's specific mandate and a decision by its members on an appropriate course of action for future work in this area.

Government and non-government organitations (NGOs)which are possible candidates for implementing recommendations with CEARC include federal and provincial ministries of environment and health, CPHA, CMA, FEARO, and universities, among others.

Five major implementatlon strategies are discussed: 1) establishing task groups, 2) conducting workshops, 3) sponsoring conferences, 4) lobbying, and 5) promoting research. Most of the recommendations may be implemented through a combination of these strategies. The following table presents possible strategies for implementing each recommendation and suggests an organization or a combination of organizations to implement them. The ensuing discussion describes the strategy in more detail.

**Table 6.1 Proposed Implementation Strategy**

| Strategy / Recommendation | Task Groups | Work-shops | Conferences | Lobbying | Research; Contracts |
|---|---|---|---|---|---|
| **EIA** POLICY AND PROCESS | | | | | |
| **R1** Policy Development | A | A | A | **A** | |
| R2 Definition of Goals | A | A | | | |
| R3 Definltion of Terms | A | A | | | |
| EDUCATION | | | | | |
| R4 Development of Education Programs | A | A | A | | **A,B,C** |
| GUIDANCE | | | | | |
| **R5** Guidance Development | **A,B,C** | | | | **A,B,C** |
| INFORMATION MANAGEMENT | | | | | |
| R6 Development of information Directory: | | | | | **A,B,C** |
| R7 Development of internatlonai Network: | | | A | | |
| RESEARCH | | | | | |
| R8 Research | | | | | **A,B,C** |

Key: **A** = CEARC seeks the assistance of other organizatlons to implement the **recommendation.**
**B** = CEARC suggests that another organization implement the recommendation or a portion of it.
**C** = CEARC **implements** the recommendation or a portion of it by itself.

## 6.2 **R1Policy Development**
## **R2 Definition of Goals**
## **R3 Definition of Terms**

Because these three recommendations will contribute to the same outcome, **a n** EIA-health policy or agreement, they should be implemented at the same time using the same strategy. This strategy proposes a collaborative effort by several organizations. The objective is to develop a national policy or agreement which can be taken back to the federal and provincial governments for endorsement. A four step process Is envisioned. First, establish a small task

group (approximately 4 to 6 individuals) with representatives from federal and provincial environment and health ministries and EIA practitioners from universities and consulting firms. This task group would begin work on each of these recommendations and prepare a draft policy or agreement. Second, conduct a workshop or series of workshops to be attended by representatives from all federal and provincial health and environment ministries. The participants will review the draft and arrive at a consensus on proposed amendments. The objective of the workshop is to amend the draft so that the resultant policy or agreement is acceptable by federal and provincial governments. Third, the task group will revise the draft accordingly and distribute the final draft to the federal and provincial governments where It may be modified to suit special federal or provincial circumstances and considered for adoption. Finally, throughout the process, appropriate NGOs, such as CPHA and environmental interest groups, will develop and implement a promotional campaign to secure support for the policy or agreement from environmental and health ministers. This campaign may consist of sponsoring an informational conference for the ministers and lobbying.

This comprehensive strategy requires the cooperation and assistance of several organizations. Depending on its mandate, CEARC can co-sponsor portions of this strategy and/or act as a catalyst to secure the involvement of the necessary organlzations, some of which include:

- Federal and provincial environment ministries;
- Federal and provincial health ministries;
- CPHA and other non-government health organizations;
- Universities and environmental consulting firms; and
- Non-government environmental interest groups.

### 6.3 R4 **Development of Educational Programs**

Educatlonal programs are needed for a number of groups: for environment and health mlnisters as part of the promotional campaign described above; for environmental and health professionals in the public and private sectors; and for students of environmental and health disciplines,

These educational programs may be developed by establishing several task groups. For example, one task group may be composed of representatives from CPHA, CMA, FEARO, and universities to develop an educational program for students in health disciplines. Likewise, another task group may develop

educational workshops for health and environmentalprofessionals in both public and prlvate sectors.

