

Canada



Environment
Canada

Environnement
Canada

ISSUES

environment

Compliance

Reviewing the

.....
EA Summary

TD
198.58
.C3
R4913
1998

Guidelines

Regulations

ALTERNATIVE

PROCESS

Shipley Environmental

Training • Consulting • Writing Services



Proposed Agenda

October 27, 1998

Reviewing the EA Summary

A.M.

- 8:00-8:10 Introduction (Agenda, Attendees, etc.)
- 8:10-8:30 Workshop Objectives
- 8:30-9:00 Introduction to "*A Guide for Reviewers*" and Other Workshop Materials
- 9:00-9:30 Purpose and Content of a CEAA EA
- 9:30-9:45 Break
- 9:45-10:45 Introduction to "*Preparing the EA Summary*"
Content of the EA Summary
Section 16 (1) and the EA Summary
- 10:45-11:15 Role of Major Environmental Issues
- 11:15-11:45 Alternatives (No Project, Proposed Project, and Action Alternatives)

P.M.

- 11:45-1:00 Lunch
- 1:00-1:15 Review of Morning's Discussion
- 1:15-2:15 Environmental Effects
- 2:15-2:30 Mitigation
- 2:30-2:45 Break
- 2:45-3:15 Follow-up Activities
- 3:15-3:45 Writing SEIK Comments
- +3:45-4:15 Role of the EA Summary
- 4:15-4:30 Workshop Summary



Workshop: Reviewing the EA Summary

Introduction to the Workshop

Welcome to the workshop! As participants, you are the key to making this workshop both productive and enjoyable. Please share your examples, your priorities, and your knowledge because the more information you share, the more realistic and practical this workshop will become.

Objectives for the Workshop

Overheads 1 and 2 present eight suggested objectives. These objectives are only provisional, so please answer the following questions:

- Are these suggested objectives the right ones for this workshop?
- What details in these objectives would you change or even delete?
- What other objectives would you suggest?

Objectives for the Workshop

- To identify the minimum information necessary for a CEAA EA
- To identify how much of the preceding EA information properly goes in the proposed EA Summary
- To identify the information needed for the DOE specialists
- To determine how much detailed information to provide about alternatives

How to Prepare the EA Summary

Objectives for the Workshop

- To determine the minimum standards necessary for an adequate description of direct, indirect, and cumulative effects
- To determine the role of mitigation
- To identify who would be responsible for follow-on monitoring
- To survey the do's and don'ts of how to prepare DOE comments on an EA Summary

How to Prepare the EA Summary

1. **To identify the minimum information necessary for a CEAA EA, especially the technical information necessary for DOE to comment on the EA.**
2. **To identify how much of the preceding EA information properly goes in the proposed EA Summary (as described in *Preparing the EA Summary*).**
3. **To identify the information needed for the DOE specialist to decide if a resource issue is a major factor in subsequent decision making.**
4. **To determine how much detailed information to provide about alternatives, especially the no-project alternative.**
5. **To determine the minimum standards necessary for an adequate description of direct, indirect, and cumulative effects of the proposed project.**
6. **To determine the role of mitigation in the preceding description of the direct, indirect, and cumulative effects and to decide if mitigations also apply to both the proposed project and to the other alternatives**
7. **To identify who would be responsible for follow-on monitoring of the project (or an alternative) as implemented.**
8. **To survey the do's and don'ts of how to prepare DOE comments on an Environmental Assessment.**



Workshop Materials

- *A Guide to Reviewers* (Tab 2)
- Workshop Overheads (Tab 3)
- *Preparing the EA Summary* (Tab 4)
- Draft Environmental Assessment Summary—Suncor Energy Inc. Project Millenium (Tab 5)
- Appendices (Tabs 6-8)
 - CEAA
 - Reviewer's Checklists



A Guide for Reviewers

Reviewers of environmental assessments are important contributors to successful compliance with the Canadian Environmental Assessment Act (CEAA). As the CEAA in Section 12(3) states, “every Federal authority that is in possession of specialist or expert information or knowledge [SEIK] shall, on request, make available that information to the responsible authority”

In their role as specialists and experts, SEIK reviewers for the Department of Environment provide essential input to responsible authorities, provincial agencies, review panels, and, when applicable, outside proponents.

The goal of this guide is to assist SEIK reviewers to comply with CEAA by discussing strategies for effective reviews and by providing or referencing other tools for reviewers to use.

Three Tools for SEIK Reviewers

A Checklist for Reviewers. The checklist on pp. 2-5 provides a generic tool for addressing resources analyzed in an environmental assessment. Reviewers will often need to supplement this generic tool with resource-specific information. Section D in this Guide for Reviewers surveys some of resource-specific information currently available for SEIK reviewers to use.

Preparing the Summary for an Environmental Assessment. This manual (Section 3 – *Preparing the EA Summary*) establishes DOE’s expectations as to the format and content of the summary for an environmental assessment. Proponents are not required to use this format and content, but its use is strongly recommended. The more often proponents prepare such a summary, the more consistent will be the information packages they submit to SEIK reviewers. In turn, if reviewers become familiar with this manual, they should be able to review environmental assessments more efficiently.

Suggestions for Writing Review Comments. The suggestions on pp. 6-10 reflect key do’s and don’ts for reviewers.



A Checklist for Reviewers

1. Name and Title		
2. Area(s) of Expertise		
3. Is your area of expertise a major resource issue? If yes, continue with questions 4-8. If no, do you agree? If don't agree, explain why. [See <i>Preparing the EA Summary</i> , pp. 15-19 for guidance on major vs. minor issues]	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4. Do you agree with predicted direct, indirect, and cumulative impacts? If yes, go to question 6. If no, answer the following questions: [<i>Preparing the EA Summary</i> , pp. 45-53]	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Adequate baseline data? [<i>Preparing the EA Summary</i> , pp. 33-42] Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Predictive method(s) technically and scientifically sound? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>



<p>Adequate discussion of any limitations of predictive method(s)? [Preparing the EA Summary, p. 49] Discussion:</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<p>Identified gaps in knowledge adequately presented? [Preparing the EA Summary, p. 51] Discussion:</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<p>Clear presentation of the significance of impacts using both context and intensity? [Preparing the EA Summary, p. 49] Discussion:</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<p>All foreseeable impacts (direct, indirect, and cumulative) addressed? [Preparing the EA Summary, pp. 45-53] Discussion:</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<p>5. Are proposed mitigation measures appropriate and likely to be effective? If yes, go on to question 6. If no, answer the following questions? [Preparing the EA Summary, pp. 51]</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>



Mitigation measures address impacts of highest concern? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Mitigations suggested are practical and workable given the project context? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
All feasible alternate mitigations are proposed and discussed? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
6. Is proposed monitoring adequate given the context and intensity of the impacts and the type and degree of mitigations? Is yes, go on to question 7. If no, answer the following questions	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Monitoring proposed for all major project impacts? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Adequate discussion of who will monitor and how results will be reported? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>



All feasible and alternate monitoring proposed and discussed? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Environment Canada's potential contributions to monitoring adequately discussed? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
7. Are management strategies and responsibilities adequate? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
8. Are proposed follow-up actions adequate? Discussion:	Yes <input type="checkbox"/>	No <input type="checkbox"/>



Suggestions for Writing Review Comments

As CEEA provides in Section 12(3), the Department of Environment has a legal obligation to provide specialist/expert information or knowledge (SEIK) to a responsible authority upon request from that responsible authority.

The DOE submits SEIK comments in consolidated review response. This response represents the departmental position on the proposed project, not the views of a single specialist; as such, review comments should be carefully drafted and reviewed before being sent to the responsible authority. DOE staff members should also remember that the DOE is not an expert on every environmental topic, so some proposed comments may not be appropriate for submission to the responsible authority.

How to Write Review Comments

3

How to Write Review Comments (Slide 1)

- Clearly indicate that comments comply with Section 12(3) of the CEEA
- Do not draw conclusions that draw on CEEA terminology
- Avoid comments with subjective terms
- Do not provide overall judgments about a project
- Avoid providing confirmation of regulatory compliance

How to Prepare the EA Summary

1. **Clearly indicate that comments comply with Section 12(3) of the CEEA and do not reflect any decision-making authority within the DOE.**

2. **Do not draw conclusions that draw on CEEA terminology**—in particular, do not state that an impact is a “significant adverse environmental effect.” This phrase from the CEEA is reserved for the responsible authority.

Instead, DOE reviewers should discuss potential impacts as fairly and non-judgmentally as possible. For example, if a population of water fowl will be jeopardized by a project, lay out the facts: breeding numbers, acres of habitat, quality of the habitat, estimates of breeding success, relation of local impacts to overall impacts (as within an entire province, within Canada, or internationally).

DOE comments should be so clear and so carefully written that, if appropriate, the responsible authority is able to decide if the impacts represent a “significant adverse environmental effect.”

3. **Avoid comments with subjective (judgmental) terms**—for example, “Unfortunately,” “It is regrettable,” “Sadly,” “It is unfortunate.” Keep comments as factually objective as possible.
4. **Do not provide overall judgments about a project.** DOE does not approve or disapprove a project. Instead, the review comments should discuss the potential environmental impacts of projects. The responsible authority must then use the comments in deciding to approve or disapprove a project.



**How to Write Review
Comments (Slide 2)**

- Identify clearly any data deficiencies in the environmental assessment documents
- Provide DOE comments early in the planning process
- Highlight major comments
- Avoid any references to political considerations
- Provide SEIK comments in writing, never orally

How to Prepare the EA Summary

5

**How to Write Review
Comments (Slide 3)**

- Write all comments with the knowledge that they are subject to the Access to Information legislation
- Prepare your comments as carefully as you would a peer-reviewed scientific paper

How to Prepare the EA Summary

5. **Avoid providing confirmation of regulatory compliance when such compliance actually depends upon later actions of the proponent.** DOE's position has to be that it appears that the project will meet regulatory requirements if the proponent provides adequate documentation. DOE reviewers should not tell a proponent how to meet regulatory requirements. If DOE review comments are too detailed and too prescriptive, then DOE may not be able to launch a prosecution at a later date, especially if the proponent can argue that it has followed all regulatory steps as prescribed by the DOE.

6. **Identify clearly any data deficiencies in the environmental assessment documents.** Link such deficiencies to published methodologies or codes of professional practice. Remember that the responsible authority must decide if the additional data is truly necessary, especially when acquiring such data may cost time and money.

The DOE review comments should make the value of the missing data clear to the responsible authority without mandating a decision about whether to collect the data.

7. **Provide DOE comments as early in the planning process as possible when DOE has a clear legal role to provide SEIK comments.** For example, DOE reviewers might review draft guidelines or other preliminary materials as a way to help the proponent prepare the final environmental assessment.

8. **Highlight major (most important) comments.** Avoid detracting from major comments by burying them with a lot of minor comments. One option is to present major comments in the primary review comments and to forward or attach any remaining minor comments.

9. **Avoid any references to political considerations.** DOE comments should reflect department policy and should have a clear scientific, technical, or regulatory basis. A separate briefing note is the place to mention warranted political sensitivities

10. **Provide SEIK comments in writing, never orally.** Also, remember that SEIK comments represent a DOE position, so comments are never presented as the views of single reviewer. This is way SEIK reviewers are usually not identified in the SEIK comments. (A reviewer should call the appropriate EP EA coordinator if the responsible authority, proponent, or proponent's contractor wants to meet with the reviewer.)

11. **Write all comments with the knowledge that they are subject to the Access to Information legislation.** So, if you don't mean it, don't say it. In the future, all comments, including memoranda from individual reviewers, will be included in the CEAA's electronic public registry.

12. **Prepare your comments as carefully as you would a peer-reviewed scientific paper.** This approach is important, especially if DOE comments eventually are quoted in the public press and become part of a politically sensitive debate.



Review Checklists, Legal Authorities, and Specialized Bibliographies

SEIK reviewers routinely use even more specific checklists and other content guidelines than those discussed in preceding subsections. These other checklists and guidelines are so extensive that copies of them are not presented below. Instead, the following discussion briefly profiles some of these other guidelines and suggests how SEIK reviewers might use the guidelines in their reviews of Environmental Assessments.

Review Checklists

Environmental Assessment Guidelines for the Provision of Specialist Information (Prepared by the Atmospheric Environment Program) (Appendix B)

These Guidelines address the following specific projects:

- A. Pulp and Paper Mills
- B. Thermal Powered Electricity Generation Plants
- C. Incinerators
- D. Oil and Gas Exploration Development, Production, and (Offshore) Transportation
- E. Petro-Chemical Processing
- F. Mines
- G. Nuclear Projects
- H. Airports
- I. Smelters
- J. Dams and Hydroelectric Generation Projects
- K. Marinas, Ports, Dredging, Offshore Structures and Undersea Facilities (Non-Oil and Gas)
- L. Highways and Ground Transportation

SEIK reviewers would find the preceding guidelines helpful when an Environmental Assessment includes any of the specific projects. Even more important, the preceding guidelines cover the following major issues that are often key issues used to determine the scope of an Environmental Assessment.

Issue 1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

Issue 2 Transboundary impacts on visibility.



- Issue 3 Impacts from water vapour emissions.
- Issue 4 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on federal Lands having no provincial/territorial jurisdiction (e.g., Indian Lands).
- Issue 5 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.
- Issue 6 Estimates of greenhouse gas emissions
- Issue 7 Impact of the environment on the project
- Issue 8 Impact of climate change on the project
- Issue 9 Impact of the project on the local climate.

Draft Guidelines for Conducting Environmental Assessments (Prepared by the Atlantic Region, Environment Canada) (Appendix C)

These draft guidelines apply to many common small projects covered under the Canadian Environmental Assessment Act:

- Projects Involving Fences
- Erosion/Siltation Prevention and Control
- Alternatives to Pressure-Treated Wood
- Freshwater Finfish Aquaculture
- Marine Shellfish/Finfish Aquaculture
- Landfills
- Peat Harvesting
- Wastewater Treatment

Legal Authorities

SEIK reviewers should always link comments to a relevant law, regulation, or policy. Therefore, reviewers often find that a consolidated list of laws, regulations, and policies to be helpful review tool. Such a list is available on pp. 69-87 of Environment Canada (1996), Policy and Procedures Manual, DOE Prairie and Northern Region, Regional Environmental Assessment Program.



Specialized Bibliographies for Reviewers

SEIK reviewers also use specialized references, often ones developed for a specific project and reflecting technical approaches to resource issues in that project.



**Factors in an EA
CEAA, Section 16 (1)**

- a) the environmental effects of the project . . . and any cumulative environmental effects
- b) the significance of [these] effects
- c) comments from the public
- d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects
- e) any other matter relevant (such as need for the project and alternatives)

Notes:

Content of an Environmental Assessment

The Canadian Environmental Assessment Act (CEAA) lists in Section 16 (1) and (2) the factors that must be considered for every proposed project. These factors constitute the minimum standards for an adequate environmental assessment.

Not all these factors, however, would be applicable to a single environmental assessment. As the CEAA itself provides, different proposed projects can and should be documented and processed in very different ways. Some proposed projects need only a simple screening. Other more complex projects would require a comprehensive study. Even more complex and politically sensitive projects would require a mediation or panel review.

Regardless of the legally mandated CEAA level of analysis and documentation, both project proponents and federal and provincial departments should keep the following principles in mind as they integrate the Section 16 factors into their project planning activities.

- **Don't take information or conclusions for granted.** Things obvious to the proponent or the responsible authority are not always obvious to members of the public. A proponent might not need, for example, to write up the purpose and need for a project, but a written explanation of the purpose and need would help both technical reviewers of the project and members of the public.
- **Distinguish between honest analysis of the environmental effects and self-fulfilling justifications of the project.** Insofar as possible, documents prepared for an environmental assessment should be complete and honest presentation of data and interpretations.



7

**Factors in an EA
CEAA, Section 16 (2)**

- (a) *the purpose of the project*
- (b) *alternative means of carrying out the project . . . And the environmental effects of any such alternative means*
- (c) *any follow-up program*
- (d) *the capacity of any renewable resources that are likely to be significantly affected*

Notes:

- **Be willing to admit to problems in a project and to analyze alternative ways to address these problems.** An honest discussion of project problems and of how to solve these problems fosters credibility with the responsible authority and with members of the public.
- **Solicit public comments early in the assessment process.** Knowing what the public is thinking will help avert last-minute changes in scope based on newly discovered information as well as unexpected public perceptions about this information.
- **Stipulate an appropriate scope for the assessment.** Scope originates with the extent of proposed project activities, but it also includes the spatial extent of effects, the duration of effects, and analysis methodologies that are deemed appropriate for the assessment. Record clearly all decisions about the scope, especially decisions to exclude some areas and topics from the scope of the environmental assessment.



8

Questions for a Checklist for Reviewers

3. *Is your area of expertise a major resource issue?*
4. *Do you agree with the predicted direct, indirect, and cumulative impacts?*
5. *Are proposed mitigation measures appropriate and likely to be effective?*
6. *Is proposed monitoring adequate given the context and intensity of the impacts?*
7. *Are management strategies and responsibilities adequate?*
8. *Are proposed follow-up actions adequate.*

Notes:

Questions for a Technical Reviewer

The overall adequacy of an environmental assessment depends upon the adequacy of its parts, especially the technical analyses of each affected resource.

Technical reviewers naturally focus on their primary area of expertise and responsibility, which is usually a single affected resource. Judgments about a single resource, however, often have implications that might affect other resources.

Thus technical reviewers have two responsibilities: (1) to determine if the effects on a single resource are adequate and (2) to link this determination to broader implications for the entire environmental assessment.

The questions in Overhead 2 focus on the technical analysis of a single resource, but each question also links with one or more of the factors listed in Section 16 of the CEAA.

Overhead 8 presents only the major questions from A Checklist for Reviewers (pp. 2-5 in *A Guide for Reviewers*). The checklist also lists sub-questions for each of the major questions.



Environmental Assessment (EA) Summary	
1.0	Introduction and Overview to the Proposed Project <ul style="list-style-type: none">• Summary of Proposed Project• Purpose (Objectives, Need, and Scope)• Responsible Federal Agencies and Provincial Departments• Issues from the Public and Other Agencies• Federal or Provincial Permits and Licenses
2.0	Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives
3.0	Affected Environment
4.0	Environmental Effects

Notes:

The Logic Behind the EA Summary

Chapters 1.0 and 2.0 combine to present a good summary of the entire Environmental Assessment.

Chapter 1.0 describes the proposed project and identifies the purpose, need, and scope for the project. Chapter 1.0 also summarizes public comments, especially those comments mentioning resource issues that need to be addressed. Finally, Chapter 1.0 identifies any permits or licenses required by the proposed project.

Chapter 2.0 both describes the alternatives and compares the environmental effects of the alternatives. The effects presented in Chapter 2.0 represent a summary of the detailed effects analyses presented in Chapter 4.0

Readers of Chapters 1.0 and 2.0 will gain a good sense of the entire proposed project and often will not need to read Chapters 3.0 and 4.0.

Chapters 3.0 and 4.0 constitute the detailed backup information. Chapter 3.0, entitled the Affected Environment, describes the baseline environmental conditions within and near the area of the proposed project. Chapter 4.0 analyzes the environmental effects on the baseline conditions. Chapter 4.0 is the premier scientific or technical chapter.

Chapter 5.0 lists the preparers of the EA Summary, along with a brief summary of their experience and academic credentials.

Chapter 6.0 lists those individual, groups, and governmental departments that contributed information to the EA Summary.



10

CEAA and the EA Summary (Slide 1)	
Section 16 (1)	EA Summary Chapters
(a) the environmental effects of the project ... And any cumulative environment	4.0 and 2.0 (summary)
(b) the significance of [these] effects	4.0
(c) comments from the public	1.0
(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects	2.0
(e) any other matter relevant (such as need for the project and alternatives)	1.0 and 2.0

Notes:

Section 16 Content and the EA Summary

As Overheads 10 and 11 show, every environmental and decision making factor that the CEAA includes in Section 16 has an assigned place and role in the EA Summary.

The CEAA factors seem to appear in no logical order, merely a shopping list of points to cover. In contrast, the proposed contents for the EA Summary follow a predictable pattern, one that readers can rely on.

This predictable organizational pattern is as follows. Chapters 1.0 and 2.0 combine to provide readers with all the essential details about the proposed project and its alternatives. Chapter 3.0 and 4.0, while valuable, present the technical details. As such, Chapters 3.0 and 4.0 are usually the most technically dense ones in the EA Summary.

11

CEAA and the EA Summary (Slide 2)	
Section 16 (2)	EA Summary Chapters
(a) the purpose of the project	1.0
(b) alternative means of carrying out the project ... and the environmental effects of any such alternative means	2.0 and 4.0
(c) any follow-up program	2.0
(d) the capacity of any renewable resources that are likely to be significantly affected	3.0 and 4.0

Notes:



12

What Are Major Environmental Issues?

- An issue is any environmental resource that will be affected by the proposed project or one of the action alternatives.
- A major environmental issue is a resource that will be potentially affected to a significant degree.

Notes:

The Role of Environmental Issues in the EA Summary

An **issue** is any environmental resource that will be affected by the proposed project or one of the action alternatives.

As the flowchart in Overhead 12 shows, environmental issues originate when someone (the project proponent, the responsible authority, or a member of the public) believes that a proposed project might have environmental impacts that are unacceptable.

Whether these environmental impacts will occur and whether they will be unacceptable are usually unknowns until late-stage project planning and analysis is completed.

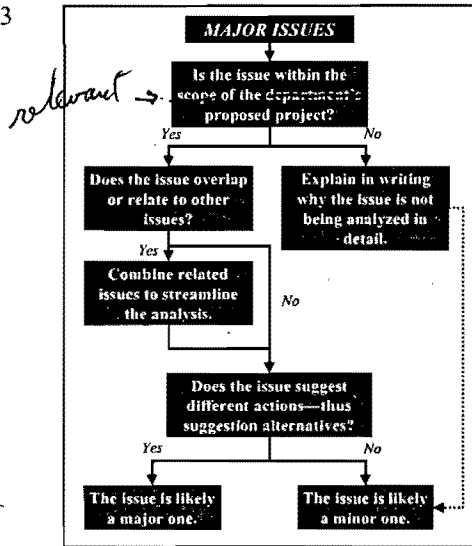
Still, an early list of potential environmental issues is a good planning step even if some of the issues turn out to be minor or even irrelevant.

A **major environmental issue** is a resource that will be potentially affected to a significant degree.

Some resources, such as air quality and water, are likely to be major environmental issues in any project that involves substantial on-the-ground activities. Other resources, such as wildlife or cultural resources may or may not be major issues. In the case of wildlife, if the proposed project has only minor effects on nearby wildlife, then wildlife would not be a major environmental issue. If no wildlife (or wildlife habitat) exists in the project area, then the effects on wildlife would not even be an issue.

Distinguishing between major issues and minor issues is an important step in deciding upon the scope of an environmental assessment.

13



Notes:

clump : regrouper cluster



14

The Role of a Major Resource Issue

- *Will require detailed and expensive analyses of effects*
- *Will cause design changes in the proposed project*
- *Will justify the inclusion of one or more mitigation actions*
- *Will be a major criteria in deciding just what version of the proposed project to permit (implement)*

Notes:

- *Elevate the level of the aso°*

As Overhead 14 suggests, major issues require much more time (and money) because they will usually require detailed mitigation actions. Also, major issues are usually the source of disputes between supporters of a proposed project and those who oppose the project.

If, for example, cultural resources turns out not to be major environmental issue, then the EA Summary would need to have only a brief discussion of cultural resources. Usually, this discussion would reference backup studies that confirmed that cultural resource either did not exist in the project area or were, if they existed, of limited value.



15

Two Definitions of the No-Project Alternative

1. Do not implement the proposed project.
2. Continue the existing management of a facility or of a geographical area.

Notes:

Proposed Project and Alternatives

As Section 16 of the CEEA indicates, every comprehensive study, every mediation, and every assessment by a review panel, shall include "alternative means of carrying out the project" (Section 16(2) (a)). The CEEA mandate means that to be adequate, an environmental assessment must discuss these alternative means (more commonly called alternatives).

Alternatives are important because they are a commonsense way to assess the effects of the proposed project. If a proposed project will cause X effects on fisheries habitat, what effects will an alternative to the proposed project cause. Will this alternative cause X+1 effects (an increase) or will it cause X-1 (a decrease)? An alternative provides a valuable way for lay readers and reviewers to decide if certain projected effects are reasonable and are worth the cost of implementing the proposed project.

16

Changing Versions of the Proposed Project Alternative

- Proposed Project (Proponent's Initial Project Plan)
- Proposed Project (Initial Plan with Preliminary Changes)
- Proposed Project (Even More Changes)
- Proposed Project (as Analyzed in a Comprehensive Study)

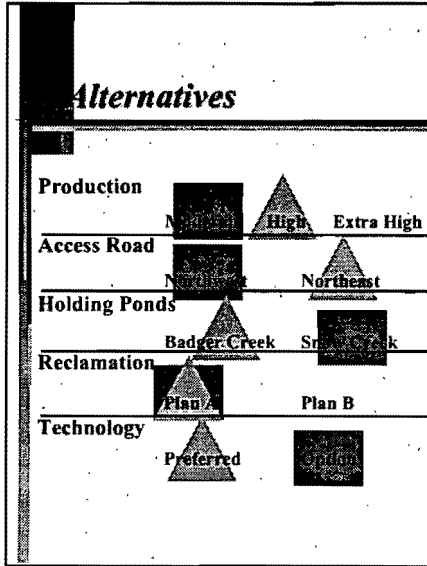
Notes:

For conceptual reasons, the no-project alternative is probably the best baseline for judging a proposed project. So, if a mining company proposed a new mining project, the baseline situation would be the existing environmental conditions at the proposed site.

Alternatives thus serve two purposes. The no-project alternative provides the environmental baseline against which to judge a proposed project. The other action alternatives help measure the comparative costs and benefits of different versions of the proposed project.



17



Notes:

18

Naming and Numbering of Alternatives

Option 1 (Recommended)	Option 2 (Not Recommended)
Alternative 1: No Project	No Project
Alternative 2: Proposed Project	Proposed Project
Alternative 3: An Action Alternative	Alternative 1
Alternative 4: Another Action Alternative	Alternative 2

Notes:



19

**"Environment"
CEAA, Section 2**

"Environment" means the components of the Earth, and includes

- (a) land, water and air, including all layers of the atmosphere
- (b) all organic and inorganic matter and living organisms, and
- (c) the interacting natural systems that include components referred to in paragraphs (a) and (b)

Notes:

Environmental Effects in the CEAA

An environmental effect must conform to relevant definitions in the CEAA, Section 2. Overhead 19 has the CEAA definition of "environmental." Overhead 20 has the CEAA definition of "environmental effect."

From the definition of "environmental," physical and biological resources are primary CEAA concern. Social and economic effects are included only by implication and then when it effects on physical and biological resources are the cause of social and economic effects.

20

**"Environmental Effect"
CEAA, Section 2**

"Environmental Effect" means, in respect of a project,

- (a) any change that the project may cause in the environment
 - on health and socio-economic conditions
 - on physical and cultural heritage
 - on current use of lands and resources for traditional purposes by aboriginal persons
 - on any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance
- (b) any change to the project that may be caused by the environment whether any such change occurs within or outside Canada

Notes:

The definition of an "environmental effect" confirms the primary role of effects on physical and biological resources. In subsection (a) effects on health and socio-economic conditions arise only if there has been a "change that the project may cause in the environment."

The CEAA definitions are, however, quite general in nature. The definitions provide no guidance on how to measure or assess effects. And no language in these CEAA definitions will help technical specialists decide if an effect is significant.



Categories of Effects

- *Direct Effects*
- *Indirect Effects*
- *Cumulative Effects (Past, Present, and Future)*
- *Significant Adverse Effects (Reserved for the Responsible Authority)*
- *Sustainability of Resources*
- *Irreversible Commitments of Resources*

Notes:

Categories of Effects

Overhead 21 lists some of the commonly used categories used to identify environmental effects. A resource specialist using this list of categories will not overlook major effects.

These categories are, however, difficult to apply to a specific project because they overlap and often appear to contradict each other. For example, a cumulative effect can be direct or indirect and it may be adverse, but is it significant, at least from the CEAA perspective? Or, to use another example, are all irreversible commitments of resources significant? The answer depends on the context and intensity of the effects. In each of these cases, technical experts need to decide on the context and intensity of the effects, which will usually be unique conditions of a specific project.

These categories do not appear in the CEAA in a single list, but they are implied within various subsections of the law.



22

Steps for Determining Significant Adverse Effects

- Step 1: Deciding whether the environmental effects are adverse
- Step 2: Deciding whether the adverse effects are significant
- Step 3: Deciding whether the significant adverse environmental effects are likely

Notes:

Significant Adverse Effects

The responsible authority for a project must determine if a proposed project will have significant adverse effects and if such effects can be justified.

Given the role of these legal determinations, most environmental assessments usually avoid labeling an effect as a "significant adverse effect." Instead, preparers of the EA Summary should discuss potential effects in a scientific and technical manner. Data and information about potential effects should be so clear and so conclusive that the responsible authority can use the data and information to support the determination that an effect is an adverse significant effect.

23

Criteria for Significant Adverse Effects

- Magnitude of the adverse environmental effects
- Geographic extent of the adverse environmental effects
- Duration and frequency of the adverse environmental effects
- Degree to which the adverse effects are reversible or irreversible
- Ecological context

Notes:

Thus, discussions of an affected resource should properly address the criteria listed in Overhead 23, but they should not label an effect as a "significant adverse effect."

in some case I threshold level which will not significant.



Summarizing Effects in the EA Summary

- Establish issue indicators and, when possible, thresholds
- Quantify effects using indicators and thresholds
- Explain any weighting or ranking systems
- Display effects in a summary graphic, usually a matrix in Chapter 2.0

Notes:

project the effect in the future

Summarizing Effects in the EA Summary

Chapter 4.0 (Environmental Effects) is the main chapter in an EA Summary for the discussion of environmental effects. This chapter is the scientific and technical heart of the environmental assessment. Chapter 4.0 is usually the hardest chapter for members of the public to read, precisely because it is a technical and scientific chapter.

Given the difficult nature of Chapter 4.0, the proposed outline for the EA Summary suggests presenting in Chapter 2.0 a summary of the environmental effects analyzed in Chapter 4.0. This Chapter 2.0 summary should be as readable and as accessible as possible. The challenge for writers of Chapter 2.0 is to present difficult technical and scientific concepts in a manner that will allow the responsible authority and members of the public to understand the context and intensity of the potential effects.



25

What is Mitigation?

The elimination, reduction or control of adverse environmental effects of the project and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means

Notes:

The Role of Mitigations

Mitigations are a crucial component of any proposed project. During the project planning process, the proponent will usually discover adverse effects, perhaps even significant adverse effects.

For each adverse effect discovered, the proponent or the responsible authority should seek to develop a mitigation action to lessen or to eliminate the adverse effect. Such mitigation actions then become part of the proposed project.

The discovery of mitigation actions is a dynamic process. The proponent's initial proposed project may include some obvious mitigations. Later, perhaps in light of comments from the public, the proponent decides to include additional mitigations in the proposed project. Finally, the responsible authority may decide to negotiate with the proponent for the inclusion of even more mitigations.

26

Planning for Mitigation

- *Who is responsible for the mitigation actions?*
- *Who will fund these mitigations?*
- *When will these mitigations be implemented?*
- *Who will verify the completion of these mitigations?*

Notes:

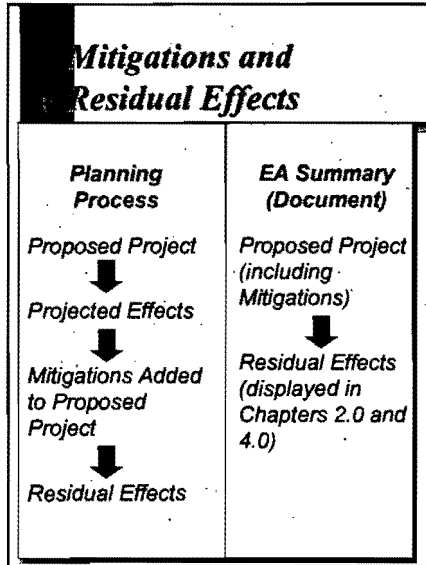
The final proposed project alternative should contain all mitigations necessary for the final permitting and implementation of the proposed project. Sometimes an environmental assessment will analyze alternatives with different combinations of mitigations. Such alternatives, as listed below, help show reviewer and members of the public just how effective different mitigations will be.

Alternative 1: No Project

Alternative 2: Proposed Project (with basic mitigations)

Alternative 3: Proposed Project (with basic mitigations and additional mitigations relating to potential water quality effects)

Alternative 4: Proposed Project (with basic mitigations and additional mitigations relating to both water quality and air quality effects)



Notes:

Residual Effects

Reviewers of an environmental assessment must distinguish between effects from an unmitigated project and the residual effects from a project including mitigations.

Of these two categories of effects, residual effects are the more important, especially to technical reviewers and to members of the public. Residual effects are more important because they convey to reviewers what effects are likely if the proposed project (including mitigations) is implemented.

The EA Summary should display and emphasize residual effects. In Chapter 2.0 the summary of effects should present residual effects. Non-mitigated effects are only important if the proponent has not agreed to mitigation as part of the proposed project. In this case, one alternative would be the proposed project without mitigations, and a second alternative would be the proposed project with mitigations.

Similarly, in Chapter 4.0 the emphasis should be on residual effects. The discussion may begin with some information about non-mitigated effects, but the key role of Chapter 4.0 is to present the residual effects that would occur assuming the implementation of the proposed project and all agreed-to mitigations.



28

What Is a Follow-up Program?

- A program to verify the accuracy of the environmental assessment of a project
- A program to determine the effectiveness of any measures taken to mitigate the adverse of the project

(Follow-up is often called monitoring)

Notes:

The Role of Follow-up Programs

As Section 16 of the CEAA notes, follow-up is a potential requirement in an environmental assessment.

Follow-up, often called monitoring, is important because predictions and estimates within an environmental assessment are uncertain at best. Given the inevitable uncertainty, the responsible authority and members of the public rightly want to know if what the environmental assessment stated has turned out to be true.

Initially, a follow-up program verifies that implementation actions within a proposed project occurred as they were supposed to occur.

Next, a follow-up program attempts to validate that the assumptions in the environmental assessment were accurate.

29

When Is a Follow-up Program Appropriate?

- A Responsible Authority must design and implement a follow-up program when one of the following conditions occur:
 - The project involves new or unproven technologies
 - The project involves new or unproven mitigation measures
 - A familiar project is proposed for a new or unfamiliar setting
 - The environmental analysis is based on new technologies or methodologies

Notes:

Consider a project requiring a new type of fish ladder so that spawning fish can migrate around a blocked stream. A follow-up program would initially verify that the proponent constructed the fish ladder and was maintaining it in working order. Next, the follow-up program would survey spawning fish to validate that the fish ladder was successful in allowing the spawning fish to move upstream. As appropriate, the follow-up program might remain in effect for several years to account for yearly variations within spawning populations.

Finally, a successful follow-up program contains provisions for communicating its findings back to the responsible authority and to other technical specialists so that they can build these findings into future environmental assessments.



30

Some Suggestions for SEIK Comments

- Link comments to Section 12(3) of the CEAA
- Make comments clear, factual, and non-judgmental
- Identify data deficiencies and other unknowns
- Provide comments as early as appropriate
- Write all comments as if they would appear in the public press

Notes:

Responsibilities of SEIK Reviewers

Under the CEAA, Section 12 (3), the Department of the Environment has a legal obligation to provide specialist/expert information or knowledge (SEIK) to a responsible authority.

Such SEIK comments are extremely important contributions to the overall environmental assessment process, as outlined in the CEAA.

Because of their importance, comments should be accurately researched and carefully written. Suggestions for the preparation of the SEIK comments appear on pp. 6-10 of *A Guide for Reviewers*.

31

Sample Review Comments for Discussion (Slide 1)

1. Measurements from the Suncor stack found that PM is emitted at 2.6 t/d (Table 3-18, Golder, 1998), which is unfortunately double the estimated rate of 1.0 t/d used for dispersion predictions in this EIA (Tables B2-1 and B3-1).
2. The production of O₃ from biogenic Volatile Organic Compounds (VOCs) may be a significant factor and must be considered to understand the NO_x/VOCs/O₃ cycle in the Regional Study Area (RSA).

Notes:

Sample Review Comments

Overheads 31, 32, and 33 illustrate errors within comments from SEIK reviewers. Although the sample comments are based on actual Environment Canada review comments, the original wording has been changed to illustrate common errors.

Circle one or more questionable phrases within each of the sample review comments on overheads 31, 32, and 33. As necessary, review the SEIK review guidelines on pp. 6-10 of *A Guide for Reviewers*.



32

Sample Review Comments for Discussion (Slide 2)

- 3. Without application of the fully capable CALPUFF model for regulatory dispersion and deposition predictions, full approval of the Suncor proposal is impossible.
- 4. Recommended mitigations include the protection of trees older than 50 years and of prey species habitats (graminoid ferns) within riparian zones, buffer zones, and wildlife corridors.

Notes:

33

Sample Review Comments for Discussion (Slide 3)

- 5. Environment Canada cannot assess the potentially significant adverse impacts on wildlife until the proponent provides the location and extent of the proposed roads.
- 6. The proponent's assertion is accurate that impacts will be minimal within the Local Study Area (LSA). Unfortunately, the proponent is silent on how the proposed development will impact the Athabasca River Valley within the entire Oil Sands Regional Study Area. Environment Canada's approval of the EIA is contingent on the proponent's discussing the impacts on the RSA.

Notes:

ISSUES

environment

Compliance

Preparing the

.....
EA Summary

Guidelines

Regulations

ALTERNATIVE

PROCESS

ShIPLEY Environmental wishes to acknowledge the contributions and insights of Environment Canada. More specifically, we are indebted to Shauna Mercer, Rosaline Frith, Garry McLean, Anne-Marie Henry, Dale Kirkland, Warren Fenton, and Claire Michaud. We would also like to acknowledge Ryerson Christie from the Canadian Environmental Assessment Agency for his input and consideration.

Author: Larry H. Freeman, PhD

ShIPLEY Environmental, Inc.
420 West 1500 South, Suite 100
Bountiful, UT 84010
Phone (888) 270-2157
Fax (888) 270-2158
www.shipleynviro.com

Copyright © 1998 by Franklin Covey Co. All rights reserved.
Revisions prepared by ShIPLEY Environmental under exclusive license from Franklin Covey Co.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or use of any information storage or retrieval system, for any purpose without the express written permission of Franklin Covey Co.

9801-01
Printed in the United States of America

CONTENTS

PRELIMINARY INFORMATION

PREFACE	1
WHAT IS THE ENVIRONMENTAL ASSESSMENT (EA) SUMMARY?	2
SUGGESTED CONTENT FOR AN EA SUMMARY	3

PARTS OF AN EA SUMMARY

EXECUTIVE SUMMARY	7
CONTENTS	9

INTRODUCTION AND OVERVIEW OF THE PROPOSED PROJECT (CHAPTER 1.0)	11
--	----

COMPARISON OF ALTERNATIVES (CHAPTER 2.0)	21
--	----

AFFECTED ENVIRONMENT (CHAPTER 3.0)	33
--	----

ENVIRONMENTAL EFFECTS (CHAPTER 4.0)	43
---	----

LIST OF PREPARERS (CHAPTER 5.0)	54
---------------------------------------	----

LIST OF DEPARTMENTS, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE SUMMARY OF AN ENVIRONMENTAL ASSESSMENT ARE SENT (CHAPTER 6.0)	55
---	----

APPENDICES	56
------------------	----

INDEX	57
-------------	----

GLOSSARY	58
----------------	----

BIBLIOGRAPHY	59
--------------------	----

BUILDING ORDER INTO THE SUMMARY REPORT FOR AN EA	60
--	----

INDEX	I-1
-------------	-----



PREFACE

For over 20 years, federal agencies, provincial and territorial governments, and concerned citizens have been working to make environmental considerations an integral part of Canadian governmental decisions.

These efforts culminated in 1992, when the Canadian Parliament assented to the Canadian Environmental Assessment Act (CEAA). Under this act, the "Government of Canada seeks to achieve sustainable development by conserving and enhancing environmental quality and by encouraging and promoting economic development that conserves and enhances environmental quality" (Preamble to the CEAA).

As this initial clause from the preamble to the CEAA suggests, sustainable development has evolved into a primary goal. CEAA also recognized that achieving this goal would require broad cooperation outside the government. Thus, one of the purposes of the law was "to ensure that there be an opportunity for public participation in the environmental assessment process" (Section 4(d)).

With its emphasis on public participation, CEAA is a law of disclosure. Proponents must disclose to responsible authorities and to the public what Canadians gain or lose with each decision that has environmental implications. Well-written, analytic environmental assessments are essential if the public is to understand the purpose and scope of the many projects covered by CEAA.

Despite technical and scientific progress, environmental assessments still include difficult, inexact scientific forecasts. The human species' thirst for resources and ability to pollute exceed each prior year's predictions and projections. With such an unpredictable and uncontrollable human environment, few are confident in current environmental forecasts; many are ready to go to court.

In the following pages, we suggest ways to make environmental assessments more accurate and readable and, therefore, more compliant with the letter and spirit of CEAA.

WHAT IS THE ENVIRONMENTAL ASSESSMENT (EA) SUMMARY?

The guidance in this manual outlines the content and organization for the summary that would accompany written records that constitute an environmental assessment.

The general term "environmental assessment" includes both environmental processes and environmental reports. This general term replaces several competing terms: "environmental impact assessment", "environmental impact study", and "environmental impact analysis". For purposes of consistency, guidance in this manual uses only the term "environmental assessment", not these competing terms.

The CEAA definition of "environmental assessment" focuses on processes, not the parallel written records. In practical terms, however, processes don't exist until key steps or phases are recorded for future study and analysis.

See the CEAA definition of "record" for an indication of how diverse the records for an environmental assessment can be.

The summary for an environmental assessment is what Environment Canada reviewers would use to guide them in their review of the records for an environmental assessment. This summary would also be the starting point if a responsible authority required a proponent to prepare a screening report or a comprehensive study report. See the CEAA definitions for "screening", "screening report", and "comprehensive study".

CEAA

Section 2

"**Comprehensive Study**" means an environmental assessment that is conducted pursuant to section 21 and that includes a consideration of the factors required to be considered under subsections 16(1) and (2)

"**Environmental Assessment**" means, in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with this Act and the regulations

"**Record**" includes any correspondence, memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, photograph, film, microform, sound recording, videotape, machine readable record, and any other documentary material, regardless of physical form or characteristics, and any copy thereof

"**Screening**" means an environmental assessment that is conducted pursuant to section 18 and that includes a consideration of the factors set out in subsection 16(1)

"**Screening Report**" means a report that summarizes the results of a screening

SUGGESTED CONTENT FOR AN EA SUMMARY

*CHAPTER 1 + CHAPTER 2 =
MANAGERIAL INFORMATION*

Executive Summary
Table of Contents
Issue Tracking Matrix

1.0 Introduction and Overview of the Proposed Project

- 1.1 Explain **who** wants to do **what** and **where** and **why** (the purpose) they want to do it.
- 1.2 Explain any other environmental assessments (screenings or comprehensive studies) that influence the scope of this environmental assessment.
- 1.3 Explain the decision(s) that must be made and identify any Federal departments or provinces involved in this environmental assessment.
- 1.4 Summarize public participation and introduce the major resource indicators (major issues). As appropriate, identify minor issues considered but discarded from detailed analysis.
- 1.5 List federal, provincial, or municipal permits, licenses, authorizations, regulations, and entitlements necessary to implement the project.
- 1.6 Preview the remaining chapters of the environmental assessment (screenings or comprehensive studies).

2.0 Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives

- 2.1 Explain that this chapter describes the alternatives including the proposed project, no project, and other action alternatives. Also, remind readers that this chapter summarizes the environmental effects of these alternatives, but that the full analysis of environmental effects appears in Chapter 4.
- 2.2 Describe all alternatives. Your descriptions should include all connected actions, projected outputs, and any necessary mitigations.
- 2.3 Explain how these alternatives are reasonable alternatives in light of the objectives (selection criteria) given in Chapter 1. As part of this explanation, describe briefly alternatives eliminated from detailed study and explain why they were eliminated.
- 2.4 Compare the alternatives by summarizing their environmental impacts. Potential actions and outputs would cause these impacts.

**CHAPTER 3 + CHAPTER 4 =
SUPPORTING INFORMATION**

3.0 Affected Environment

- 3.1 Explain that this chapter presents relevant resource components of the existing environment—that is, the baseline environment. As appropriate, preview the chapter contents so that readers can readily find subsections.
- 3.2 Resource X (Major Issue 1)
- 3.3 Resource Y
- 3.4 Resource Z (Major Issue 2)

NOTE 1: Include **all** relevant physical, biological, social, and economic features of the human environment. Use the same order or sequence of resources in Chapters 3 and 4.

NOTE 2: Major issues (key resource indicators) should receive more extensive discussion than minor issues. For tracking, cross-reference resources with the relevant major issues.

4.0 Environmental Effects (organizational option 1)

- 4.1 Explain that this chapter is organized by resources.
- 4.2 Effects on Resource X (Major Issue 1)
 - 4.2.1 Alternative A (No Project)
 - 4.2.2 Alternative B (Proposed Project)
 - 4.2.3 Alternative C (Short Title)
 - 4.2.4 Alternative D (Short Title)
- 4.3 Effects on Resource Y
 - 4.3.1 Alternative A (No Project)
 - 4.3.2 Alternative B (Proposed Project)
 - 4.3.3 Alternative C (Short Title)
 - 4.3.4 Alternative D (Short Title)
- 4.4 Effects on Resource Z (Major Issue 2)
- ...
- 4.10 Significant Adverse Effects
- 4.11 Sustainability of Resources
- 4.12 Irreversible Commitments of Resources
- 4.13 Any Other Disclosures

4.0 Environmental Effects(organizational option 2)

4.1 Explain that this chapter is arranged by alternatives.

4.2 Effects of Alternative A (No Project)

4.2.1 Resource X (Major Issue 1)

4.2.2 Resource Y

4.2.3 Resource Z (Major Issue 2)

4.3 Effects of Alternative B (Proposed Project)

4.3.1 Resource X (Major Issue 1)

4.3.2 Resource Y

4.3.3 Resource Z (Major Issue 2)

4.4 Effects of Alternative C (Short Title)

4.4.1 Resource X (Major Issue 1)

4.4.2 Resource Y

4.4.3 Resource Z (Major Issue 2)

4.10 Significant Adverse Effects

4.11 Sustainability of Resources

4.12 Irreversible Commitments of Resources

4.13 Any Other Disclosures

5.0 List of Preparers

6.0 List of Departments, Organizations, and Persons to Whom Copies of the Screening or Comprehensive Study Are Sent

Index

Appendices (if any) Note: Some other sections can be either one of the appendices or a separate chapter

Public Participation Report

Bibliography

Glossary (Terms, Abbreviations, and Acronyms)

Maps

EXECUTIVE SUMMARY

SUGGESTED CONTENT

- A. Introduction and Overview of the Proposed Project (Chapter 1.0)
- B. Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives (Chapter 2.0)
- C. Affected Environment (Chapter 3.0)
- D. Environmental Effects (Chapter 4.0)

Note: The organization parallels in miniature the recommended format of a screening or a comprehensive study. If necessary (and appropriate), add other information and headings.

SUGGESTIONS FOR WRITING

Executive Summary

1. All of the essential information that is contained in the environmental assessment summary should be in the executive summary; repetition of information is inevitable.

Ordinarily an executive summary should be no longer than three or four pages, but an executive summary for a complicated environmental assessment might be 15 or 20 pages long. Such a lengthy executive summary is necessary if the executive summary circulates without any accompanying documents.

We recommend organizing the executive summary by using section headings that parallel the main chapter headings in the environmental assessment summary.

2. Whatever section headings you choose for the summary, include the following information:
 - Explain **who** wants to do **what** and **where** and **why** (the purpose) they want to do it.
 - Explain the decision(s) that regulators must make.
 - Describe the potential major impacts of all alternatives, with emphasis on the alternative that the proponent is proposing.

- Briefly identify the alternatives that were considered.
 - Discuss the areas of controversy. Make sure you accurately summarize the major issues.
3. If you know that the executive summary will be distributed separately, write a more detailed 10- to 15-page document and include appropriate graphics, such as a map and a matrix that compares the effects of the alternatives. These graphics will likely be duplicates of ones in the body of the environmental assessment.
 4. Use graphics, an open format, and other techniques to make the executive summary highly readable. Many readers will read only the executive summary.

CONTENTS

SUGGESTIONS FOR WRITING

Contents

1. Prepare a "Contents" for the environmental assessment summary, as illustrated in Example 4, which is the first page from an actual contents page for an environmental assessment. Some departments (and editors) prefer the previously used title: "Table of Contents". Editors today are more inclined to choose the shorter title.
2. Include first-level subsections in your table of contents so that readers can accurately locate content within the various chapters. Always also include second-level or even third-level headings, especially if you are writing a complex, long summary of an environmental assessment.
3. Here and elsewhere in the environmental assessment summary report, choose headings that help readers keep track of where they are. As in example 3, add clarifying words or phrases throughout.

4. As in example 4, you may number headings and subheadings. Many early environmental assessments used a standard outline numbering system: I, A, 1, a, etc. Others used a scientific system: 1.0, 1.1, 1.1.1, 1.1.2, etc. More recently, editors are relying on different type styles and sizes to differentiate lower-level headings.

We recommend retaining numbers for chapter headings and the second-level headings. Lower-level headings need not be numbered, but the formats for these lower-level headings should be clear to readers.

5. Number the pages of your preliminary materials (such as the contents and the executive summary) with small Roman numerals: i, ii, etc. As an option, you could number the executive summary in this manner: S-1, S-2, etc.
6. Number the pages either sequentially from the beginning of the document to the end or chapter by chapter (3-5, 3-6, etc.) with the chapter number coming before the en dash. An en dash is longer than a hyphen, but shorter than a normal dash (called an em dash).