Sponsorship and coordination of these task groups may be a joint effort between any number of organlzatlons, such as CPHA, CMA, and federal and provincial envlronmental and health mlnistrles. While CEARC may sponsor and coordinate one or two task groups, It may suggest that cooperating organlzatlons sponsor others. Slmllarly, these educational programs may be developed by awardlng contracts to educational consultants, in which case CEARC can, again, split the responsiblllty wlth other organlzatlons.

### 6.4 R5 Guidance Development

A great deal of guidance is needed to Integrate health and EIA. Enough work exists in this category for several joint and separate research efforts. Some guidance should be developed as soon as possible, such as screening criteria Including health Issues. Others may require further deflnltlon through a needs assessment. Once the types and contents of such materials have been Identifled, CEARC can determine how they may best be developed. For examp le, some guidance materials may be most efficiently prepared by a federal-provincial task group while others may require a research contract. CEARC can sponsor research projects or coordinate a task group on Its own, suggest that other organlzatlons do so, or establish cooperative programs among several organlzations.

### 6.5 R6 Informational Directory

The Informational directory may be developed through awarding a research contract to a private consultant. To ralse funds for the project, CEARC may do one of three thlngs: It may act as sole sponsor and reserve sufficient funds for the contract; It may propose that another organlzation sponsor the contract; or It may establish a coalltlon of sponsors (both government and non-government) to coordinate the project jointly.

### 6.6 R7 International Network

To explore the possibility of establishing an International network of EIA-health experts, CEARC may co-sponsor an International conference. Experts from around the world may attend the event, present papers, and discuss relevant

issues. In addition, they may discuss the desirability and feasibility of forming a network. The purpose of such a network would be to act as a resource to provide EIA practitioners with technical assistance, to conduct research and contribute relevant studies to resource centres listed In the Informational directory, and to identify other experts In the field who may be Interested In joining the network. If the Idea Is approved at the conference, the participants may complete Informatlonal sheets which would be compiled and made available to Canadian and other governments. CEARC could share the financial and organlzatlonal responsibilites of producing such a conference with government and non-government organlzatlons in Canada and from around the world Including, for example, CPHA, Environment Canada, FEARO, Health and Welfare Canada, U.S. EPA, U.S. National Institute of Health, WHO, United Nations Environment Programme, Pan-American Health Organlzation, and others,

6.7 R8 Research

Research is on-going. In determining research Initiatives for upcoming fiscal years, CEARC can use the list In this report as one **source of Ideas.** The Council can select research topics it wishes to sponsor and recommend others to other organlzations (such as CPHA, and federal and provincial health and environment ministries) for sole or joint sponsorship.

## 6.8 Conclusion

Of course, all of these activities cannot occur simultaneously. Some should take priority over others and should be Initiated as soon as possible. Recommendat Ions 1, 2, and 3 should be initiatedfirst. Developing an effective policy which Is acceptable by federal and provincial environment and health ministries Is central to all ensuing efforts and willrequiretime. SImultaneouslyl, work on Recommendation 4 should begin. Educat Ing environmental and health mlnisters of this new initiative Is crucial to gaining their acceptance of the EIA-health policy or agreement. Likewise, envlronmental and health professionals in EIA (In government and non-government organltatlons) need to become better informed of this endeavor so that implementation of the policy, once promulgated, will be facilitated. Final ly, certain guidance materials should be developed as soon as possible. Recommendation 5 is a significant undertaklng but Initial guidance, such as

screening criteria including health, are needed to facilitate the early stages of the policy's implementation.

These four projects, policy development and promotion, education of environmental and health ministers, education of EIA and health professlonals, and development of Initial guidance materlals should receive top priorlty. Work on developing educational programs for students, other guidance, an Informational directory and international network, and sponsoring research should follow appropriately.

This report may be considered a first step in approaching the goal of integrating health and EIA. A great deal of work needs to be done to achieve this goal.

If health is to be integrated with EIA, this report serves a useful purpose. It presents an overview of current practice which explains the degree to which health is currently addressed in Canada, the United States, and Europe (a complete summary of current practice is located in Volume II). Also, It provldes a set of recommendations and an implementation strategy to facilitate increased attention to health in EIA. These recommendations propose action in five areas: 1) EIA-health policy development, 2) education, 3) guidance development, 4) Informatlon management, and 5) research. Taken as a whole, this report provides CEARC with a blueprint for future work in integrating health and EIA.