THIS	4.4.3 Direct Effects on Water Quality
	<i>or</i>
	4.4.3 Direct Effects (Water Quality Issue)
NOT THIS	4.4.3 Direct Effects

EXAMPLE 3—*Substantive headings help readers skip and scan for key points. Good headings tell a story.*

Contents	
List of Tables	iii
List of Figures	v
Issue Tracking Matrix	vi
Summary	ix
Chapter 1.0 Introduction and Overview of the Proposed Project	
1.1 Introduction	1
1.2 Decision Needed	2
1.3 Scoping Summary	3
1.4 Relevant Issues	4
1.5 Summary of Prior Legal Action	8
Chapter 2.0 Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives	
2.1 Alternatives Considered	11
2.2 Range of Alternatives and Alternatives Eliminated	13
2.3 Summary of the Environmental Effects of Alternatives	23
2.4 Identification of the Agency Preferred Alternative	22

7. Number appendices by using the appendix letter (or number) along with a page number: A-1, A-2, etc. Usually, an en dash comes between the appendix letter (or number) and the page number.
8. As a supplement to the traditional contents page(s), consider including a matrix displaying how each chapter (section) of the summary responds to the major issues. See example 8.

If you decide to include this matrix, place it either following the contents or at the end of the summary (on a foldout sheet).

EXAMPLE 4—Always include second-level headings in your contents. Third- or fourth-level headings are optional, but they would help your readers visualize the whole EA.

Issue Tracking Matrix							
Issues	Summary	1.0 Introduction & Overview	2.0 Alternatives	3.0 Affected Environment	4.0 Environmental Effects	Appendix A Public Involvement	Appendix B
1. Soil Stability	2	4-5	8, 10-11	18-21	49-52, 68	A-3, A-5	B-6, B-11, and B-15
2. Water Quality	2-3	5	8, 11-12	21-24	53-57, 68-69	A-3, A-5	B-5, B-8, and B-20
3. Wildlife	3	5-6	8, 13	27-30	60, 64, 69-70	A-5, A-14, A-20, and A-24	B-13 and B-22

EXAMPLE 8—An issue tracking matrix tells readers you have covered each issue thoroughly and consistently.

INTRODUCTION AND OVERVIEW OF THE PROPOSED PROJECT (CHAPTER 1.0)

SUGGESTED CONTENT

1.0 Introduction and Overview of the Proposed Project

- 1.1 Explain **who** wants to do **what** and **where** and **why** (the purpose) they want to do it.
- 1.2 Explain any other environmental assessments (screenings or comprehensive studies) that influence the scope of this environmental assessment.
- 1.3 Explain the decision(s) that must be made and identify any federal or provincial departments involved in this environmental assessment.
- 1.4 Summarize public participation and introduce the major resource indicators (major issues). As appropriate, identify minor issues considered but discarded from detailed analysis.
- 1.5 List Federal, provincial, or municipal permits, licenses, authorizations, regulations, and entitlements necessary to implement the project.
- 1.6 Preview the remaining chapters of the environmental assessment summary.

SUGGESTIONS FOR WRITING

1.0 Introduction and Overview of the Proposed Project

- 1.1 Explain who wants to do what and where and why (the purpose) they want to do it.
 - 1.1.1 Open with a brief summary of the proposed project. This statement sets up the following detailed explanation of the why (the purpose) for both the proposed project and the other alternatives. See example 1.1.1.
 - 1.1.2 Explain the purpose for the proposed project in terms of the department or external proponent that is proposing the project. Begin by explaining the on-the-ground purpose, **not** the legal requirement to prepare a screening or a comprehensive study.
 - 1.1.3 Briefly explain the role of the environmental assessment and the associated screening report, comprehensive study, mediation, or panel review. As appropriate, refer to CEAA Section 16, which lists the topics potentially included in these legal documents (or phases).

The Provincial Government of Saskatchewan proposes to undertake restoration activities on the shores, islands, and riparian habitats in and around Redbury Lake. This proposed project will primarily involve student and adult volunteers. Overall, some XXX acres of wildlife habitat will be restored during the summer of 1998. The area will also be better able to serve as a Migratory Bird Sanctuary.

EXAMPLE 1.1.1—*The lead sentence in 1.0 is actually a brief summary of the proposed project.*

1.1.4 List and explain project objectives.

Objectives arise from many sources: a federal or provincial law, department mission, a prior environmental assessment, or another department's objective (perhaps based on a Federal or provincial law).

As you write the summary to an environmental assessment, list the objectives, as illustrated in Example 1.1.4. As appropriate, tell readers just how firm or binding an objective must be. For instance, a Federal law authorizing a water supply project might set a fisheries objective dealing with salmon spawning (say 50 percent annual increase by the end of the decade). This objective is a fixed target, although even in this instance the Federal department might find that the 50 percent increase is impossible. Or an even clearer example, if a provincial water quality standard specifies a maximum amount of sediment in a stream, then all reasonable (potentially legal) alternatives would need to achieve this standard.

B. Project Objectives

1. To undertake restoration activities on the shores, islands, and riparian habitats, specifically:
 - a. Restore Gull Island to its former no-access status (except for its western tip and south-western beach)
 - b. Remove accumulations of garbage, herbicide and pesticide containers, etc. along the full length of Oscar Creek.
 - c. Conduct a similar sweep along the length of Lost Creek.
2. To create volunteer programs with private landowners and independent groups to mitigate the negative effects of past agricultural and recreational activities on riparian habitats and wildlife.
3. To involve young people (both high-school students and young families) in the foregoing assessment and to provide appropriate training and tools for the on-going monitoring of the impacts of human activity on water quality and wildlife populations.
4. To take an ecological snapshot of the watershed, including its riparian and upland habitats, and the possible impacts of human activities.

EXAMPLE 1.1.4—Project objectives (also called goals or the mission) are key starting points in any environmental assessment.

CEAA

Section 16

(1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- (b) the significance of the effects referred to in paragraph (a);
- (c) comments from the public that are received in accordance with this Act and the regulations;
- (d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and
- (e) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project, that the responsible authority or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered.

Finally, avoid listing as objectives the project activities that you are proposing. For instance, an improper objective would be to build a 3-mile extension to road 183. The actual objective would possibly be the need to provide year-round access to a stream monitoring station. In this case, maybe a road is unnecessary because a helicopter would be more environmentally desirable. A sound objective usually allows different alternatives as ways to achieve the objective.

1.1.5 Objectives are also important because they help a department to define the minimum standards that the proposed action and alternatives must meet. Conceptually, these standards, sometimes called selection criteria, help the agency define the range of reasonable alternatives it will analyze in a screening or a comprehensive study.

As an example, consider a proposed project dealing with a new vehicle maintenance facility. The department proposing such a project surveys its current fleet of vehicles, analyzes maintenance records, and projects the number of additional vehicles to be added to the fleet. Based on this data, the department estimates that it needs at least eight repair bays or a minimum floor space of 5,500 square feet.

This estimate of needed floor space becomes a minimum standard, and all alternatives analyzed should include floor space of about 5,500 square feet. An alternative that allocated only 3,500 square feet would not be a reasonable alternative.

See the discussion in section 2.1.2 (pp. 21-22) for additional information about minimum standards.

1.1.6 Include a location map to show **where** the action would take place if it were implemented. Be sure to prepare a location map that is tailored to the specific environmental assessment, not one from your map file.

1.2 Explain any other environmental assessments (screenings or comprehensive studies) that influence the scope of this environmental assessment.

1.2.1 As CEAA Section 24 suggests, explain the conceptual linkage between any prior environmental assessments and the environmental assessment you are working on. Note here and repeat in Chapter 2 any indication that one or more alternatives may not be consistent with this prior environmental assessment.

CEAA

Section 24

- (1) Where a proponent proposes to carry out, in whole or in part, a project for which an environmental assessment was previously conducted and
 - (a) the project did not proceed after the assessment was completed,
 - (b) in the case of a project that is in relation to a physical work, the proponent proposes an undertaking in relation to that work different from the proposed when the assessment was conducted,
 - (c) the manner in which the project is to be carried out has subsequently changed, or
 - (d) the renewal of a license, permit, approval or other action under a prescribed provision is sought,the responsible authority may use or permit the use of that assessment and the report thereon to whatever extent it is appropriate for the purpose of complying with Section 18 or 21.
- (2) Where a responsible authority uses or permits the use of an environmental assessment and the report thereon pursuant to subsection (1), the responsible authority shall ensure that any adjustments are made to the report that are necessary to take into account any significant changes in the environment and in the circumstances of the project.

1.2.2 These references to another environmental assessment should not be brief or cryptic. As in example 1.2.2, establish the specific links between the two environmental assessments. For example, if the prior environmental assessment allocated land to a pipeline corridor, that decision quite properly limits the scope of your proposed project within the same general project area. Be prepared to cite specific guidance, including full citations to the previous environmental assessment(s).

1.3 Explain the decision(s) that must be made and identify any federal departments or provinces involved in this environmental assessment.

1.3.1 The decision(s) to be made are directly connected to the scope of the proposed project (and ultimately, the alternatives and potential impacts).

According to the Goat Creek Planning EA, land on the north side of Summit Ridge provides moderate quality grazing for three existing allotments. According to the EA (p. 145), improved grazing is a goal, contingent on changes in grazing intensity and some seasonal restrictions. The present EA will address these changes in its alternatives.

EXAMPLE 1.2.2—Tiering requires careful page references to the prior environmental assessments.

- a. To deny the permit (no action)
- b. To approve the permit as submitted
- c. To approve the permit with specific management constraints and mitigation measures

EXAMPLE 1.3.1—The decisionmaker's options are important guides as to the possible scope of the alternatives to be analyzed.

For example, a federal department often has the option of proposing a project in a given fiscal year, such as the development of a hiking trail. Such a project is contingent on public need, department budgets, and prior environmental assessments. As early as possible, the decisionmaker needs to establish the scope for this proposed project. Will the trail system extend beyond the Sweet Creek drainage? Should a trailhead parking lot be part of the proposed project? These up-front decisions on scope should appear in a project initiation memo to the interdisciplinary team.

More important, the scope of the decisions to be made must be carefully explained in this section of Chapter 1. See example 1.3.1.

1.3.2 When the proposed project originates outside a federal department, as in a hydroelectric project or a mining project, the department's decision space is especially important.

1.3.3 Sometimes part of the decision might already have been made and recorded in a previous environmental assessment. For example, a corporation with an existing mining project might be requesting an operational expansion of the mine. If an environmental assessment exists for the current mining operation, then provisions of this original environmental assessment might have a legal bearing on any new environmental assessment being prepared to answer the corporation's request for an operational expansion.

1.4 Summarize public participation and introduce the major resource indicators (major issues). As appropriate, identify minor issues considered but discarded from detailed analysis.

1.4.1 Summarize public participation because any environmental assessment under Sections 18 and 22 of the CEEA, requires some degree of public participation. Remember that a full record of all public participation activities is properly part of the environmental assessment documentation. These activities should be referenced in a screening or a comprehensive study.

1.4.2 Mention your efforts to involve other departments, provinces, or municipalities.

1.4.3 Identify the major issues. An issue is an impact on a physical, biological, social, or economic resource. An issue is **not** an activity; instead, the predicted impacts of the activity create the issue.

Major issues are those resource impacts that are sufficiently severe or significant that the responsible authority for a proposed project would need to consider the impacts before making a decision.

CEEA

Section 18

(3) Where the responsible authority is of the opinion that public participation in the screening of a project is appropriate in the circumstances, or where required by regulation, the responsible authority shall give the public notice and an opportunity to examine and comment on the screening report and on any record that has been filed in the public registry established in respect of the project pursuant to section 55 before taking a course of action under section 20.

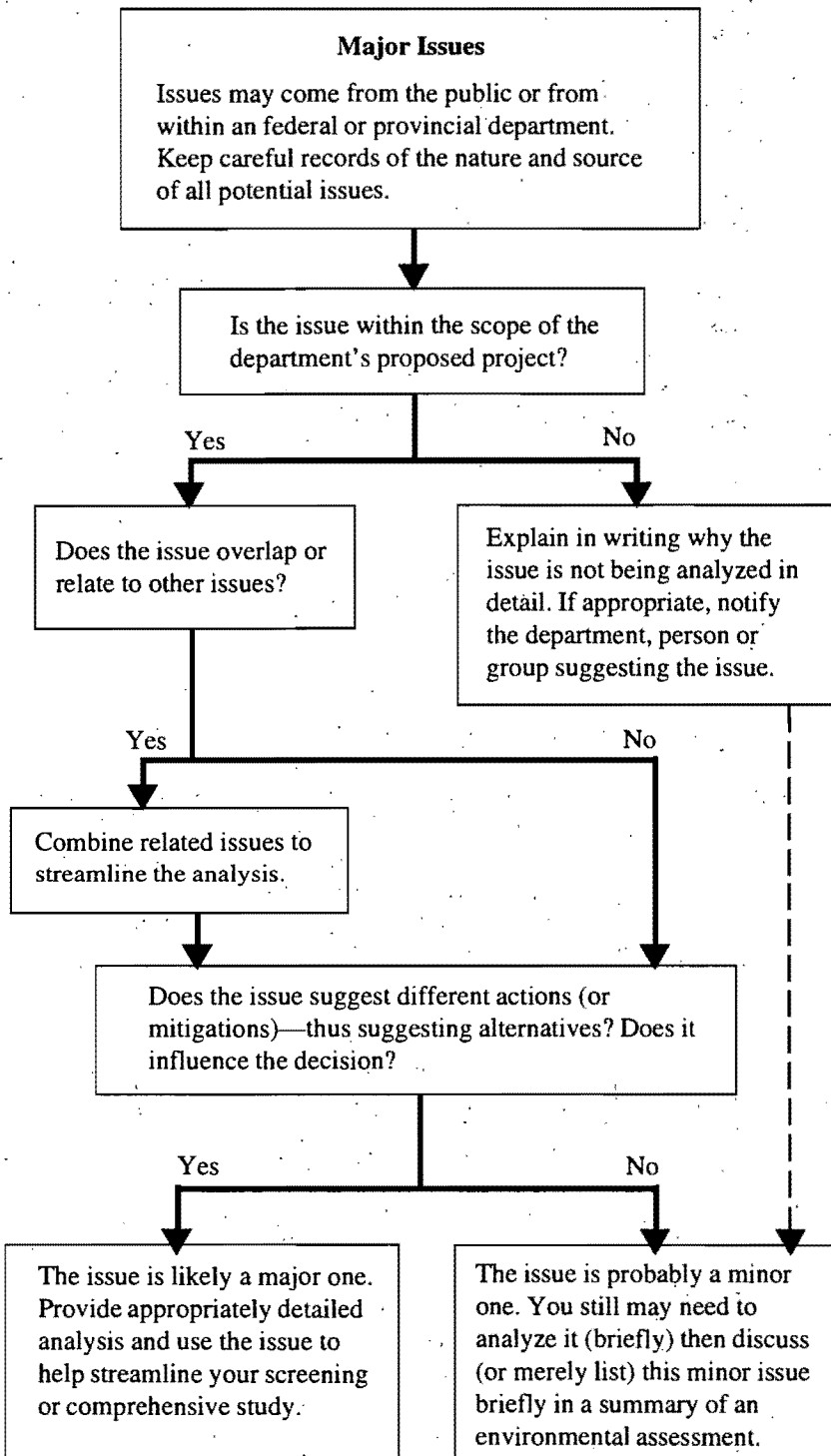
Section 22

(1) After receiving a comprehensive study report in respect of a project, the Agency shall, in any manner it considers appropriate to facilitate public access to the report, publish a notice setting out the following information:

- (a) the date on which the comprehensive study report will be available to the public;
- (b) the place at which copies of the report may be obtained; and
- (c) the deadline and address for filing comments on the conclusions and recommendations of the report.

(2) Prior to the deadline set out in the notice published by the Agency, any person may file comments with the Agency relating to the conclusions and recommendations and any other aspect of the comprehensive study report.

Major Issues



See the decision tree in example 1.4.3 for a conceptualization of how to determine which issues are major ones and which are minor ones. Note that you should record and track both major and minor issues, but major issues receive more attention and will be explicitly considered when making a screening or a comprehensive study decision.

EXAMPLE 1.4.3—Issues can arise at any time and from any source. The Federal or provincial department must carefully analyze and prioritize all potential issues.

1.4.4 Frame your major issues by mentioning, first, the project activities that will cause potential impacts. Next, explain how different potential impacts relate to each other. Your goal is to educate readers as to why a particular issue is major (and, thus, important to the decision at hand).

See examples 1.4.4-1 and 1.4.4-2 for ways to write up major issues. Other write-ups might begin with a question: "What will be the impacts on bighorn sheep?" Whatever approach you use, give readers enough information so that they can see why each issue is relevant to the scope of the proposed project and the decisions needed. Cite backup data and technical reports as necessary.

ISSUES FROM THE BELTRANE MINING EA SUMMARY

A. Impacts on the bighorn sheep

- Beltrane Mining vehicles might disturb bighorn sheep, causing them to move away from Road 28N to areas of less favorable habitat. Such a displacement could change the ratio of rams to ewes, which is a reflection of the viability of a population.
Indicator: ram/ewe ratios (%).
- Vehicular disturbance to bighorn sheep would be probable near the mineral lick and lambing area that adjoin Road 28N. This lambing area is one of five known for the sheep using the Sweet Canyon area (figure 3, p. 5). Disturbance close to the lambing area might affect the number of lambs surviving to adulthood.
Indicator: lamb survival (%).
- A decline in bighorn sheep near Road 28N would decrease existing recreational and educational opportunities to view and to study the sheep.
Indicator: RVDs (Recreation Visitor Days).

B. Increased erosion as well as a decrease in water quality because of either the heavy maintenance of Road 31S or the reconstruction of Road 31S

- Erosion might add sediment to the Big Muddy channel and perhaps contribute to the silting of the Lucas Reservoir.
Indicator: sediment.
- Aquatic organisms and fisheries in the Big Muddy and in the Lucas Reservoir probably would be harmed by a decline in water quality.
Indicator: number of catch or fish and their reproductive success rates.
- Water from the Big Muddy ultimately flows into Lucas Reservoir and then into Eastgate Reservoir, which is a source of municipal water. Removal of added sediment would increase the cost of water purification.
Indicator: cost (\$).

EXAMPLE 1.4.4-1—*Issues arise when the department (or another interested party) identifies an effect that they would like to avoid or mitigate. Use the issue statements to educate readers about what the problems and choices are.*

1.4.5 Mention what resource indicators (quantifications) you propose to use to measure the environmental impacts. In example 1.4.4-1, both the ram/ewe ratio and the annual survival rate of lambs would be key measures (indicators) of the effects on bighorn sheep in the project area.

As part of your write-up of the issue, you should list such indicators:

Indicators (Standards)
—Ram/ewe ratios
—Annual lamb survival

Such indicators, especially if listed in Chapter 1, become excellent tracking devices because the projected numbers would be displayed later in a screening or a comprehensive study (both in Chapter 2 and in Chapter 4).

ISSUES FROM THE BIG MEADOW GRAZING EA SUMMARY

Issue 1. Composition of Vegetation (Biodiversity)

Cattle grazing could weaken or even kill the native grasses, which currently constitute about 50 percent of the vegetation in Big Meadow.

Range analysis in 1976 and 1989 on an adjacent and similar range area shows that weedy herbaceous plants often replaced weakened and dying native grasses (Grazing Report in Appendix C). This decline in native grasses would permanently change in the natural biodiversity of the high meadow plant community (Pearson, A. L., pp. 74-75). This shift in vegetative composition could permanently decrease the usable and nutritious forage, either for livestock or for elk. (See issue 3 below.)

Indicator: Potential effects of the different alternatives will be estimated in light of the ratio of native grasses to weedy herbaceous plants.

Issue 2. Soil Erosion and Meadow Productivity

Some of the areas where grass could die have soil that is a highly erodible, silty loam (Soil Conservation Service, 1975). If exposed, this loam could erode, forming rills and gullies during heavy summer rainstorms. Any loss of surface soils would further impair the ability of Big Meadow to produce vegetation, particularly grass.

Indicator: Potential effects of the soil loss would be estimated in light of the number of acres likely to be subject to erosion. This acreage would be an indirect indication of the vegetative productivity.

Issue 3. Elk Grazing vs. Cattle Grazing

Decreased grass and lower vegetative productivity would have an effect on the elk that historically graze on Big Meadow primarily from July through October. Data from the Department of Natural Resources (Utah Department of Natural Resources, 1987), suggest that elk from the Unit 22 herd are relying on Big Meadow forage to carry them into the fall breeding season and into the often harsh winters.

Indicator: The estimated number of elk using Big Meadow constitute current grazing use, as measured in AUMs (Animal Use Months). Cattle grazing would consume additional AUMs and could deprive elk of necessary grazing.

EXAMPLE 1.4.4-2—Well-written, accurate issues educate readers about the potential effects of the proposed project and alternatives.

1.4.6 As appropriate, list and explain any minor issues discovered but considered not relevant for the purposes of your analysis. Often you need only refer readers to your public participation report.

1.5 List Federal, provincial, or municipal permits, licenses, authorizations, regulations, and entitlements necessary to implement the project.

1.5.1 Specify who (proponent, provincial department or private proponent) is responsible for obtaining the different permits. Often, as in mining projects, the person responsible will be the mining proponent. At times, however, a Federal department will need to obtain a permit, license, or an authorization.

1.5.2 In some cases, different alternatives may require different permits. Be sure to explain such differences either here or when you describe the alternatives in Chapter 2.

1.5.3 List, if appropriate, any provincial or municipal permits. For example, provinces have permit authority over water quality issues, and a Federal department has permit authority over projects affecting fisheries.

CEAA

Section 5

(1) An environmental assessment of a project is required before a federal authority exercises one of the following powers or performs one of the following duties or functions in respect of a project, namely, where a federal authority

(d) under a provision prescribed pursuant to paragraph 59(f), issues a permit or license, grants an approval or takes any other action for the purpose of enabling the project to be carried out in whole or in part.

1.6 Preview the remaining chapters of the environmental assessment (screening or comprehensive study).

1.6.1 This preview focuses primarily on what to expect in the remaining chapters, but you might also explain to readers the role of major issues in helping structure the environmental assessment summary.

1.6.2 This preview is unnecessary for many short environmental assessments, but most environmental assessments would be easier to read if this preview is included.

1.6.3 Some editors would prefer not to place this preview at the end of Chapter 1. As an option, these editors would prefer to write what is often called a preface telling readers how best to approach the content chapters that follow. This preface would usually be positioned after the table of contents and would be numbered with lowercase Roman numerals.

Other editors have chosen to include such information on a summary card that readers can use as a bookmark; in such cases, the card usually lists alternatives on one side, with guidance for readers on the other side.

COMPARISON OF ALTERNATIVES INCLUDING THE PROPOSED PROJECT, NO PROJECT, AND OTHER ACTION ALTERNATIVES (CHAPTER 2.0)

SUGGESTED CONTENT

2.0 Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives

- 2.1 Explain that this chapter describes the alternatives including the proposed project, no project, and other action alternatives. Also, remind readers that this chapter summarizes the environmental effects of these alternatives, but that the full analysis of environmental effects appears in Chapter 4.
- 2.2 Describe all alternatives. Your descriptions should include all connected actions, projected outputs, and any necessary mitigations.
- 2.3 Explain how these alternatives are reasonable alternatives in light of the objectives (selection criteria) given in Chapter 1. As part of this explanation, describe briefly alternatives eliminated from detailed study and explain why they were eliminated.
- 2.4 Compare the alternatives by summarizing their environmental impacts. Potential actions and outputs would cause these impacts.

SUGGESTIONS FOR WRITING

2.0 Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives

2.1 Explain that this chapter describes the alternatives including the proposed project, no project, and other action alternatives. Also, remind readers that this chapter summarizes the environmental effects of these alternatives, but that the full analysis of environmental effects appears in Chapter 4.

- 2.1.1 Remind readers that this chapter does more than merely describe the alternatives. The heart of this chapter is to define sharply the differences between the alternatives, especially how their environmental effects differ.
- 2.1.2 Review for readers the conceptual linkage between the purpose for project (including project objectives), as introduced in Chapter 1, the major environmental issues, also introduced in Chapter 1, and the range of reasonable alternatives to be presented in Chapter 2.

As Section 16 of CEAA implies, a reasonable alternative is one that achieves, in large part, a proposed project's defined purpose while not violating any minimum environmental standards, as introduced in the discussion of major environmental issues.

CEAA

Section 16

(1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

(e) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project, that the responsible authority or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered.

(2) In addition to the factors set out in subsection (1), every comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

(b) alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;

2.2 Description of the Proposed Project, No Project, and Other Action Alternatives

2.3 Description of Alternatives Considered but Eliminated from Detailed Study

2.4 A Comparison of Environmental Effects

EXAMPLE 2.1.3—A preview of contents should appear in every chapter. As an option, print the major subheads on the divider page before the chapter begins.

As an example, assume that a proposed project is to provide an additional parking area for visitors to a recreational site. Current usage patterns show that the existing lot is always full during the peak summer season and that vehicles waiting for parking space clog the nearby access roads. The agency proposing the project estimates that a new or expanded lot would require at least 400 parking spaces. This estimate is based on current use and a projected increase in use over the next decade. A relevant environmental issue is an existing wetlands that borders two sides of the current parking area.

A reasonable alternative for this proposed parking area would be one that provided at least 400 parking spaces (or close to that number) but did not damage the adjoining wetlands. An alternative that provided only 200 parking spaces (almost no change from the existing lot) would not be feasible. Similarly, an alternative that damaged the wetlands would not meet the minimum environmental standards related to the existence of the wetlands.

For more information about minimal environmental standards or, as they are often called, selection criteria, see the discussion in sections 1.1.4 and 1.1.5 (pp. 12-13).

2.1.3 For summaries over 30 pages, list the content (headings) to follow, as in example 2.1.3.

2.2 Describe all alternatives. Your descriptions should include all connected actions, projected outputs, and any necessary mitigations.

2.2.1 Make your descriptions as site-specific as possible. Your goal is to show to the responsible authority and other interested readers exactly what would happen on the ground if a particular alternative were implemented. Unless you are site-specific at the beginning, you run the risk of having to repeat the environmental assessment once more site-specific information becomes available.

Usually, information about an alternative is a mixture of potential activities and outputs. Typical activities would be constructing a road, cutting timber, installing a utility line, or allowing a mining corporation to enter an area. Typical outputs would be 3.2 miles of new road, 10 million board feet of timber, 4 miles of 3-inch diameter underground conduit, and 2 million tons of ore mined, processed, and shipped.

Often, actions and outputs can be summarized for all alternatives, as illustrated in example 2.2.1. Such a summary is different from the summary of environmental effects.

2.2.2 As section 20 of the CEAA states, include mitigations, management requirements, and monitoring in your description of each alternative. These details will help you flesh out for readers exactly what would happen on the ground if an alternative were implemented.

CEAA

Section 20

(2) Where a responsible authority takes a course of action referred to in paragraph (1)(a), it shall, notwithstanding any other Act of Parliament, in the exercise of its powers or the performance of its duties or functions under that other Act or any regulation made thereunder or in any other manner that the responsible authority considers necessary, ensure that any mitigation measures referred to in that paragraph in respect of the project are implemented.

Section 2

“Mitigation” means, in respect of a project, the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means

Alternative	Acres Disturbed	Miles of Road	Seasonal Closure
A (No Project)	0	0	All Year
B	125	2.7	April 1 to June 15
C	140	3.4	April 1 to June 1

EXAMPLE 2.2.1—*The list of activities and outputs will replace hard-to-read text.*

Alternative 3

Alternative 3 would increase the AUMs to 1,811. It would use a three-pasture rest-rotation grazing system. Under this alternative, the permittee would be required to transport the cattle by truck between the winter range and the mountain summer range. The permittee would be required to keep the fences in sound condition at his own expense.

Management Requirements

The Pearl Gate would be closed to public access during the elk calving season. The CWS (Canadian Wildlife Service) or provincial fish and wildlife service would ensure that gates are secure.

All fences would be upgraded to four strands of barbed wire within 3 years by the permittee.

Monitoring Requirements

The CWS or provincial fish and wildlife service would check the condition of the pastures several times during the spring, summer, and fall months.

The permittee is required to monitor the conditions of the pastures regularly and to report problems to the CWS or provincial fish and wildlife service if they occur.

EXAMPLE 2.2.2—Each alternative description should contain all potential action and restrictions. The summary of an environmental assessment then presents the effects of the entire alternative.

CEAA

Section 2

“Project” means

- (a) in relation to a physical work, any proposed construction, operation, modification, decommissioning, abandonment or other undertaking in relation to that physical work, or
- (b) any proposed physical activity not relating to a physical work that is prescribed or is within a class of physical activities that is prescribed pursuant to regulations made under paragraph 59 (b)

As in example 2.2.2, some mitigations, management requirements, and monitoring may be specific to a single alternative.

2.2.3 Consolidate mitigations, management requirements, monitoring, into a single list if they are common to every action alternative. Place this list either at the beginning or the end of this section of Chapter 2. If such a list is quite extensive, you might want to include it in an appendix and reference it in this section of Chapter 2.

Make this consolidated list as complete as possible so that during implementation no item will be overlooked. Include, if available, the federal or provincial department responsible for each action and the approximate timing of the action.

2.2.4 Define carefully for readers both the proposed project and the no project alternatives.

The proposed project is, usually, what the proponent is thinking about doing when the environmental assessment begins. As such, it may or may not be what is finally implemented. Note that the proposed project may evolve into a somewhat different project or work as the environmental assessment progresses.

The **no project alternative** has two common meanings: (1) Continue present management activities, but do not do the proposed project (or defer the proposed project), and (2) don't do anything at all in the project area (that is, cease current management). See example 2.2.4 for a sample write-up of a no project alternative. Tell readers which meaning of *no project* you are using. Always analyze and fully discuss the no project alternative. Also, remind readers that the no project alternative is the baseline for all the rest of your analysis. Under no project, environmental impacts will still occur because the existing environment is not static.

2.2.5 Make Alternative A (or Alternative 1) the no project alternative. Making no project the first listed alternative will usually help readers track the impacts of later action alternatives because no project is the conceptual baseline for these impacts.

2.2.6 Describe each alternative as it *would be*. Do not use *will*.

Alternative A would manage for a pristine-primitive environment. It would emphasize near natural conditions. All man-made improvements would be removed.

2.2.7 Use short titles for your alternatives if possible. These titles often can be the key action or output: *3.5 miles of road* or *4.5 million board feet*.

2.2.8 Identify any of the alternatives that are not consistent with a prior environmental assessment for the project area. Note that environmental specialists for the proposed project properly should consider such alternatives because the environmental conditions (and issues) may have

Alternative A No Project (Continue Present Access, Maintenance, and Use)

Under No Project, the Bureau of Reclamation would neither improve nor restrict access to Reclamation land in the Yellowtooth Basin. The current situation as described below would continue. See Chapter 3 (Affected Environment) for a more detailed profile of the current environmental situation in the Basin.

Current access is by unimproved Reclamation road 2W112, much of which is in poor condition, especially after rain. Road 2W112 crosses a half mile of Ute tribal land and then fords Crystal Creek. Reclamation has no right-of-way to the segment controlled by the Ute Tribe. The ford at Crystal Creek is often impassable due to heavy spring runoff and summer thunderstorms.

Current uses include noncommercial post and pole firewood harvest (under Reclamation permits); some fishing and hunting, especially during elk season; and limited summer use by three small placer miners above the ford on Crystal Creek. This level of use is not expected to increase unless road 2W112 were improved, including some provision for an all-season crossing of Crystal Creek. Reclamation currently issues the firewood permits, and Reclamation has approved plans of operation for the miners, although nothing guarantees any of these users easy access or adequate maintenance of road 2W112.

Current maintenance is minimal. About every other year, Reclamation has sent a grader into the Yellowtooth Basin to smooth out ruts and repair washed out sections of road 2W112. Reclamation has provided limited gravel or fill. Total maintenance costs average about \$2,500 for each time Reclamation has sent the grader in. The miners have also done some limited intermittent maintenance, with Reclamation approval.

Other access options include a proposed spur to the mining operations using private land. One miner has stated his intention to construct this short spur (roughly a quarter mile from the end of 2W112). If he completes the spur (likely gravel, low-standard construction), this road would provide a second access route to the Yellowtooth Basin, assuming the miner permitted public travel on the spur. This road would make 2W112 a loop route. This mining spur would become important if the Ute Tribe decided to deny access across their segment of existing 2W112.

EXAMPLE 2.2.4—*Under no project, things do occur—both naturally and as the result of a proponent's ongoing management.*

changed since the prior environmental assessment was prepared. Analyzing such alternatives may properly amend the prior project decision.

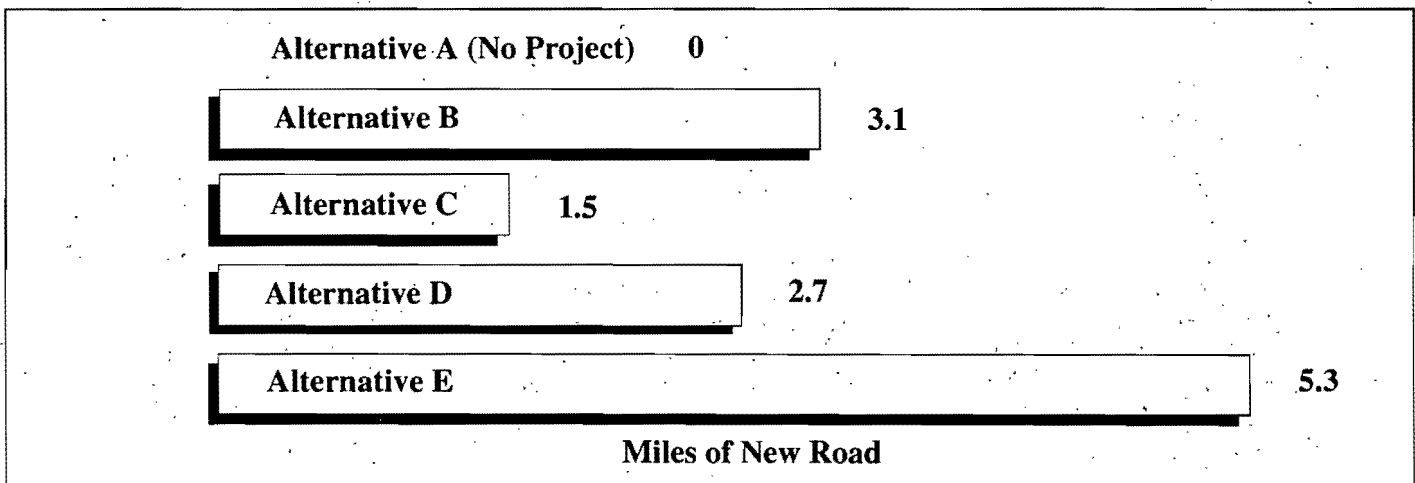
2.2.9 Include and analyze reasonable alternatives that alter the regulatory authority's role. For example, some alternative activities may fall only under provincial jurisdiction and thus be outside federal control. Or, some reasonable alternatives might be illegal now but could become legal at a later date when new legislation passes. All such alternatives should be analyzed in an environmental assessment.

2.3 Explain how these alternatives are reasonable alternatives in light of the objectives (selection criteria) given in Chapter 1. As part of this explanation, describe briefly alternatives eliminated from detailed study and explain why they were eliminated.

2.3.1 Review for readers the conceptual linkage between the purpose (including project objectives), as introduced in Chapter 1; the major environmental issues, also introduced in Chapter 1; and the range of reasonable alternatives presented in Chapter 2: A reasonable

The four action alternatives all would harvest much the same volume of timber, but they differ in both where the harvest would be and how they would access the timber. Alternative A (No Project) would harvest no timber and would require no new roads. Alternative B would harvest 12.8 MMBF (million board feet) from units (areas) that are to the west of Forest Road 2N03. These units will require 3.1 miles of new road and 5.7 miles of road reconstruction. Alternative C would harvest 11.7 MMBF from units from both sides of 2N03. These units would require only 1.5 miles of new road and some 7.8 miles of road reconstruction. Alternative D . . .

EXAMPLE 2.3.3-1—The range of activities available to a department will depend on the site, the department budget, the departmental mission, or other management goals. Always make these constraints clear.



EXAMPLE 2.3.3-2—A bar chart is only one way to present graphically that the alternatives contain different levels of action. As in this example, new road construction is only one of the project activities that might change from one alternative to another.

alternative is one that achieves, in large part, the proponent's defined purpose (objectives) while not violating any minimum environmental standards. See the discussions under sections 2.1.2 (p. 21) and 1.1.4 and 1.1.5 (pp. 12-13).

In some rare instances, a proponent may analyze an alternative that is not feasible, perhaps because it is technically unrealistic or economically too costly. The proponent's purpose in such instances is to show by detailed analysis that such an alternative is not feasible.

2.3.2 Briefly discuss how a team of environmental professionals arrived at decisions about what constitutes reasonable alternatives. As part of this discussion, describe alternatives discarded during the analysis process. If necessary, provide detailed information in a separate appendix and be sure to retain documentation of such decisions in your project files.

2.3.3 A range of alternatives is an important conceptual step in any environmental assessment. As examples 2.3.3-1 and 2.3.3-2 indicate, you should explicitly explain how you are defining the range for your project.

2.3.4 Examples 2.3.3-1 and 2.3.3-2 focus on actions and outputs, but a second way to look at the range of alternatives is to consider how the alternatives differ in regard to their different types and degrees of effects. In example 2.3.3-1, even though the harvest level remains much the same in all alternatives, the impacts might be very different based on the different units to be harvested and the different road systems.

2.4 Compare the alternatives by summarizing their environmental effects. Potential actions and outputs would cause these effects.

2.4.1 Remind readers that this summary of environmental effects is actually a summary of the information presented in Chapter 4. Readers who need clarifications or further details about environmental effects should refer to the relevant subsections of Chapter 4.

2.4.2 The environmental effects are the key to distinguishing between the alternatives, so make this section as readable and accessible as possible. Most proponents routinely build a comparative matrix into this section of Chapter 2. This matrix usually has the alternatives on one axis and the major issues on the other axis. For each issue, the axis is usually further subdivided into indicators or measurements, as in examples 2.4.2-1.

Example 2.4.2-2 illustrates air quality data that would become part of a matrix that summarizes environmental effects. As with example 2.4.2-1, these data

would help a responsible authority to make a decision, but the data alone do not force a particular decision.

2.4.3 Make the information in the comparative matrix as quantifiable as possible. Record acres disturbed, the number of grazing animals, variations in flow rates, etc. Use such trend words as *high*, *low*, *moderate*, and *limited* only if you have carefully explained in Chapter 4 what each of these trend words means. Note that these trend words avoid judgment words like *good*, *bad*, or *desirable*.

TABLE 2-1. SUMMARY OF CONSEQUENCES

Consequences	Alt 1 No Project (0 MMBF)	Alt 2 (28 MMBF)	Alt 3 (22 MMBF)	Alt 4 (17 MMBF)
Deer Habitat (Issue 1)				
Acres of Deer Winter Range Harvested	0	1,028	803	551
Percent of Deer Winter Range Harvested	0	10%	8%	5%
Number of Deer Area Could Support:				
Mild Winter	811	725	744	765
Moderate Winter	356	298	311	326
Severe Winter	136	102	110	118
Relative Adverse Impact on Resident Deer Population	none	high	moderate	low

MMBF = million board feet of timber

EXAMPLE 2.4.1-1—This matrix for a proposed timber harvest includes both projected activities and an estimate of effects. Activities often are indirect yet valuable ways to estimate different effects.

TABLE 2-1. SUMMARY OF CONSEQUENCES				
Consequences	Alt 1 No Project (0 MMBF)	Alt 2 (28 MMBF)	Alt 3 (22 MMBF)	Alt 4 (17 MMBF)
Eagle Habitat (Issue 2)				
Acres of Beach Fringe Nesting Habitat Harvested	0	117	40	0
Percent of Beach Fringe Nesting Habitat Harvested	0%	24%	8%	0%
Number of Eagle Nest Trees and Buffer Zones Affected	0	3	2	0
Relative Adverse Impact on Resident Eagle Population	none	high	low	none
Water Quality/Fish Habitat (Issue 3)				
Miles of Class 1 Stream Requiring AHMU Prescriptions	0	1.0	0.9	0.5
Miles of Road Built Within Class 1 AHMU	0	0.6	0.4	0.2
Number of Road Crossings of Class 1 Streams	0	4	4	1
AHMU=Aquatic Habitat Management Units				

EXAMPLE 2.4.1-1 (continued).

TABLE 2-1. SUMMARY OF CONSEQUENCES

Consequences	Alt 1 No Project (0 MMBF)	Alt 2 (28 MMBF)	Alt 3 (22 MMBF)	Alt 4 (17 MMBF)
Economic Factors (Issue 4)				
Total Pond Log Selling Value (\$ million)	0	10.1	8.0	6.2
Total Costs to Operator Including Profit and Risk (\$ million)	0	9.2	7.6	6.0
Possible Return to Government (\$ thousand)	0	952	462	204
Employment (Issue 5)				
Number of Jobs Generated	0	196	154	119
Dollar Value of Jobs (\$ million)	0	4.51	3.54	2.74
Dollar Value Secondary (\$ million)	0	31.57	24.78	19.18

EXAMPLE 2.4.1-1 (continued).

Use phrases, even sentences, in the matrix if you have to qualify or explain either your numerical estimates or your trend words. You must support your judgments (forecasts) with a careful analysis in Chapter 4. Thus, this matrix in Chapter 2 becomes the summary matrix for all of Chapter 4.

2.4.4 Do not use numerical ratings, check marks, or other evaluation methods to summarize the effects of the alternatives. See negative example 2.4.4. These methods have the illusion of certainty, but they are less reliable than words like *high* and *low*. If the matrix is properly done, readers cannot mindlessly add up a column or row to find out which alternative is supposedly

the best one. Both the responsible authority and members of the public have to impose their own value systems (trade-offs) on the information in the matrix.







2.4.5 Do not identify the responsible authority's chosen alternative (even if known).

This decision is properly left for the responsible authority or the authority's staff to make once the screening or comprehensive study is completed. And in some cases, the proposed project (along with its documentation) will move into mediation or a panel review. In these cases, the responsible authority will not choose an alternative until mediation or the panel review is completed.

TABLE 4.7 ANNUAL AIR EMISSIONS FROM INDICATED SOURCES FOR NH₃, BENZENE, H₂S, NO_x AND SO₂

Source	Air Emissions				
	NH ₃ (kg/y)	Benzene (kg/y)	H ₂ S (kg/y)	NO _x (t/d)	SO ₂ (t/d)
Agrium Inc., Fort Saskatchewan	373 176	-	-	2.13	-
Agrium Inc., Redwater	1 272 528	-	-	50.4	9.1
Amoco Canada Petroleum Co. Ltd.	-	-	-	0.66	0.49
Chevron Canada Resources	-	-	-	0.42	0
Dow Chemical Canada Inc.	330	6 360	1 031	4.37	0.17
Dupont Canada Inc.	-	-	-	0.05	-
Geon Canada Inc.	-	-	-	0.05	0
Imperial Oil Resources Limited	-	-	-	-	0.49
Redwater Water Disposal Company Ltd.	-	-	-	0.11	17.4
Shell Canada Limited Scotford Refinery	96	10 825	3 275	3.78	1.3
Shell Chemicals Canada Limited Scotford Styrene Plant	119	23 329	-	2.61	0.01
Sheritt International Corporation	704 133	-	-	0.23	0.65
Westaim Corporation	60 042	-	-	-	0.67
TOTAL	2 410 424	40 514	4 306	19.45	30.28

EXAMPLE 2.4.2-2—Data on air emissions would become part of the overall comparative matrix displaying the differences between alternatives.

		Alternatives			
		A	B	C	D
I S S U E S	Air Quality	-	Good	4	
	Water Quality	--	Great	2	
	Fish Habitat	---	Bad	1	
	Vegetation	-	Better	3	
	Economics	++	Good	6	
	Social	+	Worst	5	

EXAMPLE 2.4.4—None of the above evaluation techniques should appear in your EA Summary. Use either quantifications (as in example 2.4.1-2) or other indicators (as in example 2.4.1-1). Using numerical rankings or a plus or minus does not really disclose effects unless you supply a careful rationale for the numerical rating or a plus or minus.

AFFECTED ENVIRONMENT (CHAPTER 3.0)

SUGGESTED CONTENT

3.0 Affected Environment

3.1 Explain that this chapter presents relevant resource components of the existing environment—that is, the baseline environment. As appropriate, preview the chapter contents so that readers can readily find subsections.

3.2 Resource X (Major Issue 1)

3.3 Resource Y

3.4 Resource Z (Major Issue 2)

NOTE 1: Include **all** relevant physical, biological, social, and economic features of the human environment. Use the same order or sequence of resources in Chapters 3 and 4.

NOTE 2: Major issues (key resource indicators) should receive more extensive discussion than minor issues. For tracking, cross-reference resources with the relevant major issues.

SUGGESTIONS FOR WRITING

3.0 Affected Environment

3.1 Explain that this chapter presents relevant resource components of the existing environment—that is, the baseline environment. As appropriate, preview the chapter contents so that readers can readily find subsections.

3.1.1 Explain that Chapter 3 describes the environmental components (resources) of the area that **would be affected** by the alternatives and that **would affect** the alternatives if they were implemented.

Remind readers that, despite the word *affected* in the title, this chapter does not present effects. Instead, the environment described is the baseline for the comparisons in Chapter 4, Environmental Effects.

CEAA

Section 16

(2) In addition to the factors set out in subsection (1), every comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

(d) the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

Section 18

(2) Any available information may be used in conducting the screening of a project, but where a responsible authority is of the opinion that the information available is not adequate to enable it to take a course of action pursuant to subsection 20(1), it shall ensure that any studies and information that it considers necessary for that purpose are undertaken or collected.

3.1.2 An increasingly popular option for writers of environmental assessments is to combine Chapter 3 and 4. In this option, writers prepare a single combined discussion of both the environmental baseline (affected resource) and the environmental effects on this resource. Readers, therefore, don't have to shift back and forth from Chapter 3 to Chapter 4.

3.1.3 Discuss in detail resources you earlier (in Chapter 1) listed as major issues. Your discussion of these issues (resources) should validate why these are deemed to be major and, thus, highly relevant to the decision to be made.

3.1.4 Discuss as briefly as possible those resources not identified as major. In some cases, you might merely list certain resources as considered but not found in the project area. Remember that some things—such as wetlands, endangered wildlife species, or cultural resources—should always be mentioned, if only to note that none exists in the project area.

Such a paragraph listing items considered but not present in the project area provides legal evidence that you have not overlooked any resources.

No matter how you decide to cover resources you don't consider major, remember to provide backup information as appropriate. Such information could be memos from specialists or a checklist like example 3.1.5. If you decide to use a checklist, include it in the appendix or in your project file and be sure to reference it in the text of your environmental assessment summary.

3.1.5 Sometimes you need to describe parts of the environment that would not be affected by the proposed action or by any alternative. For example, if an earthquake fault was located near the project site, the decisionmaker and the public ought to know of its presence even though the project would not affect the fault. But the fault might affect the project.

3.1.6 Describe the area where the proposed project would take place. Include the legal description if necessary. Probably a general location map appears in Chapter 1; refer to it and include a more specific, detailed map here if needed.

3.1.7 Preview the rest of the chapter by explaining how you have organized the resources. Remind readers that Chapter 3 covers resources in the same order as they will be covered in Chapter 4.

A common organization has been to use general categories: physical, biological, social, and economic. Individual resources become third-level subheadings under the four categories. If you choose to follow this pattern, tell your readers.

Another organization (one we prefer) is to arrange individual resources (issues) according to their relationship to each other or their significance. For instance, hydrology and fisheries would appear next to each other. Such an organization is particularly common if you have only three or four major issues; after you cover these three or four, you can move on to brief discussions of the minor resources.

Environmental Factors Checklist

Directions: Check the appropriate columns to indicate that the interdisciplinary team has addressed each of these factors. For those factors with background documentation, indicate where readers can find the information—in the EA, in the appendices, or in the analysis file. As appropriate, include this checklist in an appendix or in the analysis file.

Factors	In EA	Analyzed, Not in EA	Not Applicable	Background Documentation (Location)
Physical Factors.				
1. Location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Geomorphic/physiographic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Geologic hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Unique land forms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Climate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Soils.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Productivity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Capability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(1) Erodibility.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(2) Mass failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5. Minerals and energy resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Locatable minerals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Leasable minerals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Energy sources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Visual resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
7. Cultural resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Archaeological.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Historical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Architectural.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. Paleontological.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
8. Wilderness resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
9. Wild and scenic rivers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
10. Water resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Water quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(i) sediments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(ii) temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(iii) dissolved oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(iv) dissolved solids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

EXAMPLE 3.1.5—A checklist is a good tool to validate that you have addressed all potential resources. Always have such a checklist in your environmental assessment file. As an option, put the checklist in the appendix.

Factors	In EA	Analyzed, Not in EA	Not Applicable	Background Documentation (Location)
(v) tropic status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(vi) salinity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(vii) coliforms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(viii) mercury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(ix) phytoplankton	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(x) heavy metals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(xi) pH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
(xii) suspended solids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Streamflow regimes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Floodplains.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. Wetlands.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Ground water recharge areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
11. Air quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. SO ₂	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. NO _x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. VOC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. TRS (total reduced sulfur)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. PM (particulate matter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f. Metals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g. PAH (polycyclic aromatic hydrocarbons)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
h. O ₃	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
i. NH ₄	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
j. CO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
k. Fugitive dust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
12. Noise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
13. Fire.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Potential wildfire hazard.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Role of fire in the ecosystem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
14. Land use including prime farm, timber, and rangelands.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Agriculture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
15. Infrastructure improvements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Roads.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Trails.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Utility corridors and distribution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

EXAMPLE 3.1.5 (continued).

Factors	In EA	Analyzed, Not in EA	Not Applicable	Background Documentation (Location)
d. Water collection, storage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Communications systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f. Solid waste collection and disposal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Biological Factors.				
1. Vegetation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Forest, including diversity of tree species.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Rangeland, including conditions and trends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Other major vegetation types.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. Threatened or endangered plants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Research natural area (RNA) potentials.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f. Unique ecosystems (other than RNAs).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g. Diversity of plant communities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
h. Noxious weeds.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Wildlife.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Habitat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Populations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Threatened or endangered species.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. Diversity of animal communities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Animal damage control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Fish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Habitat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Populations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Threatened or endangered species.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Recreation resources (usually a combination of physical and biological factors).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

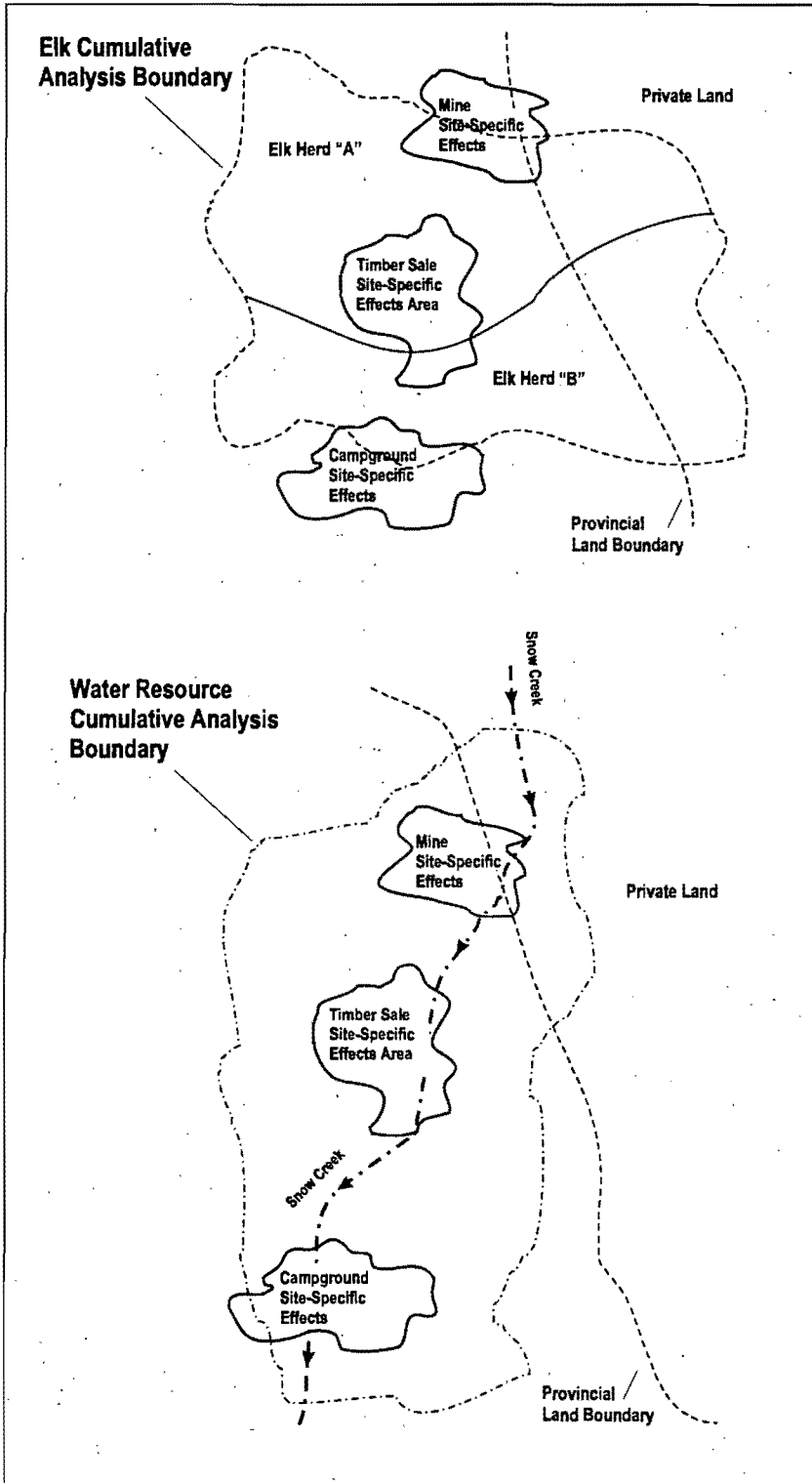
EXAMPLE 3.1.5 (continued).

Factors	In EA	Analyzed, Not in EA	Not Applicable	Background Documentation (Location)
5. Insects and diseases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Exotic organisms; for example, Russian thistle, Siberian ibex.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Economic Factors.				
1. Economic base.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Employment/unemployment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Housing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Land use requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5. Community service requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Revenue base.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Local general government.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Special service districts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
7. Plans and programs of other agencies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
8. Income.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Sources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Amounts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Distribution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
9. Cost.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Financial analysis (who pays for what, when).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Social Factors.				
1. Population dynamics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Size (growth, stability, decline).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Composition (age, sex, minority).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Distribution and density.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. Mobility.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Displacement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Social institutions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Educational.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Economic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

EXAMPLE 3.1.5 (continued).

Factors	In EA	Analyzed, Not in EA	Not Applicable	Background Documentation (Location)
d. Political.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Military.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f. Religious.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g. Recreation/leisure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Special concerns.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Minority (civil rights).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Historic/archaeological/ cultural.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Ways of life—defined by.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
a. Subcultural variation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b. Leisure and cultural opportunities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c. Subsistence hunting and fishing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d. Personal security.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e. Stability and change.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f. Basic values.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g. Symbolic meaning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
h. Cohesion and conflict.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
i. Community identity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
j. Health and safety.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5. Land tenure and land use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Legal considerations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

EXAMPLE 3.1.5 (continued).



EXAMPLE 3.2.3—Each resource you analyze should have its own map showing the extent of the analysis.

3.2 Resource X (Major Issue 1)

3.2.1 Cross-reference each resource with its parallel major issue (from Chapter 1). At times, your discussion of a resource may include more implications than you chose to introduce in Chapter 1. Even so, cross-reference between the chapters. Your goal is to help your readers see the links between major issues and resources.

Particularly important are the resource indicators you mentioned for each issue discussed in Chapter 1. If, for example, you identified ram/ewe ratios as important to the viability of the bighorn sheep population, record in this chapter the current ram/ewe ratios in the project area.

3.2.2 Describe what is, not what **would be**. Don't include effects; effects appear in Chapter 4 (Environmental Effects). Although your emphasis is on what is, you also should mention any trend that is apparent from available data. For example, surveys may have shown that the grazing in the project area has declined in recent years. Record this trend as part of the current baseline information.

3.2.3 Stipulate the area you are describing for each affected resource because the area of potential cumulative effects will differ from resource to resource. Thus, your baseline area for one resource will often extend beyond the project area you described at the beginning of this chapter and in Chapter 1. You cannot determine the proper resource area to describe until you finish analyzing the potential cumulative effects of all alternatives.

The maps in example 3.2.3 illustrate how different cumulative analysis boundaries apply to different resources.

You should include such adjusted or extended area maps for each resource. Also, explain why (and how) the area differs from the project area described in Chapter 1.

3.2.4 Incorporate by reference relevant information. As in example 3.2.4, briefly summarize all information that you incorporate by reference. Information you incorporate by reference must be reasonably available to the public.

Use parenthetical citations rather than footnotes to cite references.

All references cited should appear in an alphabetical list in the bibliography. See the discussion of the bibliography on p. 59.

Parenthetical references should include the page number, preceded by the abbreviations *p.* for *page* and *pp.* for *pages*. Some scientific disciplines are beginning to use the single abbreviation *p.* for both *page* and *pages*. If you choose to use the single form of the abbreviation, do so throughout your entire document.

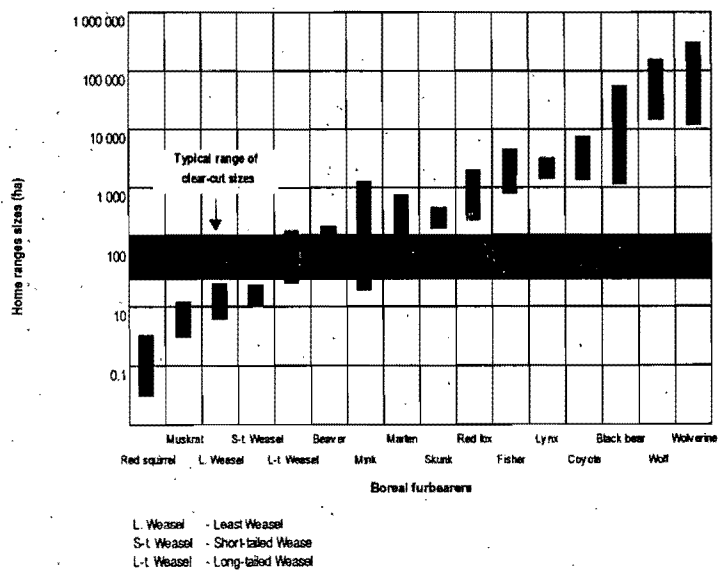
3.2.5 Use graphics, whenever possible, to capture key concepts and complex relationships. Graphics are usually most effective when they are designed to communicate a specific issue, not drawn from some tangential research study or report.

Both examples 3.2.5-1 and 3.2.5-2 show how project-specific concepts can be presented in graphics. Remember to plan (design) your graphics early because they may replace sections of the text.

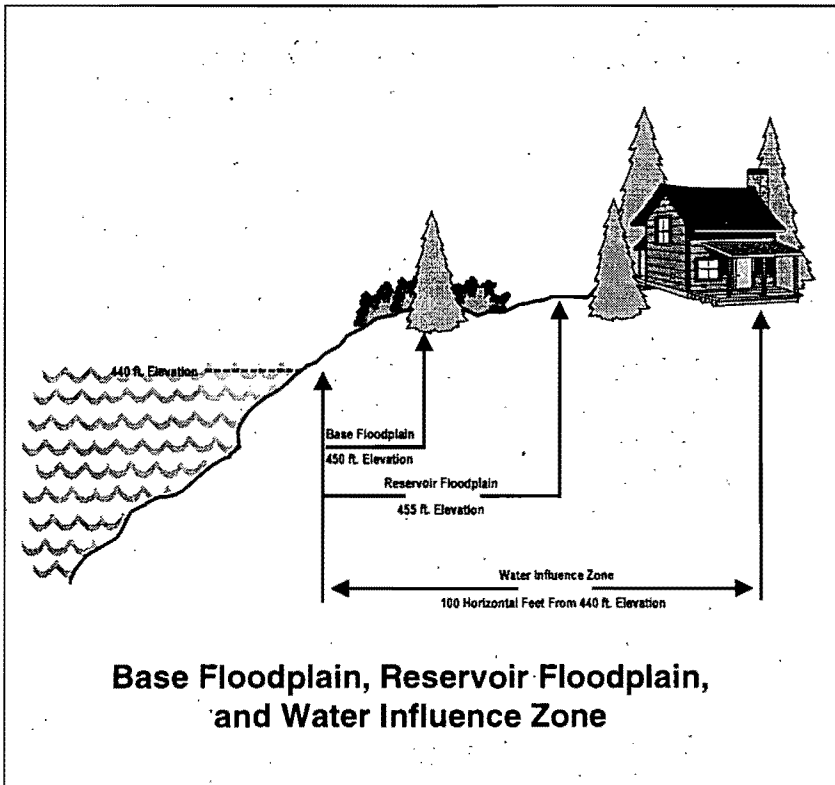
According to recent studies (Jones 1986, pp. 234-237, and Clarkson 1988, pp. 45-46), lamb survival depends directly on the nutritional value of browse available to ewes, which itself is a function of the moisture available from early spring through June.

EXAMPLE 3.2.4—Use parenthetical citations, not footnotes, to cite referenced information. Also, be sure to summarize briefly the relevant content.

Home Range Sizes of Boreal Furbearers and Approximate Size of a Typical Clear-cut



EXAMPLE 3.2.5-1—A graphic such as this one can replace a number of lines of text. As in this example, graphics can have a caption (headline) above them. More commonly, both the title and caption appear under the graphic.



EXAMPLE 3.2.5.-2—This graphic essentially defines three different areas around a proposed reservoir. The accompanying text would, of course, explain the technical assumptions supporting these definitions.

3.3 Resource Y

3.3.1 Cover resources that may not be major issues. Resource Y is such a resource. Including resource Y shows that the team of environmental specialists has not overlooked any potentially major resources.

Resource Y, for instance, might be a resource that started out as a major issue (in the analysis process). During the analysis, however, the team of specialists managed to adjust the potential alternatives so that effects on Resource Y became minimal for all alternatives. Still, some effects remain. So Resource Y is retained in Chapter 3 (and Chapter 4) even though the discussions are appropriately brief.

3.3.2 Keep the discussion of issues that are not major brief by referencing either the environmental assessment or appendices. Such references should be specific for each resource and should indicate what readers would find if they turned to the appendices or examined the analysis file.

3.4 Resource Z (Major Issue 2)

3.4.1 Resource Z, like Resource X, is linked to a major issue introduced in Chapter 1. Use such cross-references throughout your screening or comprehensive study.

3.4.2 As with any resource linked to a major issue, discuss it in appropriate detail. Avoid, however, overloading the discussion with background (file) information that is better summarized and then referenced. A good rule of thumb is that any information in Chapter 3 should be directly related to the environmental effects to be presented in Chapter 4.

ENVIRONMENTAL EFFECTS (CHAPTER 4.0)

SUGGESTED CONTENT

4.0 Environmental Effects (organizational option 1)

- 4.1 Explain that this chapter is organized by resources.
- 4.2 Effects on Resource X (Major Issue 1)
 - 4.2.1 Alternative A (No Project)
 - 4.2.2 Alternative B (Proposed Project)
 - 4.2.3 Alternative C (Short Title)
 - 4.2.4 Alternative D (Short Title)
- 4.3 Effects on Resource Y
 - 4.3.1 Alternative A (No Project)
 - 4.3.2 Alternative B (Proposed Project)
 - 4.3.3 Alternative C (Short Title)
 - 4.3.4 Alternative D (Short Title)
- 4.4 Effects on Resource Z (Major Issue 2)
- 4.10 Significant Adverse Effects
- 4.11 Sustainability of Resources
- 4.12 Irreversible Commitments of Resources
- 4.13 Any Other Disclosures

4.0 Environmental Effects (organizational option 2)

- 4.1 Explain that this chapter is arranged by alternatives.
- 4.2 Effects of Alternative A (No Project)
 - 4.2.1 Resource X (Major Issue 1)
 - 4.2.2 Resource Y
 - 4.2.3 Resource Z (Major Issue 2)
- 4.3 Effects of Alternative B (Proposed Project)
 - 4.3.1 Resource X (Major Issue 1)
 - 4.3.2 Resource Y
 - 4.3.3 Resource Z (Major Issue 2)
- 4.4 Effects of Alternative C (Short Title)
 - 4.4.1 Resource X (Major Issue 1)
 - 4.4.2 Resource Y
 - 4.4.3 Resource Z (Major Issue 2)
- 4.10 Significant Adverse Effects
- 4.11 Sustainability of Resources
- 4.12 Irreversible Commitments of Resources
- 4.13 Any Other Disclosures

CEAA

Section 16

(1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- (b) the significance of the effects referred to in paragraph (a);

Section 2

“**Environmental Effect**” means, in respect of a project,

- (a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and
- (b) any change to the project that may be caused by the environment, whether any such changes occurs within or outside Canada;

SUGGESTIONS FOR WRITING

***4.0 Environmental Effects
(organizational option 1)**

***4.1 Explain that this chapter is organized by resources.**

or

***4.0 Environmental Effects
(organizational option 2)**

***4.1 Explain that this chapter is organized by alternatives.**

4.1.1 Introduce this chapter by explaining that it is the scientific and analytic basis for the comparisons of the alternatives. Explain that this section describes the probable impacts (effects) of each alternative on selected environmental resources.

4.1.2 Choose a chapter organization to fit your project and the scope of the EA.

If your environmental assessment summary is fairly complex and if you have fairly well-developed technical analyses of the probable consequences, organize by resources (organizational option 1). Choosing this organization allows each technical area to develop its own discussion and its own methodologies. This option more closely fits with the scientific and analytic intent of this chapter.

If your environmental assessment summary is relatively short and if you have limited technical information, organize by alternatives (organizational option 2). This organization is appropriate if you have brief profiles of the impacts related to each alternative. The more technical information you have on each resource, the more desirable is option 1—organizing by resource.

4.1.3 Tell your readers which organizational option you have chosen. Remind them that Chapter 4 will discuss resources in the same sequence as they were discussed in Chapter 3.

4.2 Effects on Resource X (Issue 1)

4.2.1 Alternative A (No Project)

or

4.2 Effects of Alternative A (No Project)

4.2.1 Resource X (Issue 1)

4.2.1 In either organization, you must address the effects of each alternative on **all** resources. The challenge is to cover all the potential effects (impacts): direct, indirect, cumulative, short-term, long-term, beneficial, and adverse. You also need to identify any non-reversible commitments. These categories overlap, making any discussion of them difficult to organize.

For conceptual purposes, use the checklist in example 4.2.1 to guarantee that you haven't overlooked the major. Note that each item in this checklist could be a subheading, or you might decide to combine items under a single subheading (for example, past, present, and future cumulative).

4.2.2 Cover all affected resources, but focus more detailed discussions on resources linked to the major issues identified in Chapter 1. Also, some topics, such as the sustainability of a resource, should be mentioned in Chapter 4 even if they aren't major issues.

Effects on Resource X

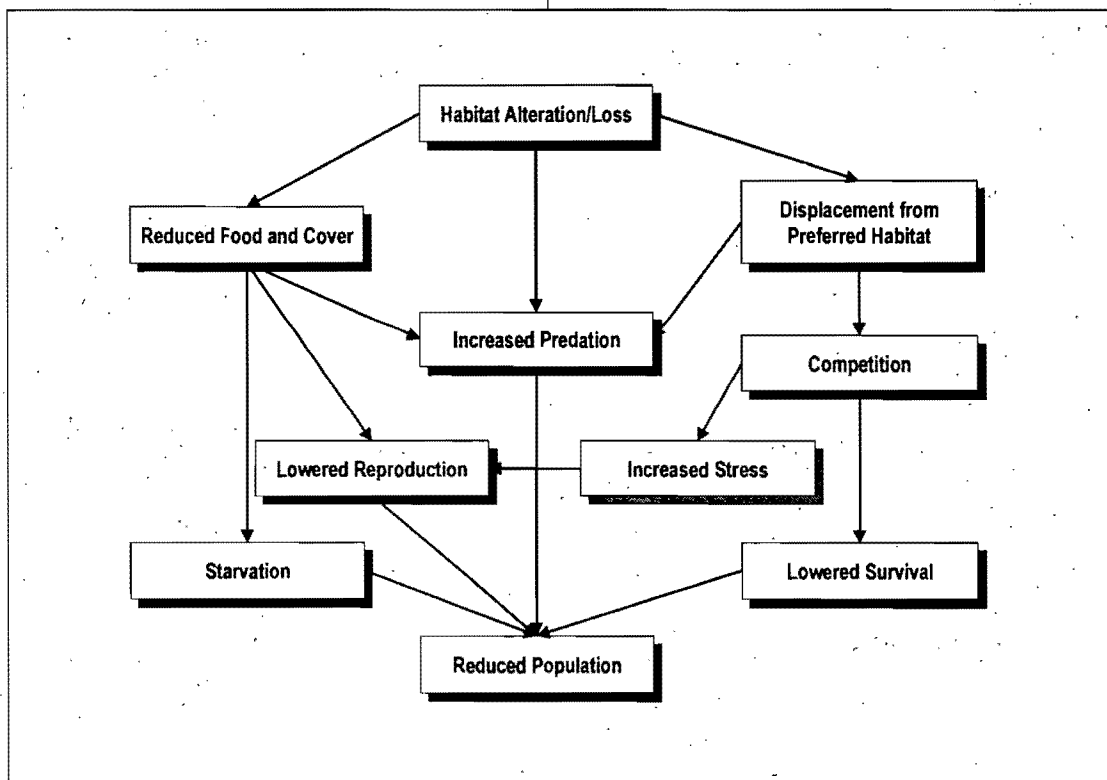
- Analytic, concise introduction to Resource X, including indicators, models, technical assumptions, analysis boundary, and analysis intensity
- Direct and indirect effects of Alternative B
- Total cumulative effects of all actions (including Alternative B)
 - Effects of past connected and cumulative actions
 - Effects of present connected and cumulative actions
 - Effects of reasonable foreseeable future connected and cumulative actions
- Other potential effects (if not already covered and discussed)
 - Significant adverse effects that cannot be avoided
 - Sustainability of resources
 - Irreversible commitments of resources

EXAMPLE 4.2.1—Use this checklist for each resource and each alternative to guarantee that you've considered all potential impacts. The items in the checklist need not be separate subheadings. In many documents, for example, cumulative effects would not be broken out into past, present, and future.

4.2.3 Conceptually, begin with actions (causes) and then analyze the potential effects (both direct and indirect).

The line between direct and indirect is difficult to draw and somewhat arbitrary; the key is to be sure that you have covered all relevant, meaningful direct and indirect effects. The flow chart in example 4.2.3 illustrates how different impacts flow from a single action (cause). You should also prioritize the possible impacts so that you focus on those that are most important.

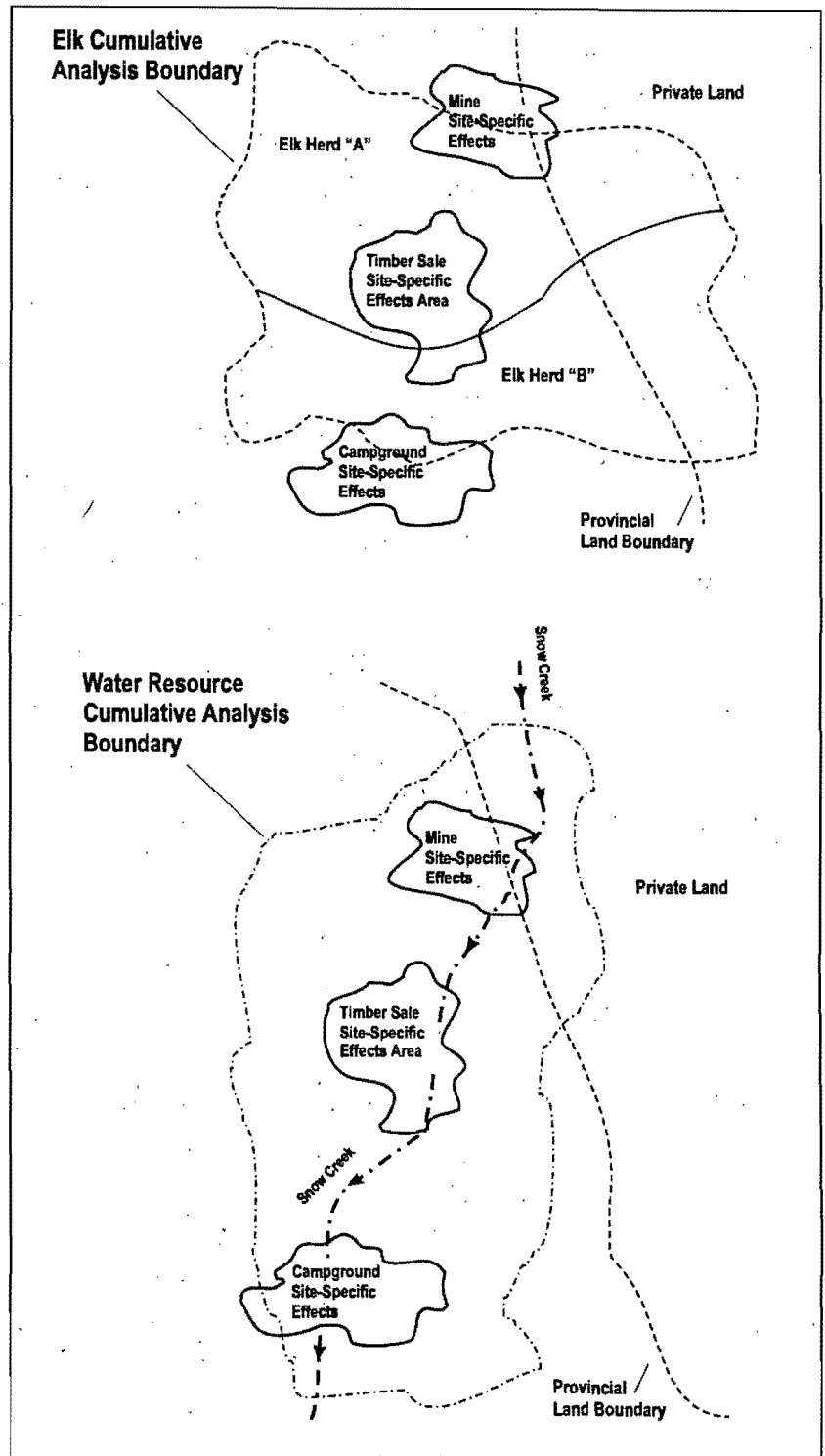
The flow chart presents more detail than you would need in your environmental assessment, but use the same conceptual approach to guarantee that you haven't overlooked any possible impacts. What you choose to discuss will depend on the indicators you decide to display and track for each major issue.



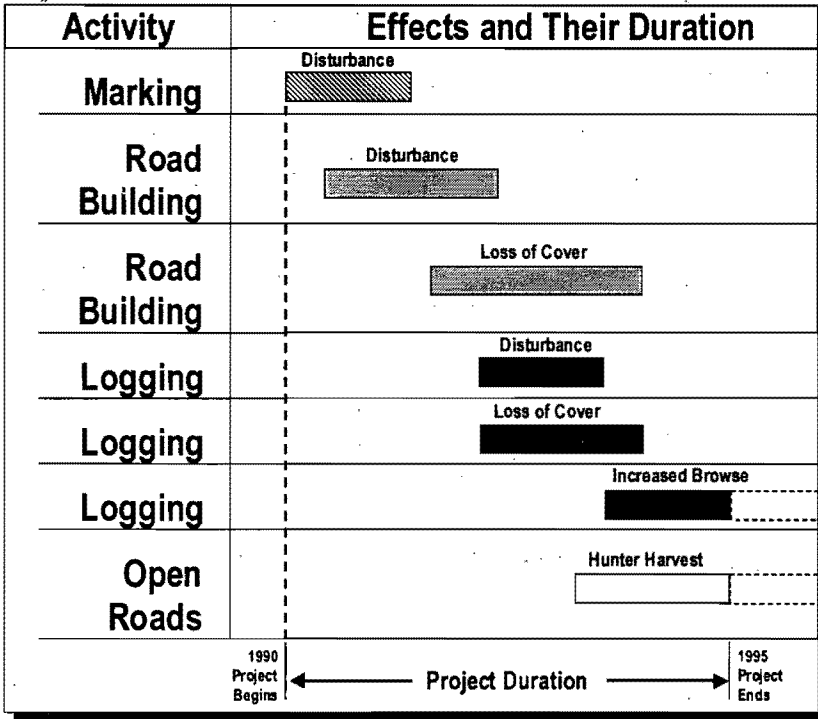
EXAMPLE 4.2.3—This flow chart schematically captures the cause-and-effect relationship behind the Little Bow Project/Highwood Diversion Plan for the Alberta Government. In this flow chart, we have not attempted to separate direct from indirect effects. You must discuss all effects, but you need not separate them into direct and indirect categories.

4.2.4 Stipulate the geographical and temporal boundaries (the context) for your analysis of each resource. These boundaries do not coincide with the project boundaries, which usually reflect only the area and time period when the potential actions would occur.

The maps in example 4.2.4-1 illustrate how different cumulative analysis boundaries apply to different resources. In Chapter 3, you should have included such adjusted or extended area maps for each resource. If appropriate, repeat such maps in Chapter 4, along with any supporting explanations of how the effects discussed in this chapter determine the area to be analyzed.



EXAMPLE 4.2.4-1—Each resource will likely have a different cumulative analysis boundary. Either here in Chapter 4 or earlier in Chapter 3, you should provide maps of the analysis boundary for each resource.



Temporal boundaries are similarly complex. In example 4.2.4-2, different actions related to a timber sale have different effects, which have different durations.

EXAMPLE 4.2.4-2—Each resource has its own temporal limits. Be sure to specify those for each resource you discuss. The dotted lines for logging and open roads indicate that the effects continue into the future.

4.2.5 Quantify effects and interpret your estimated effects. Your discussion should include acres of habitat lost, amount of sediment entering the stream, and other commonly accepted ways to quantify effects on a resource. If you can only indicate effects as trends (*low, moderate, high, etc.*), remember that both quantifications and trends require careful explanation and interpretation.

As in example 4.2.5, you should explain the context and intensity behind your analysis.

4.2.6 Use the words *significant* or *significantly* only if you have given readers a clear sense of just why you consider an impact to be significant. Usually your discussion of the potential significance of impacts will address the context and intensity of the impacts.

4.2.7 Discuss the cumulative effects of each alternative. Given the legal importance of cumulative effects to an adequate environmental assessment, consider using a subheading of "Cumulative Impacts" for each resource and each alternative. Use this subheading even when all you have to say is that you have identified no cumulative effects.

See Section 16(1)(a) of CEAA for the requirement that cumulative effects be considered.

4.2.8 Analyze the effects of **all** alternatives, including no project alternative. Under no project things do happen, so do not rely on "no effects" (or zeros) as your analysis for the no project alternative.

Effects of Alternative 2 on Threatened and Endangered Species

This alternative would proceed with approximately 11,113 acres of timber stand harvest, and construct 61 miles of new roads within the DA (Decision Area).

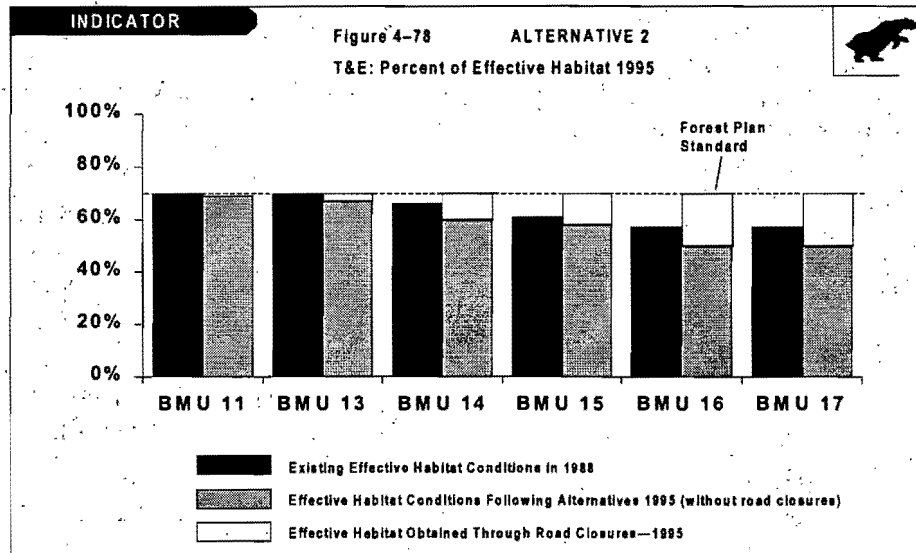
These activities would reduce the effective habitat within the DA for **grizzly bear** and **wolf** by 29.2 square miles, or 6.3% of the Decision Area (Appendix A). Significant increased human activity and access would occur on this 29.2 square miles of previously available habitat during active sales and road building. Activities would affect all six BMUs (Bear Management Units). Use by grizzlies and wolves of habitat in these activity areas would decrease. This alternative has the second highest amount of human activities and disturbances of those displayed.

Road closures in the DA would more than compensate for increased human activity. Figure 4-78 provides information on the present grizzly bear habitat effectiveness, the effect on habitat effectiveness if road closures were not implemented, and the effect with road closures.

Compensation for the proposed activities would require road closures outside the sale areas to manage grizzly bear habitat at management plan levels (Appendix A). It would also require some winter-season-only sales. Vehicle access and associated human numbers would be reduced on the 29.2 square miles closed to compensate for sale activities. Deliberate or accidental man-caused mortality might decrease in these closed areas.

This alternative would convert 11,113 acres of forested lands (which includes 242 acres of riparian harvesting) to open forage lands, and 230 acres of forested lands to roadways. The total amount of cover to be converted to foraging units within the Decision Area by BMU would be as follows: BMU 11: 866 acres (3%); BMU 13: 681 acres (3%); BMU 14: 2,114 acres (7%); BMU 15: 1,449 acres (3%); BMU 16: 462 acres (7%); and BMU 17: 720 acres (5%). See Appendix A for further details about this conversion of cover to forage.

EXAMPLE 4.2.5—*Impacts on grizzly bears and wolves are estimated using the percent of effective habitat. These percents (a quantification) are only an indirect measure of the potential impacts. Such indirect indicators are often the only way to estimate effects.*



EXAMPLE 4.2.5 (continued).

CEAA

Section 16

(1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

4.2.9 Assess the effectiveness of all mitigations and management requirements built into each alternative. This assessment is crucial because without it, the actual effects of the various alternatives will not be clear to readers. Therefore, the meaningful impacts of an alternative are those that remain after all the actions and mitigations have been taken.

4.2.10 Identify and explain instances where you have incomplete or unavailable data or where your confidence level is extremely low. Your task is to give an honest and realistic appraisal of the impacts on all resources, even when you cannot quantify, when you do not have good data, and when your confidence is low.

4.2.11 As in example 4.2.11, describe what *would be*, not what *will be*. This use of *would* for all alternatives implies that the responsible authority (acting for the agency) has not already chosen one of the alternatives.

Would is only one of several verbs that suggest future probability: *would*, *could*, and *might*. *Would* implies a high degree of certainty and is your best choice for making firm forecasts in Chapter 4. Do not dilute the power of *would* by using a modifying adverbial: *probably would*, *generally would*, or *possibly would*. All such adverbials weaken your statements in Chapter 4.

Could implies a degree of doubt, so don't use it in stating your estimation of effects. *Might* implies even more doubt, so don't use it either.

Use *should*, a word historically related to preceding words, only to state an "ethical or moral obligation". Do not use *should* to convey future probabilities.

4.2.12 Incorporate by references any relevant information. Chapters 3 and 4 are the primary chapters where you would need to incorporate references to technical information. Briefly summarize all information that you incorporate by reference. Information you incorporate by reference must be reasonably available to the public.

Use parenthetical citations rather than footnotes to cite references, as illustrated in example 4.2.12.

Parenthetical references should include the page number, preceded by the abbreviations *p.* for *page* and *pp.* for *pages*. Some federal departments and some scientific disciplines are beginning to use the single abbreviation *p.* for both *page* and *pages*. If you choose to use the single form of the abbreviation, do so throughout your entire document.

Alternative A **would** cost about \$400,000 the first year because the man-made improvements **would** be removed.

Alternative B **would** cost about \$100,000 the first year. The man-made improvements **would** remain and **would** be modified to blend with the landscape.

EXAMPLE 4.2.11—Use *would*, not *will*, to forecast actions and effects under all alternatives.

According to recent studies (Jones 1986, pp. 234–237, and Clarkson 1988, pp. 45–46), lamb survival depends directly on the nutritional value of browse available to ewes, which itself is a function of the moisture available from early spring through June.

EXAMPLE 4.2.12—Careful citations to sources make your discussions more credible.

***4.3 Effects on Resource Y**

- 4.3.1 Alternative A (No Project)
- 4.3.2 Alternative B (Proposed Project)
- 4.3.3 Alternative C (Short Title)
- 4.3.4 Alternative D (Short Title)

or

***4.3 Effects of Alternative B
(Proposed Project)**

- 4.3.1 Resource X (Issue 1)
- 4.3.2 Resource Y
- 4.3.3 Resource Z (Issue 2)

***4.4 Effects on Resource Z (Issue 2)**

or

***4.4 Effects of Alternative C
(Short Title)**

Sections 4.3, 4.4, and other second-level subheadings continue the organization introduced at the beginning of Chapter 4. In sections 4.3, 4.4, and other subheadings, follow the suggestions for writing presented for section 4.2 (pp. 45-51).

4.10 Significant Adverse Effects

4.11 Sustainability of Resources

4.12 Irreversible Commitments of Resources

4.13 Any Other Disclosures

Note: The preceding subsections (4.10, 4.11, 4.12, and 4.13) usually conclude Chapter 4. Their numbering, of course, would change according to the number of resources and alternatives covered earlier in Chapter 4.

As an option, some writers combine the contents of sections 4.10, 4.11, 4.12, and 4.13 into a single section that summarizes these key legal disclosures.

4.10 Significant Adverse Effects

The significant adverse impacts discussed in this subsection will be a summary of impacts discussed earlier in Chapter 4. The reason for summarizing them here is to highlight them for both the decisionmakers and members of public.

CEAA

Section 20

- (3) Where the responsible authority takes a course of action pursuant to paragraph (1)(b) in relation to a project,
 - (a) the responsible authority shall file a notice of that course of action in the public registry established in respect of the project pursuant to section 55; and
 - (b) notwithstanding any other Act of Parliament, no power, duty or function conferred by or under that Act or any regulation made thereunder shall be exercised or performed that would permit that project to be carried out in whole or in part.

4.11 Sustainability of Resources

The sustainability of resources is an increasingly important topic, both for governmental authorities and for environmental groups. The planet's resources are being harvested or used at an increasing rate, and environmental professionals are now concerned that the human use of some resources is so intensive that these resources will cease to be available for future generations.

Managing resources for future sustainability is, therefore, an important environmental goal, as defined in Section 2 of CEAA. As such, specialists should make their best estimates about the future status of each resource potentially affected by a proposed project (or alternatives). Usually, estimates will examine the balance (trade-offs) between short-term uses and long-term productivity.

The terms *short-term* and *long-term* need definitions consistent with the scope of the proposed project and with resource-specific information. For instance, *long-term* means something quite different in eastern and western Canadian forests. Eastern forests can grow to maturity in 80 to 100 years while many western forests would take two or three times as long. Each resource, of necessity, has to provide its own definitions of *short-term* and *long-term*.

Once short-term and long-term forecasts are in place, the responsible authority can use this information about ultimate sustainability to make an informed decision.

CEAA

Section 2

“Sustainable Development” means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs

4.12 Irreversible Commitments of Resources

Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long term. The classic instance is when a plant or animal species becomes extinct; this is an irreversible loss. Mining is a similar case; once ore is removed, it can never be replaced. Recent reports suggest that to replace the ecosystem of an old-growth western forest might take 300, 400, or even 500 years. Given the long-term nature of the effects, clear cutting an old-growth forest becomes an irreversible commitment of resources.

4.13 Any Other Disclosures

Other disclosures vary from federal department to department or province to province.

Check your department procedures for requirements as to these other disclosures.

LIST OF PREPARERS (CHAPTER 5.0)

Name	Contributions	Degree(s)	Years Experience
Joan Ascher	Hydrology	BS Forestry MS Hydrology	8
David Buell	Soils	BS Soils	6
Susan Cassidy	Forestry/Editor	BA English MS Forestry	9
Edward Davies	Fisheries/Team	BS Fish Biology	10

EXAMPLE 5.2—A comprehensive list of preparers helps make the EA Summary credible.

SUGGESTIONS FOR WRITING

5.0 List of Preparers

- 5.1 Identify the section(s) of the environmental assessment summary written by each individual on the team of environmental specialists. Your files should also contain documentation to show how much the various individuals contributed to the environmental assessment process and to the document.
- 5.2 As appropriate, distinguish between core team members and specialists who contributed only backup studies or data. Also, indicate team members and specialists who are no longer assigned to the project or employed by the department.
- 5.3 Supply brief resumes, highlighting the expertise or experience that lends the most credibility to the sections written by each person. Usually, you should give each person's academic degrees and years of experience with the department.
- 5.4 Identify specialists or advisors from outside your department who contributed to the analysis.

LIST OF DEPARTMENTS, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE SUMMARY OF AN ENVIRONMENTAL ASSESSMENT ARE SENT (CHAPTER 6.0)

SUGGESTIONS FOR WRITING

6.0 List of Departments, Organizations, and Persons to Whom Copies of the Environmental Assessment Are Sent

6.1 Keep an orderly list of all departments, organizations, and persons to whom copies of the screening or comprehensive study are sent.

This list by itself is sometimes the sole content of Chapter 6. See example 6.1.

6.2 Maintain a complete list of all people who contribute any information to the project or who inquire about the project.

6.4 (Optional) Summarize your initial planning process and describe your public participation activities. This summary reminds reviewers (and perhaps the courts) that you did make adequate attempts to notify the public and any other interested departments and parties.

As in example 6.4, you might include a variety of information besides a circulation list:

- Consultation and coordination with other federal or provincial departments
- Public participation
- Issues eliminated from detailed analysis

CHAPTER 6. CONSULTATION WITH OTHERS—PUBLIC INVOLVEMENT PROCESS

The chief purpose of this chapter is to list those departments, organizations, and persons who were consulted in the EA process and to outline the public involvement process. Also important are those individuals attending the public scoping meetings. This chapter, therefore, has four sections:

- A list of parties who contributed information and views to the EA
- A list of parties attending the public scoping meeting held in Alberta, Canada, on September 15, 1992
- A list of departments, organizations, and persons to whom the summary of the environmental assessment will be or has been sent
- Public involvement process

EXAMPLE 6.4—Optional Chapter 6 demonstrates that the responsible authority has informed the public and other governmental departments.

APPENDICES

SUGGESTIONS FOR WRITING

Appendix

1. Limit appendices to material that is indeed essential to the summary of the environmental assessment. One test is that the appendices should not contain material just pulled from the files; instead, include reports or data prepared just for the summary.
2. Use contrastive numbering systems for the main chapters and the appendices. So, if the chapters are called 1, 2, etc., then the appendices should be called A, B, etc.
3. Number the appendices using the appendix number and then the page number from that appendix: B-3, B-4, etc.

INDEX

SUGGESTIONS FOR WRITING

Index

1. Most complex summaries of an environmental assessment should include an index, as illustrated in example 1. A routine (short) screening does not need to have an index.
2. If possible, use a computer to help you alphabetize your entries. Be sure, however, that your final index reflects the final pagination of the printed document.
3. Make the index detailed enough so that it is actually useful to readers. For example, **include citations to all major issues, to all other resources, to environmental terms used, and to departments and groups involved with the proposed project.** An index this detailed will be more helpful to readers than an index that only cites major headings (as in a table of contents).
4. Include *See* and *Also see* references to help readers locate related information. A *See* reference tells readers to go to another entry in the index. *Also see* reminds readers to check related information.

Affected environment (Chapter 3) 3-1 to 3-7
 Air quality 3-4, 4-4, 4-8, 4-12, 4-17
 Alternatives 2-3 to 2-8
 Eliminated 2-2
 Compared 2-10
 Appeal rights iv
 Aquatic organisms 3-2, 4-3, 4-8, 4-11, 4-16
 Bighorn sheep 1-1, 2-3 to 2-8, 3-1, 4-1, 4-4, 4-7, 4-10
 Black-tailed deer. *See* Sitka black-tailed deer

EXAMPLE 1—*A useful index is fairly detailed. Invest enough time to make the index a useful tool for readers. For example, subheadings under “air quality,” “aquatic organisms,” and “bighorn sheep” would make this index more useful.*

GLOSSARY (TERMS, ABBREVIATIONS, AND ACRONYMS)

SUGGESTIONS FOR WRITING

Glossary

1. Include a glossary for all summaries of an environmental assessment. A glossary is helpful because many readers of a summary are unfamiliar with proponent and resource terminology. By including a glossary, you avoid having to include lengthy definitions in your text. You still may want to have informal (short) definitions within the text, leaving the longer definitions for the glossary. Glossaries occasionally appear at the beginning of documents, usually following the contents. Lengthy glossaries, however, will usually appear following appendices.
2. Include both resource terms and environmental terminology in your glossary. Either within the glossary or in a separate list, explain all acronyms, abbreviations, and symbols.
3. As in example 2 of the *groundwater* definition, identify the sources of your definitions whenever possible.
4. Compile the glossary as you work on the project, not at the end. Technical specialists, for example, should contribute definitions of their terms when they turn in their draft materials. Such early submissions help eliminate conflicting definitions from different team members. Also, careful editing is only possible when the terms and their definitions are clear.
5. For repeated projects or similar proposed actions, prepare a single glossary for inclusion in every summary that your department prepares.
6. For longer summaries, consider having both a total glossary **and** sub-glossaries throughout document.

For instance, you might include a brief glossary on hydrological terms as a lead-in to the discussions of hydrology in Chapters 3 and 4.

Groundwater

Water within the earth that supplies wells and springs. Specifically, water in the zone of saturation where all openings in soils and rocks are filled—the upper surface of which forms the water table. (From the *Wildland Planning Glossary*, USDA Forest Service General Technical Report PSW-13/1976)

CEAA

The Canadian Environmental Assessment Act (CEAA), which was assended to on 23 June 1992, establishes a federal environmental assessment process. CEAA applies only to projects for which the federal government has some decisionmaking responsibility.

EXAMPLE 2—*Make your glossary complete enough to be helpful to the lay readers, especially readers unfamiliar with CEAA.*

BIBLIOGRAPHY

SUGGESTIONS FOR WRITING

Bibliography

1. Collect all bibliographic entries into a single alphabetical list. The information in this list will make full footnotes unnecessary; instead, use parenthetical citations when you reference sources. See example 1.
2. Compile the bibliography as you work on the project, not at the end. Technical specialists, for example, should turn in bibliographic information along with their draft materials.
3. Make your bibliographic citations as specific as possible: author(s), date, full title (including subtitles), and the full source (edition, issuing group or press, and the city of publication). The format for this information, as illustrated in example 3, is fairly standard, but pick a format and use it from the beginning of your work on the summary for an environmental assessment.
4. Submit copies of all work cited when you submit your draft materials. For articles and short publications, submit clean, one-sided copies. For books, copy the pertinent pages or sections. These copies become part of the project file and are subject to copying, upon request. Do not rely on every team member keeping a file of their own publications cited.

An exception would be common reference books or other readily available texts. The test is their availability at both reference libraries and the department preparing the comprehensive study. Unless such references are widely available, include copies of the pertinent pages in the analysis file. Do not trust that you can locate such references after the EA is completed.

5. As in example 5, document carefully all informal sources—for example, personal letters and telephone calls. These should be included in the bibliography.

A recent survey of noxious weeds (Napier 1987, pp. 6–9) analyzed the economic loss to a typical sheep allotment from different types of noxious weeds.

EXAMPLE 1—*In many scientific publications, parenthetical citations are the preferred way to cite sources.*

Schwartz, Charles F., Edward C. Thor, and Gary H. Elsner. 1976. *Wildland Planning Glossary*. USDA Forest Service General Technical Report PSW-13. Berkeley, Calif.: Pacific Southwest Forest and Range Experiment Station.

EXAMPLE 3—*Make your bibliographic entries as complete as possible.*

MacMurphy, John. 1990. "Effects of Streamside Vegetation on Temperature." Personal telephone call, 24 May.

EXAMPLE 5—*Document even informal communication.*



APPENDIX A: BUILDING ORDER INTO THE EA SUMMARY

Follow the organization described on the preceding pages for the environmental assessment summary as required by the Canadian Environmental Assessment Act. In some instances you may be able to streamline or shorten this recommended organizations.

Even if you do decide to streamline this organization, be sure to retain the key conceptual framework. This framework draws on the following general categories as they apply to any well-designed environmental assessment:

- Establishing the objectives (purpose) and the scope of a proposed project
- Reviewing reasonable alternatives to the proposed project
- Profiling existing environmental conditions (the baseline situation)
- Estimating possible impacts of the project and alternatives (impacts are beneficial or adverse changes from the baseline situation)

This conceptual framework can be applied to all written environmental assessments and to mediation activities and panel reviews.

1. The Canadian Environmental Assessment Act (CEAA) is an important starting point whether you are preparing a screening report or a comprehensive study report. The Act is also an important reference if an environmental project moves into mediation and panel review phases. Mediation and review panels also lead to documents, but the suggestions about writing these documents is beyond the scope of this guide.

2. Chapters 1 and 2 (1: Introduction and Overview of the Proposed Project and 2: Comparison of the Alternatives Including the Proposed Project, No Project, and Other Action Alternatives) present managerial information to the decisionmaker and any interested publics. These two chapters usually contain almost everything a reader needs to know to understand the environmental implications of a proposed project.

Therefore, this organization is designed to be as user friendly as possible. The organization is also predictable because it reflects the commonly accepted conceptual approach to environmental assessments.

3. Chapters 3 and 4 (3: Affected Environment and 4: Environmental Effects) present technical and scientific support for the managerial information in Chapters 1 and 2.

CEAA

Section 2

“**Comprehensive Study**” means an environmental assessment that is conducted pursuant to section 21 and that includes a consideration of the factors required to be considered under subsections 16(1) and (2)

“**Environmental Assessment**” means, in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with this Act and the regulations

“**Screening**” means an environmental assessment that is conducted pursuant to section 18 and that includes a consideration of the factors set out in subsection 16(1)

4. Environmental professionals should identify, as early as possible, the major environmental issues. These issues then guide all steps in the environmental analysis and the internal order of all sections in an environmental assessment (both screenings and comprehensive studies). Minor issues also have a role in the environmental assessment summary, if for no other reason than readers want proof that the responsible authority has considered both major and minor issues prior to making a decision

Issue-driven environmental assessment summaries will automatically be analytic rather than encyclopedic.

5. A well-written and carefully edited environmental assessment summary has clear summaries, section overviews, and other helpful editorial features. Without such features, readers are likely to be overwhelmed by resource data and technical analyses.
6. The team of specialists working on an environmental assessment summary must agree, as early as possible, on a detailed outline for the final document. All specialists should then follow this detailed outline when they prepare their technical discussions.

7. The team should also prepare a full page-by-page mockup as early as possible. Use this mockup to plan how each page will look, including any visual aids.
8. Both a screening report and a comprehensive study report are disclosure summaries—that is, they both disclose the essential environmental information the responsible authority has considered before making a decision on a project.

APPENDIX B—A COMPLIANCE CHECKLIST FOR AN EA SUMMARY

The EA summary checklist on pages B-2 through B-4 is keyed to the CEAA. Thus, the checklist presents the legal minimums for an adequate EA summary.

The Shipley Environmental suggestions in the preceding pages are consistent with the CEAA as presented in the EA summary checklist. You should be aware, however, that this checklist does not include every suggestion or technique presented in *Preparing the EA Summary*. The Shipley suggestions, especially those that go beyond the CEAA minimums, are intended to help proponents and provincial and federal departments more effectively disclose the potential environmental effects of their actions while still complying fully with the CEAA.

Every proponent or provincial or federal department have their own preferences as to what an acceptable EA summary should look like. The EA summary checklist is, therefore, a good starting point for a legal review of an EA summary, but the checklist will not cover every item a department considers desirable.

EA Summary Checklist (CEAA)

Document _____
 Reviewer _____ Date _____

	CEAA Reference	Covered	Not Adequately Covered	Not Covered	Not Required	Remarks
Executive Summary (Optional for EAs):						
Adequately and accurately summarizes statement or assessment.						
Emphasizes:						
Major conclusions (especially environmental impacts of all alternatives).						
Areas of controversy.						
Issues raised by agencies and public.						
Issues to be resolved.						
Choice among alternatives and identification of the preferred alternative.						
Does not exceed 15 pages.						
1.0 Introduction and Overview to the Proposed Project						
Purpose and need of proposed project.						
Documents influencing the scope of this EA summary.	Sections 16 and 24					
Include decisions that must be made and agencies and public involved.						
Public participation involvement and major resource indicators identified.	Sections 16, 18, and 22					
Federal, provincial, or municipal permits, licenses, authorizations, regulations, and entitlements.	Sections 5 and 24					
Remaining chapters previewed.						
2.0 Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives						
Describe the alternatives including the proposed project, no project, and other action alternatives.	Sections 2 and 16					
Alternatives are reasonable alternatives in light of the objectives (selection criteria).						
Comparison of alternatives.						
For alternatives eliminated from detailed study, briefly discuss reasons they were eliminated.						
Devote substantial and equally detailed treatment to each alternative considered in detail including proposed action.						
Include no project alternative.						
Include appropriate mitigation measures.	Sections 2 and 20					

EA Summary Checklist (CEAA)

	CEAA Reference	Covered	Not Adequately Covered	Not Covered	Not Required	Remarks	
3.0 Affected Environment	Sections 16 and 18						
Shall succinctly describe environment of area(s) to be affected or created by alternatives under consideration. (Shall be no longer than necessary to understand effects of alternatives.)							
Shall concentrate effort and attention on important issues; especially the presence or absence of the following potentially significant resources:							
Floodplains?							
Wetlands?							
Threatened, endangered, or candidate species and/or their critical habitat, and other special status species?							
National parks, provincial parks, forests, conservation areas, or other areas of recreational, ecological, scenic, or aesthetic importance?							
Natural resources (e.g., timber, range, soils, minerals, fish, migratory birds, wildlife, water bodies, aquifers)?							
Property of historic, archeological, or architectural significance?							
Indigenous populations concerns?							
4.0 Environmental Effects (forms scientific and analytic basis for comparisons under alternatives including proposed project).	Sections 2 and 16 Section 2						
Environmental effects of proposed project and alternatives.							
Any adverse environmental effects which cannot be avoided should proposed project be implemented.							
Relationships between local short-term uses of man's environment and sustainability of resources.							
Irreversible commitments of resources.							
Shall include:							
Direct effects and their significance.							
Indirect effects and their significance.							
Both beneficial and adverse impacts.							
Cumulative impacts and their significance.							
Energy requirements and conservation potential of various alternatives and mitigation measures.							

EA Summary Checklist (CEAA)

	CEAA Reference	Covered	Not Adequately Covered	Not Covered	Not Required	Remarks
Environmental Effects (cont.)						
Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.						
Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.						
Means to mitigate adverse environmental impacts (if not fully covered in Chapter 2.0 Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives).						
5.0 List of Preparers						
Shall list names, together with their qualifications (expertise, experience, professional disciplines) of persons primarily responsible for preparing document or significant background papers.						
6.0 List of Departments, Organizations, and Persons to Whom Copies of the Screening or Comprehensive Study Are Sent						
Shall be sent to any of the listed groups or individuals, guaranteeing full and honest notification and disclosure.						
Appendices (Optional)						
Consists of material prepared in connection with the document (as distinct from material which is not so prepared and which is incorporated by reference).						
Consists of material which substantiates any analysis fundamental to the document.						
Analytic and relevant to decision.						
Circulated with environmental document or readily available upon request.						

DRAFT

**SUNCOR ENERGY INC.
PROJECT MILLENIUM**

**Draft Environmental
Assessment Summary**

October 1998

Table of Contents

Executive Summary	5
Chapter 1: Introduction and Overview of the Proposed Project	6
1.1 Project Overview.....	6
1.2 Purpose.....	7
1.3 Need	7
1.4 Project Timing.....	8
1.5 Public Consultation Program	10
1.5.1 Suncor's Public Consultation	10
1.5.2 Project Millennium Consultation	11
1.5.3 Responsible Authority Consultation.....	11
1.6 Project Issues	12
1.6.1 Air.....	12
1.6.2 Water (Hydrology and Geohydrology; Fish Habitat and Fisheries).....	12
1.6.3 Resource Use and Land Disturbance (Terrestrial Effects; Vegetation and Wildlife Habitats)	12
1.6.4 Social Economic	12
1.6.5 Resource Recovery	12
Chapter 2: Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives	13
2.1 Introduction and Overview	13
2.2 Description of the No Project Alternative	13
2.2.1 Bitumen Production - Mining and Extraction	13
2.2.2 Upgrading	14
2.2.3 Energy Services.....	14
2.3 Description of the Proposed Project.....	15
2.3.1 Scope of the Proposed Project.....	15
2.3.2 Mitigation for Project Millennium.....	19
2.4 Alternatives to the Project.....	22
2.4.1 Mining Options.....	22
2.4.2 Extraction Options	23
2.4.3 Tailings Disposal Options	23

2.4.4	Upgrading Options	23
2.4.5	Energy Services Options	24
2.5	Comparison of Environmental Effects	24
Chapter 3: Affected Environment.....		26
3.1	Introduction and Overview	26
3.1.1	Spatial and Temporal Boundaries	26
3.2	Air	28
3.3	Water	28
3.3.1	Surface Hydrology and Hydrogeology	28
3.3.2	Water Quality	29
3.3.3	Fish and Fish Habitat	30
3.4	Terrestrial	33
3.4.1	Terrain and Soils	33
3.4.2	Vegetation	33
3.4.3	Wildlife	34
3.5	Human Health.....	36
3.6	Socio-Economic Conditions.....	37
3.6.1	Economics	37
3.6.2	Traditional Land Use.....	37
3.7	Physical and Cultural Heritage.....	38
3.7.1	Archaeology.....	38
3.7.2	Traditional Resources.....	38
3.7.3	Palaeontological Resources	38
3.8	Relationships Among Components.....	38
3.9	Sensitivity to Disturbance.....	39
Chapter 4: Environmental Assessment of Effects.....		41
4.1	Methods and Overview.....	41
4.2	Air Quality.....	42
4.2.1	Sulfur Dioxide (SO ₂)	42
4.2.2	Nitrogen Dioxide (NO ₂)	43
4.2.3	Carbon Monoxide (CO).....	44
4.2.4	Particulate Matter (PM).....	45
4.2.5	Volatile Organic Compounds (VOC).....	46
4.2.6	Total Reduced Sulfur (TRS)	46
4.2.7	Acid-Forming Compounds (NO _x and SO ₂)	47
4.2.8	Ground Level Ozone.....	49
4.2.9	Noise.....	49
4.2.10	Green House Gases	50

4.3	Water	51
4.3.1	Surface Hydrology and Hydrogeology.....	51
4.3.2	Water Quality.....	51
4.3.3	Hydrogeology and Hydrology.....	56
4.3.4	Fish and Fish Habitat.....	58
4.4	Terrestrial	64
4.4.1	Soils and Terrain.....	64
4.4.2	Wildlife.....	69
4.4.3	Wildlife.....	69
4.5	Human Health	74
4.6	Effects on Socio-Economic Conditions	75
4.7	Physical and Cultural Heritage	78
4.8	Effects on Current Land Use and Resource Use by Aboriginal Persons	78
4.8.1	Traditional Land Use.....	78
4.8.2	Resource Use.....	80
4.9	Effects on Sustainable Use of Renewable Resources	80
4.10	Effects of Environment on the Project	81
4.11	Effects of Malfunctions or Accidents	81

Executive Summary

[Text to be written. This overview is optional. For a short, uncomplicated EA Summary, no overview would be necessary. In other cases, an overview would help reviewers and other users of the EA Summary to obtain a quick overview of the contents to follow.]

Chapter 1

Introduction and Overview of the Proposed Project

This Environmental Assessment (EA) Summary presents the major findings and supporting information, as collected in the full Environmental Impact Analysis file. Primary users of this EA Summary would be reviewers of the EIA file. Other users would include staff members within the responsible authority.

Chapter 1.0 contents are designed to introduce readers to the proposed project and to those regulatory and environmental issues that would influence the shape and extent of the proposed project.

Chapter 1.0 opens with the Project Overview (Section 1.1), which briefly describes Suncor's Project Millennium. Sections 1.2 and 1.3 continue by identifying the purpose and need that give rise to the proposed project. Section 1.4 summarizes Suncor's proposed project schedule. Section 1.5 summarizes Suncor's public consultation, including Suncor preliminary contacts with the responsible authority. Section 1.6 introduces the five major environmental issues that are relevant to the final shape and extent of the project that the responsible authority will authorize.

1.1 Project Overview

Suncor's Project Millennium will include the expansion of the Steepbank Mine and a new ore preparation plant and service complex. Suncor proposes to commence operations in late 1998.

Suncor Energy Inc. has applied to the Department of Fisheries and Oceans for authorization of the harmful alteration, disruption or destruction of fish habitat under Section 35(2) of the Fisheries Act. Authorization cannot be granted under this Act until a Comprehensive Study Report is finalized.

Suncor's oil sands activities are located 35 km north of Fort McMurray in northeast Alberta (Figure 1). The present operations are situated on the west side of the Athabasca River and include the Lease 86/17 Mine and a base plant comprising Extraction, Upgrading and Energy Services. The proposed Project Millennium development, linked by a bridge over the Athabasca River, is situated on the east side of the River.

Project Millennium will further increase the production capacity of upgraded crude oil products at Suncor's oil sands plant to a minimum of 210,000 barrels per day (bpd) from the currently approved production of 105,000 bpd, by 2002. Sufficient reserves have been acquired to sustain that rate for over thirty years. The production expansion will be achieved through the expansion of Steepbank Mine and the addition of a second upgrading train. Project Millennium (with a capital cost of \$2 billion) includes all activities required to plan, construct and operate a major facility expansion that comprises the following:

- An expansion of Steepbank Mine to supply ore to support bitumen production capacity of 260,000 bpd.
- Millennium Extraction Plant (primary separation plant) located on the east side of the Athabasca River to produce raw bitumen.
- Raw bitumen pipeline to the existing Base Extraction Plant.
- Modifications to the Base Extraction Plant to clean the raw bitumen and produce a diluted bitumen product.
- A second Upgrader train to produce a slate of upgraded crude oil products.
- Modifications and additions to the Energy Services steam and power generation as well as other infrastructure to facilitate the increased production level.

The Project includes integrated management plans for all tailings produced by both Extraction Plants and an integrated reclamation plan for current and future tailings ponds. Management, control and mitigation of environmental effects during construction and operation of both the mine and plant facilities as well as reclamation of the mine area is inherent in the project scope.

The proponent for Project Millennium is Suncor Energy Inc., Oil Sands (Suncor). Corporate offices for Suncor Energy Inc. are located in Calgary, Alberta. The contact for Project Millennium is:

Mr. Mark Shaw
Director, Sustainable Development
Suncor Energy Inc.
P.O. Box 4001
Fort McMurray, Alberta
T3H 3E3

In addition to maintaining Suncor's current workforce of 1,600 full-time employees and 380 contractors, Project Millennium

will result in the creation of about 800 direct jobs and 1,200 indirect jobs. The on-site construction workforce will peak in the year 2000 at 2,500 to 3,000. Average annual operating expenditures for Project Millennium are estimated at \$285 million (incremental).

1.2 Purpose

The purpose of Project Millennium is to develop oil sands reserves in the Steepbank Mine area at a faster rate. The expanded operation meets Suncor's 1992 strategic plan improving long-term profitability and making production costs competitive with those of Canada's top producers of conventional crude oil. The strategy included a change in mining technology, expansion of plant design capacity, acquisition of additional oil sand leases, enhancement of revenues through product mix, and improvements in environmental performance.

1.3 Need

The Project would allow Suncor to extend and expand the benefits of its project in the local, regional and provincial economies. Since announcement of its 1992 oil sands growth strategy in 1992, Suncor has increased production and reduced operating costs. Viability of Suncor's oil sands operation has been demonstrated through reduction in cash costs per barrel (bbl) (including sustaining capital) from \$19.50/bbl in 1992 to the current \$14/bbl to \$15/bbl range.

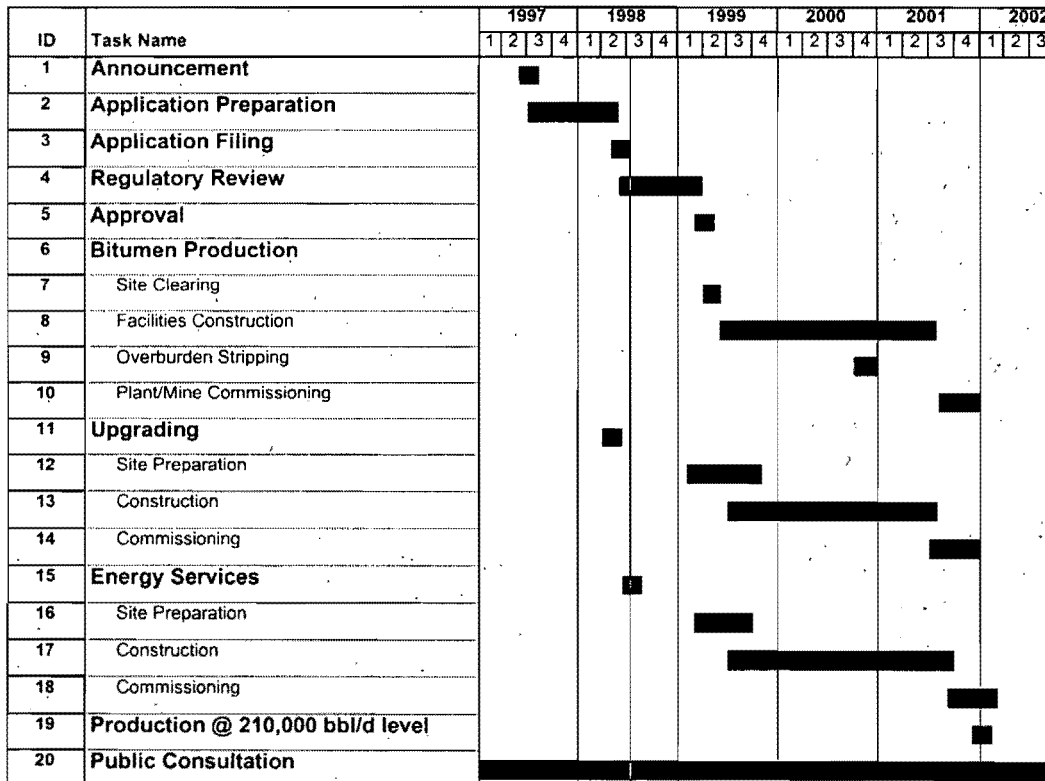
Reserves at Suncor's current Lease 86/17 Mine will be depleted in 2001. In 1996, Suncor applied for and received approval to develop Steepbank Mine (in conjunction with modifications to fixed plant facilities). The Steepbank Mine will commence production in late 1998 and will provide 50% of the extraction feed in 1999, then 100% of feed by 2002. After full production is reached, Project Millennium's cash operating costs

(including sustaining capital) are expected to average \$10/bbl to \$11/bbl. Lower operating costs further improve the competitive position of oil sands production in the marketplace and reduce the vulnerability of the operation to world oil price shocks.

Development and operation of Project Millennium will provide a number of significant benefits to the Wood Buffalo Region, the Province of Alberta and Canada. Of specific importance to Fort McMurray and the Regional Municipality of Wood Buffalo (RMWB) is the creation of approximately 800 direct jobs and positive economic spin-offs from development and employment. There will be moderate impacts during project construction and operation, as expected for a project of this nature.

1.4 Project Timing

The mine planning and environmental impact assessment (EIA) associated with Project Millennium were prepared as additions to (continuations of) the baseline work completed for the Suncor Steepbank Mine in 1996. Project Millennium-specific baseline work, which commenced in 1997, included a drilling program and environmental studies. Formal consultation on the Project began on August 1, 1997 with the issuance of the Project Millennium Public Disclosure Document. The proposed Terms of Reference for the EIA were issued to regulatory agencies and public stakeholders for review on August 1, 1997.



The overall schedule for Project Millennium is 54 months from the project disclosure to commencement of full production. The schedule includes a 27-month construction period between mid-1999 and the third quarter of 2001. Commencement of Project Millennium construction is timed to follow completion of all of the planned Suncor Fixed Plant Expansion and Steepbank Mine construction activities.

The overall schedule for Project Millennium (from disclosure to full production) is shown below. This schedule provides one year for regulatory review and approval. Regulatory review of the application is in progress with approval anticipated in the first half of 1999. Bitumen production, upgrading and energy services site preparation,

construction and commissioning will take place from 1999 to 2001. Production is scheduled for late 2001 or early 2002. The public consultation program will be ongoing through the construction and production phases.

Regulatory approval by the end of first quarter 1999 or sooner is important to Project Millennium as it allows Suncor to take advantage of the 1999 spring and summer construction window and thus achieve the project startup date of 2002.

Figure 1. Suncor Project Millennium Location Map.

1.5 Public Consultation Program

Public consultation relating to Project Millennium was consisted of three parts that were: 1) Suncor's ongoing program, 2) Suncor's consultation on Project Millennium, and 3) Responsible Authority consultations as part of the Comprehensive Study. Results of these consultations are discussed in the following:

1.5.1 Suncor's Public Consultation

Suncor held public forums, issued community newsletters and maintained an Internet Web site as primary tools for information dissemination on base operations. To strengthen and maintain relationships with key stakeholder periodic groups meetings were held. In some relationships, Memorandums of Understanding (MOU) are maintained where specific needs are addressed. Suncor has MOU's with the communities of Fort McKay and Fort Chipewyan, and the Oil Sands Environmental Coalition (OSEC). OSEC consists of the Fort McMurray Environmental Association, Pembina Institute for Appropriate Development, Environmental Resource Centre, and Toxic Watch Society. A separate MOU is under development with the Athabasca Chipewyan First Nations (ACFN).

The aboriginal communities in the region are essential to the consultation process because of the land-based nature of oil sands development, proximity to development activities and their special needs resulting from development impact. Suncor has an Aboriginal Affairs program that focuses on employment and business development opportunities, environmental initiatives, education and training, and community culture.

Regional consultative initiatives cover the entire range of environmental and socio-economic issues. In 1997, three committees were struck in response to the announced development plans by

Suncor and other companies and the concern about cumulative effects. These are as follows:

- The Regional Infrastructure Working Group (RIWG) was formed to identify and prioritize infrastructure and service needs in the Regional Municipality of Wood Buffalo (RMWB). The industry and RMWB members of RIWG work through a number of sub-committees that involve community stakeholders.
- The Athabasca Oil Sands Cumulative Effects Assessment (CEA) Initiative was begun to develop a framework of cooperation and consultation among developers and regional stakeholders. The first priority was to establish a reasonable maximum development scenario and standardize assessment methodology. The group is currently considering a regional environmental management system to address cumulative impacts.
- The Athabasca Oil Sands Development Facilitation Committee (AOSDFC) was struck to enable expedient resolution of development issues within the RMWB. This committee, consisting of senior company members, two MLA's, and a RMWB representative, directs recommended actions by RIWG or any other group to the appropriate authorities.

Other regional initiatives include the Wood Buffalo Environmental Association (WBEA), Regional Air Quality Coordinating Committee (RAQCC), Regional Aquatics Monitoring Program (RAMP) and the Regional End Land Use Committee (RELUC). The RAQCC has two main sub-committees responsible for ambient air and effects monitoring. This committee was responsible for the initiation of the Regional Health Study.

Other working groups are currently developing guidelines for wetlands and terrestrial reclamation.

1.5.2 Project Millennium Consultation

Public consultation for Project Millennium followed the project development life cycle phases. These phases included: disclosure, EIA Terms of Reference, issues scoping, methods review, project feasibility engineering integration with EIA and EIA results review and documentation for filing. Ongoing reviews and discussions are taking place with the OSEC, RMWB, Fort McKay First Nations (FMFN), and ACFN as well as ongoing relations with local communities. The consultation events associated with Project Millennium from time of disclosure in August 1997 to June 1998 are summarized in Appendix 3.

The collective and cumulative influence of stakeholders on project design and impact mitigation has involved interaction from the Steepbank Mine process and ongoing consultation for Project Millennium from the time of project disclosure through to the filing of the Application. Consultation is continuing to ensure understanding and identify where further refinements to Project Millennium are possible.

The process of assimilating stakeholder input for project consideration is done by various means such as recording of consultation proceedings and use of a computer data base system. As this information is processed in project planning stages common themes evolve which are the basis for EIA and design consideration.

1.5.3 Responsible Authority Consultation

The public consultation program completed by the Department of Fisheries and Oceans, Fish Habitat Management as Responsible Authority for the Project Millennium comprehensive study included:

1. Establishment and maintenance of a Public Registry for the project as required by the Canadian Environmental Assessment Act.
2. Consultation with the Canadian Environmental Assessment Agency.
3. Consultation with Federal Authorities participating in the review of Project Millennium:
 - Environment Canada
 - Indian and Northern Affairs Canada
 - Canadian Coast Guard (Department of Fisheries and Oceans)
 - Canadian Heritage, Parks Canada
 - Health Canada
 - Natural Resources Canada
4. Consultations with the Province of Alberta:
 - Alberta Environmental Protection
 - Alberta Energy Utilities Board
5. Consultations with First Nations:
 - Participation in the multi-stakeholder form of the Athabasca Oil Sands Cumulative Effects Assessment (CEA) initiative.
 - Meeting with a representative of the Fort McKay Industry Relations Corporation.

1.6 Project Issues

Issues identified by public stakeholders provided important input to the assessment for Project Millennium. Suncor's participation in stakeholder consultation were used by the proponent to focus the EIA. Issues identified as being of importance by stakeholders include the following ones, all of which are relevant to the final scope and extent of the proposed project that will be approved.

1.6.1 Air

- Effects of air emissions (sulphur dioxide, oxides of nitrogen and volatile organic hydrocarbons) on the regional environment as well as the health of regional residents.
- Greenhouse gas emissions
- Use of heavy equipment (trucks and shovels) throughout mining operation (air emissions).
- Extraction of bitumen from oil sands (air emissions).
- Production of air emissions from cokers, hydrotreater furnaces and the sulphur recovery plants, with burners designed for low-NO_x and CO emissions (air emissions).
- Production of air emissions from the steam production boilers (air emissions).
- Reduction of air emissions through use of electrostatic precipitators and flue gas desulphurization (air emissions).

1.6.2 Water (Hydrology and Geohydrology; Fish Habitat and Fisheries)

- Effects of water use and discharge from the development area on

regional water quality and health of users of those waters.

- Water released from dewatering of muskeg and overburden areas (water releases).
- Production of tailings and consolidated tailings (water releases).
- Water use for cooling purposes (water releases).
- Recovery of diluent from the diluted bitumen product from extraction (VOCs).
- Water use for steam, potable water and fire water (water withdrawal and releases).

1.6.3 Resource Use and Land Disturbance (Terrestrial Effects; Vegetation and Wildlife Habitats)

- Removal of surface vegetation from development area
- Reclamation (habitat recreation).
- Project reclamation and closure, and the end land uses for reclaimed mining areas.

1.6.4 Social Economic

- Impact of the project on regional and provincial socio-economic conditions.

1.6.5 Resource Recovery

- Production of fuel gas, coke and sulphur by-products
- Production of gypsum by the flue gas desulphurization unit for use in consolidated tailings process (resource use and reclamation).

Chapter 2

Comparison of Alternatives Including the Proposed Project, No Project, and Other Action Alternatives

2.1 Introduction and Overview

The purpose of this chapter is to introduce the proposed project and reasonable alternatives (including the no project alternative). Alternatives are important to environmental decision making because, without alternatives, federal and provincial reviewers cannot accurately assess the environmental pros and cons of the proposed project. Sections 2.X, 2.X and 2.X summarize the proposed project, the no project alternative, and the other action alternatives.

Sections 2.X summarizes the environmental effects of the proposed project, of the no project alternative, and of the action alternatives. This summary of effects relies on the technical analyses discussed in detail in Chapter 4.0.

2.2 Description of the No Project Alternative

2.2.1 Bitumen Production - Mining and Extraction

Bitumen Production includes the process of recovering the oil sands ore, transport to an extraction facility where bitumen is removed from the oil sands, and management and reclamation of tailings from the extraction process in tailings and consolidated tailings ponds.

Mining is initiated following site preparation, during which trees are

cleared and drainage systems are established to remove waters from muskeg and overburden materials that cover the oil sands ore. It is accomplished using a truck and shovel operation. The overlying materials are handled such that muskeg is moved to reclamation areas or reclamation material stockpiles, while the overburden is transported to areas of the development where no ore exists or where the ore has already been removed. Removal of the oil sands may involve the use of explosives (blended ammonium nitrate and fuel oil - ANFO) to ensure the ore is broken into lumps that can be handled by the shovels. A limestone quarry, located in the bedrock material under the oil sands deposit, is also operated as part of the mining operation. Limestone from the quarry is used for road construction and for the Suncor flue gas desulphurization unit in Energy Services.

Extraction of bitumen from oil sands involves the application of water and heat to the ore to separate bitumen from the sand and clays (i.e. primary extraction). A number of secondary extraction processes, including the use of diluent, are employed to maximize recovery and remove residual clays from the bitumen. A diluent recovery process removes the majority of the diluent from tailings. Most of the water used in the extraction process comes from recycle of waters previously used during extraction. Much of the heat used for extraction is obtained from an Upgrading waste heat recovery

program. The Project Millennium extraction process will be operated at a lower temperature (55 C) than the existing extraction operation. No caustic will be added to improve extraction efficiency.

The final aspect of Bitumen Production includes management and reclamation of the waste by-product of mining and extraction. Removed overburden, in combination with other mining by-products, is used to create new landforms on the mining area. The tailings materials are ultimately stored in large tailings ponds within the mined out pits. Suncor recently initiated a new tailings management process (i.e. consolidated tailings (CT)) where gypsum, which is one of the waste by-products of the Suncor powerhouse flue gas desulphurization unit, is added to a mixture of fresh tailings and mature fine tailings (from existing tailings ponds) to produce a mixture which dewateres rapidly compared with conventional tailings.

2.2.2 Upgrading

Suncor's upgrading facility functions to convert bitumen into a product mix that consists of light, sweet and sour crude oils and diesel, formulated to meet market demands. Products recovered before coking are referred to as virgin sour crude. Products recovered after coking are called sour coker crude. Either of these products can be further upgraded to light, sweet crude. Suncor blends oil products to meet individual customer requirements. Products are shipped south to markets via an existing pipeline.

Other by-products of the bitumen upgrading include petroleum coke, sulphur and fuel gas. Coke is a carbon by-product that is used as a fuel for Suncor's Energy Services unit. Suncor recently arranged for an external purchaser for some of the surplus coke. Sulphur that is recovered during the

upgrading process is marketed. Produced fuel gas is used to fuel the Upgrading furnaces.

The Upgrader is comprised of cokers, hydrotreaters and sulphur recovery units as well as product storage tanks and a hydrogen production facility. The change in the Suncor Upgrader related to Project Millennium is the construction of a parallel complex with appropriate strategic interconnections and integration with the existing facilities. A new feature for Suncor Upgrading is the addition of a tail gas recovery system that reduces emissions from the sulphur plant operation. The Project Millennium design approach incorporated numerous advanced features into the plant that, for reasons of process and space availability, would be difficult to retrofit into the existing operation. The plant will be fully integrated with the Extraction and Energy Services facilities. The Millennium Upgrader is designed to run for up to five years between total maintenance shutdowns. Both the Project Millennium Upgrader and the existing Base plant Upgrader are designed to be fully functional when the alternate Upgrader is down for turnaround maintenance. If a significant process upset or emergency occurs on one Upgrader train, the other train is designed to remain unaffected.

Figure 4 shows a schematic of the Upgrading facility as well as the connected mine, ore preparation and extraction systems.

2.2.3 Energy Services

The Energy Services facilities are designed to provide industrial utilities (water, steam, electric power and compressed air) to satisfy energy and other service demands from the Mining, Extraction, Upgrading and Administration areas.

Major components of Energy Services include raw water supply, water treatment, steam production boilers, turgogenerators, electrostatic precipitators, flue gas desulphurization, electrical distribution, waste heat recovery system, fire water system and an air system. The Project Millennium system will be integrated with the existing plant complex, to support a maintenance turnaround philosophy allowing continuous production from either the existing Base plant or the proposed Millennium plant. Electrical power demand (three times present-day demand) is predicted to grow more rapidly than steam demand (two times present demand). Therefore, emphasis has been placed on the capability of the technology to produce electrical power efficiently.

2.3 Description of the Proposed Project

2.3.1 Scope of the Proposed Project

Project Millennium entails extensions to the currently approved Steepbank Mine area, establishment of primary extraction facilities on the east side of the Athabasca River, addition of a second train to the current Suncor Upgrader and establishment of required Energy Services to support the expanded Suncor operation. An aerial photograph of the Suncor Project Millennium is shown in Figure 2. For the purposes of the Canadian Environmental Assessment Act (CEAA), the scope of the project is defined by Fisheries and Oceans Canada as the construction, operation, decommissioning and abandonment of physical works associated with the following project components: 1) access corridors (utility and transportation elements), mine site (pits and bitumen extraction facilities), 3) tailings and overburden disposal areas, 4) and all

ancillary infrastructure and facilities related to the mining operations. Figure 3 shows the overall location of Project Millennium.

Project Millennium includes changes to several components of the current Suncor project. The current operation includes Bitumen Production (mining and extraction), Upgrading, Energy Services and Infrastructure, as shown in Figure 4. The Suncor operational components are described below.

Project Millennium will result in an increase in the Suncor mining area, development of a primary extraction facility on the east side of the Athabasca River and creation of tailings and CT ponds on the east bank mining area. The proposed Project Millennium overall mining layout is shown on Figure 4.

Figure 2. Suncor Aerial Photograph.

Figure 3. Project Millennium Overall Location.

Figure 4. Project Millennium Schematic.

2.3.2 Mitigation for Project Millennium

Suncor Energy Inc., as part of its detailed project planning, has committed to the following project specific mitigations. These mitigations would apply to the proposed project and to any Suncor alternatives subsequently developed. Suncor may discover the need for additional mitigations as it continues with its project planning, especially as it coordinates its planning with federal and provincial authorities.

As integral features of the project plan, all mitigations listed are assumed to apply to the proposed project. As such, all environmental effects summarized later in this chapter and discussed in detail in Chapter 4.0 represent those residual effects that would remain after all Suncor had taken all mitigation actions.

Mitigations dealing with a single environmental issue are listed together for ease of discussion.

Air

- Continue use of the Flue Gas Desulphurization (FGD) plant to reduce SO₂ and particulate emissions associated with coke combustion.
- Install a flare gas recovery project (scheduled for completion in 1999).
- Recompression of gases currently being continuously flared, for treatment and use in the planned flare gas recovery project.
- Use low-NO_x burners for new plant equipment.
- Use of mine fleet vehicles with improved emission control technology.
- Improve the quality of diesel fuels used for mine fleet vehicles.
- Implementation of a site-wide NO_x management plan.
- Use mine fleet vehicles with improved emission control technology.
- Water roads and active areas of the coke pile during warm weather periods to suppress dust.
- Participate in a regional ground-level ozone modelling program.
- Recompression of gases currently being continuously flared, for treatment and use in the planned flare gas recovery project.
- Tie-in of any new diluted bitumen and diluent tanks to the Vapour Recovery System.
- Modification of the diluent (e.g. narrower boiling range, and less benzene and light ends) for use in secondary extraction to improve recovery in the NRU and reduce volatile organic
- Continue use of the Flue Gas Desulphurization (FGD) plant to reduce SO₂ and particulate emissions associated with coke combustion.
- Install a flare gas recovery project (scheduled for completion in 1999).
- Recompression of gases currently being continuously flared, for treatment and use in the planned flare gas recovery project.
- Install two Claus sulphur recovery trains with a downstream tail gas treatment unit for the Millennium Upgrader.
- Use of low-NO_x burners for new plant equipment.
- Use of mine fleet vehicles with improved emission control technology.
- Install two Claus sulphur recovery trains with a downstream tail gas

treatment unit for the Millennium Upgrader.

- Manage greenhouse gas emissions on a corporate basis through implementation of a seven-point plan.
- Maintain its active role in the Regional Air Quality Coordinating Committee (RAQCC).

Water

- Dewater groundwater areas impacted by the mine operation, with diversion to the interception drainage system for discharge or containment in the process water recycle system.
- Divert natural surface waters from the mining operation area.
- Maintain flows to Shipyard Lake during the mining operations, with incorporation of a self-sustaining drainage stream to provide flows to this wetlands on Project closure.
- Re-establish self-sustaining surface hydrology systems on the closure landscape.
- Control the sediment released from the east bank mine area to levels compatible with the receiving watercourses.
- Use of an interceptor ditch around the tailings pond to capture seepages.
- Operate sedimentation ponds to polish muskeg dewatering flows (and equilibrate temperatures).
- Direct CT surface flows exclusively into the EPL.
- Develop wetlands systems to provide retention and bioremediation of process-affected waters.

Equilibrate temperature of muskeg drainage waters entering small streams

by increasing the retention times of sedimentation ponds.

Oxygen levels will be controlled in muskeg drainage waters. **All drainage waters will meet regulatory requirements set by AEP for DO and BOD.**

- Use an interceptor ditch around the tailings pond to capture seepages.
- Operate sedimentation ponds to polish muskeg dewatering flows (and equilibrate temperatures).
- Direct CT surface flows exclusively into the EPL.
- Develop wetlands systems to provide retention and bioremediation of process-affected waters.
- **Monitoring of sediment and water chemistry will be conducted during and after filling of the EPL, and an ongoing research program will provide additional information on the potential bioaccumulation of PAHs and metals**
- Direct CT surface flows exclusively into the EPL.
- Develop wetlands systems to provide retention and bioremediation of process-affected waters.
- Initially direct the release of EPL water to the Athabasca River, rather than to McLean Creek.
- Recycle all process-affected waters throughout construction and operation of the Project.
- Use water retention structures to regulate flows and control sediment in muskeg drainage and other water diversions.
- Implement measures to minimize water quality impacts.
- Use tailings release waters and other process-affected water for operational waters, to reduce raw

- water withdrawal from the Athabasca River.
- Distribute muskeg drainage and overburden dewatering evenly throughout the life of the mine to avoid a large increase in flows to receiving streams.

Habitat (Fish and Wildlife)

- Avoid habitat impacts in the Athabasca River.
- Avoid impacts in the Steepbank River (minimal disturbance of watershed, 100 m setback from the escarpment, mitigation to prevent sedimentation).
- Adjust inflows to Shipyard Lake to maintain fish habitat.
- Implement additional mitigation of fish habitat in McLean Creek if necessary.
- Fish habitat lost will be replaced and monitored to ensure that the "no net loss" objective is achieved.
- Recycle all process-affected waters throughout construction and operation of the Project.
- Use water retention structures to regulate flows and control sediment in muskeg drainage and other water diversions.
- Implement measures to minimize water quality impacts.
- Use tailings release waters and other process-affected water for operational waters, to reduce raw water withdrawal from the Athabasca River.
- Distribute muskeg drainage and overburden dewatering evenly throughout the life of the mine to avoid a large increase in flows to receiving streams.
- Reduce, by at least 50%, the amount of wastewaters released to the Athabasca River.
- Recycling of all process-affected waters throughout construction and operation of the Project.
- Implementing measures to minimize water quality impacts.
- Manage the EPL so that once it is filled, it is non-toxic to aquatic life.
- Develop a sustainable closure landscape and drainage systems by vegetating reclaimed surfaces to minimize surface erosion, building drainage networks and regime channels to minimize gully and channel erosion, and constructing wetlands and lakes to reduce flood peak discharges and sediment loadings to receiving streams.
- Develop wetlands systems on the reclaimed CT deposit areas, the reclaimed tailings pond area as well as in conjunction with reclamation drainage systems to provide retention and bioremediation of operational and reclamation waters.
- Locate the development away from important habitat (e.g. minimum of 100 m from the Steepbank and Athabasca rivers).
- Minimize the footprint of development (e.g. restricting dump size; use of common access and utility corridors).
- Leave movement corridors around the development area.
- Progressively reclaiming the development area.
- Maintain vegetation free shoreline in tailings pond areas.
- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.

- Measures to protect wildlife health through reduction in air and water emissions.
- Implement additional mitigation as required based upon results from further studies.
- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.
- Restrict access to this waterbody by wildlife as required based upon results from monitoring.
- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.

Human Health

- Suncor to maintain commitment to human health.
- Control air emissions and water discharges.
- Design closure landscapes to ensure acceptable risk.

Terrestrial Resources

- Suncor will use all available material on the mine footprint to minimize the impact on regional gravel resources.
- Trees will be salvaged from areas impacted by development to reduce the loss of this resource.

2.4 Alternatives to the Project

A number of alternatives for carrying out components of Project Millennium were considered during the pre-feasibility studies and initial engineering. Evaluation of project alternatives included consideration of technological fit with the existing operation, new technologies, environmental implications of the various alternatives and economics.

The Suncor oil sands project is currently approved to operate on Lease 86/17

located on the west side of the Athabasca River, as well as on the Steepbank Mine located on the east side of the river. The Suncor development occurs within the Fort McMurray - Athabasca Oil Sands area, for which a Subregional Integrated Resources Plan (IRP) was issued by Alberta Environmental Protection in 1996. This development, as well as other regional oil sands developments, is considered within the IRP. Two options exist with regards to the Suncor Project, including: 1) No project option, which would mean continuing the Suncor project operation as it is currently approved, or 2) upgrade the operation through construction of the proposed Project Millennium.

2.4.1 Mining Options

The location of additional mining areas for Project Millennium included review of lease areas currently held by Suncor. Primary considerations were resource size, compatibility with the current operation and the recently approved Steepbank Mine, and the environmental implications of the various mine areas. Technology reviews were conducted in advance of Steepbank Mine plan decisions in 1996 Suncor intends to continue with the Steepbank design for mine expansion and will use identical technology for mining, ore preparation and ultimately hydrotransport. A second primary extraction facility (Millennium Extraction plant) will be built in the east bank mining area. The Pit 2 mining area will require facilities for ore preparation, primary extraction and support. Two locations for these facilities were considered. Neither location would sterilize bitumen reserves but the selected site, called the North plant, is within the Athabasca River Valley.

2.4.2 Extraction Options

Project Millennium design incorporates several technology initiatives that are also found in the expanded Steepbank design. Some are currently operating while others will start up in 1998. In addition to these initiatives, Suncor evaluated several ideas which have the potential to effect further improvements in extraction performance, including: a froth treatment process, use of hydrocyclones in place of scroll centrifuges, and new specifications for froth treatment diluent. Other initiatives under active assessment, with the potential for inclusion in the Millennium design, include: a froth deaerator which requires no steam, eliminating the need for boilers at Millennium Extraction plant, a low-temperature raw bitumen pipeline, an additional recovery step in the froth treatment tailings process, and use of thickener/clarifier technology (including its extension to paste technology) to recover and recycle warm water from tertiary flotation tailings

Suncor is proposing to achieve an average of 92.5% bitumen recovery from ore and to sustaining a program of recovery improvement initiatives consistent with those identified in the Steepbank Mine application. The Millennium Project is intended to improve current performance by use of deep-cone separation cells in place of shallow cells with a rake mechanism and a tertiary recovery step incorporating flotation cells.

2.4.3 Tailings Disposal Options

The fundamental change from a standard tailings disposal operation to the consolidated tailings (CT) process means that reclamation of the produced tailings is significantly accelerated. A variety of methods were evaluated to reduce volumes of mature fine tails, including sand stabilization, freeze/thaw and

aggressive drainage. Using the CT method, fresh tailings are mixed with mature fine tailings pumped from existing tailings ponds as well as gypsum from the Suncor flue gas desulphurization unit. Deposition of the CT mixture still occurs into conventional tailings ponds. CT deposition systems evaluated included standard single pipe discharge, tremmie (multiple port disposal pipes) as well as above pond surface and below pond surface disposals. The selected tremmie system facilitates the separation of water from the clay-sand tailings mixture, thereby speeding the dewatering of the deposit, thereby allowing faster reclamation of the deposit to a viable terrestrial ecosystem.

2.4.4 Upgrading Options

Delayed coking technology was selected after consideration of several other potential conversion technologies, including fluid coking and various hydrogen addition processes. Delayed coking is the most well-known, widely-used and understood technology for upgrading bitumen or vacuum residue material to lighter boiling range distillates. Lower operating pressure of these systems significantly reduces the potential for damage resulting from equipment failure.

Several hydrotreater alternatives were considered, with unionfining hydrotreating chosen, for upgrading a portion of the sour crude products to enable Suncor to produce and market finished diesel fuel. State-of-the-art catalysts, reactor designs and recycle gas amine scrubbing minimize hydrogen demand and the need to purge recycle gas to fuel gas. Heat integration minimizes fuel gas consumption. Chemical usage is reduced by using a pressure swing absorption unit rather than catacarb to purify the hydrogen produced.

The sulphur recovery technology selected for Project Millennium is similar to that in the existing Suncor operation. Two-stage rather than three-stage conversion was selected to eliminate the sour process gas blower required to send process gas through the Tail Gas Treating Unit. Tail gas treatment technology has been selected based on best available technology, with a design overall sulphur recovery of 99.5%. The unit is sized to process all Millennium Upgrader tail gas as well as a portion of the Base plant acid or tail gas.

2.4.5 Energy Services Options

Gas turbine generators (GTG) equipped with heat recovery steam generators (HRSG) were selected after consideration of other steam and power generation technologies, including import options. Project Millennium electrical power demand (three times present-day demand) is predicted to grow more rapidly than steam demand (two times present demand). Therefore, emphasis has been placed on the capability of the technology to produce electrical power efficiently. Options considered included: increased electrical power import, purchase of power and steam from an independent producer in the area (still under active consideration), additional waste heat recovery, installation of additional boiler and steam generator capacity, and installation of additional GTC capacity.

2.5 Comparison of Environmental Effects

Environmental effects are the key to distinguishing between the proposed project and the other action alternatives. Reviewers of this EA Summary--both technical reviewers and members of the public--should receive a clear and honest presentation of the environmental pros and cons of the proposed project and alternatives. The purpose of the following matrix is to present clearly and honestly these environmental pros and cons.

[Matrix of environmental effects. Environmental issues (and sub-issues) would be listed down the left margin. Across the top would be the no project alternative, the proposed project, and other action alternatives.]

Affected Environment	No Project	Proposed Project	Action Alternative	Another Action Alternative
<p>Air Quality</p> <ul style="list-style-type: none"> — Sulfur Dioxide (SO₂) — Nitrogen Dioxide (NO₂) — Carbon Monoxide (CO) — Particulate Matter (PM) — Volatile Organic Compounds (VOC) — Total Reduced Sulfur (TRS) — Acid-Forming Compounds (NO_x and SO₂) — Ground Level Ozone — Noise — Green House Gases 				
<p>Water</p> <ul style="list-style-type: none"> — Surface Hydrology and Hydrogeology — Water Quality — Hydrogeology and Hydrology — Fish and Fish Habitat 				
<p>Terrestrial</p> <ul style="list-style-type: none"> — Soils and Terrain — Wildlife 				
<p>Socio-Economic Conditions</p>				
<p>Human Health</p>				
<p>Physical and Cultural Heritage</p>				

Chapter 3

Affected Environment

3.1 Introduction and Overview

The affected environment of Project Millennium is described in under the following sections:

- 3.2 Air
- 3.3 Water
- 3.4 Terrestrial
- 3.5 Human Health
- 3.6 Socio-economic
- 3.7 Physical and Cultural Heritage.

3.1.1 Spatial and Temporal Boundaries

Decisions on the spatial and temporal boundaries for Project Millennium were made based on the understanding of the current environmental conditions associated with oil sands developments and knowledge about the potential effects associated with the proposed project. Boundaries were established by the proponent, in part, through consultation with regulatory agencies and project stakeholders.

3.1.1.1 Spatial Boundaries

The Project Millennium study area is situated in the northeastern areas of the Athabasca River basin. Two primary study areas, a Regional Study Area (RSA) and Local Study Areas (LSA) are described for the EIA.

Regional Study Area (RSA)

The Regional Study Area (RSA) for the Project Millennium EIA was expanded from that used for the Suncor Steepbank Mine EIA to include additional areas that might be affected by air emissions from oil sands developments (Figure 5). The RSA was used primarily for the assessment of cumulative effects resulting from Project Millennium in combination with other developments. The RSA was also used for impact analyses for the Project as well as cumulative effects assessment for the air quality and human health components.

Some variations to the Project Millennium RSA were made depending on the specific EIA component being addressed. For example, the Air Quality RSA and LSA (or local airshed) was defined by a 148 by 169 km area centred on the Suncor Upgrader. This area represents the north/south and east/west limits of predicted impacts related to air emissions from oil sands developments. It is within this area that air quality changes due to Project Millennium are expected to be greatest. The RSA includes the communities of Fort McMurray and Fort McKay. Air quality changes related to the Project activities were considered for Fort Chipewyan and the Chipewyan First Nations reserves even though these areas are located outside the RSA.

For the water quality component of aquatics, a difference between the Project Millennium water quality RSA and that used in the Steepbank and Syncrude Aurora Mine EIAs was the inclusion of a longer, downstream portion of the Athabasca River, ending at the confluence with the Embarras River. This extension was added to allow consideration of the communities along this stretch of the river and to evaluate potential regional development impacts on surface water quality.

For human health, the study area was selected based on the areas identified for evaluation of changes in air quality and aquatics, and the location of the nearest residential communities. The human health study area includes the air and aquatic RSAs. The socio-economic RSA includes the communities and peoples of the Regional Municipality of Wood Buffalo. The historical resources RSA were centred around the primary oil sands development or planned development areas. This RSA, which included all or portions of 132 Townships totalled 1,100,000 ha in area.

Local Study Areas (LSA)

The Local Study Areas (LSAs) were defined to include the spatial extent of resources directly or indirectly affected by Project Millennium. The LSAs encompass the Project Millennium development area or a larger area depending on the specific environmental component. There are four different LSAs for the Project, including 1) Aquatics (Surface Hydrology and Hydrogeology, Water Quality, and Fisheries and Fish Habitat), 2) Terrestrial (Terrain and Soils, Vegetation and Wetlands, and Wildlife), 3) Historical Resources and 4) Traditional Land Use and Resource Use (combination of Terrestrial and Aquatics LSAs).

The Aquatics LSA included the Hydrogeology, Surface Water Hydrology, Surface Water Quality, and Fisheries and Fish Habitat components of the EIA. The LSA was based on project areas between the Athabasca and Steepbank rivers. It included the areas south from where the Steepbank River discharges into the Athabasca River, southeast along the north and east banks of the Steepbank River. The southeastern and southern boundaries of the aquatics LSA were defined by the drainage basin areas of Wood and McLean creeks. The east shoreline of the Athabasca River formed the western boundary of the LSA. The Athabasca and Steepbank rivers represent the base of subsurface drainage for regional and local groundwater flow systems and therefore form natural hydrogeologic boundaries. Consequently, overburden dewatering effects and tailings or consolidated tailings seepage will not extend across these hydrogeologic boundaries.

The LSA also focuses on watercourses and waterbodies including the drainage basins of Shipyard, Leggett, Wood, and McLean creeks, as well as smaller basins between the McLean Creek basin and the Steepbank River. The Steepbank River is included in the Aquatics LSA, from its confluence with the Athabasca River upstream for approximately 18 km. The Athabasca River is not directly included in the Aquatics LSA. Rather, the Athabasca River is considered in the RSA where impacts related to the upstream operations, current and proposed Suncor operations, as well as developments downstream are evaluated to the point where the Embarras River connects with the Athabasca River.

The Terrestrial LSA was been designed to encompass potential direct effects to terrain and soils, vegetation and wetlands, and wildlife components. It was defined by the north or eastern shore of the

Steepbank River at the north and eastern sides, south along the eastern shoreline of the Athabasca River, east along a line positioned a minimum of 500 m south of the nearest east bank mining area development, and north along a line running to meet the Steepbank River.

The Historical Resources LSA included areas in the proposed development footprint for the Project Millennium portion of the east bank mining area. It includes the mine footprint and associated infrastructure on the east side of the Athabasca River.

The Traditional Land Use and Resource Use LSA was generally the same as the Terrestrial LSA, as most aspects of these components are related to the terrestrial resources. For aspects of traditional land use and resource use related to the aquatic environment, the LSA included consideration of the waterbodies and watercourses within the Aquatics LSA.

3.1.1.2 Temporal Boundaries

Temporal considerations for the EIA were based on the Project description and include unique conditions that may affect environmental components differently. The main project phases include construction, operations and closure. For most components, impact analyses considered construction and operations together. Construction is considered alone where it adds a large short-term change to the component under consideration (e.g. socio-economics - the influence of the construction workforce).

Time snapshots were used for some components to allow detailing of the evolution of changes in potential impacts during the life of the project. As an example, surface water hydrology and water quality incorporate water-related changes for the years 2005, 2015, closure (assumes a 10-year post mining closure activity period - 2042) and far future. The

waters associated with each project phase generally overlap. However, each project phase will have a distinct combination of water types (e.g. muskeg and overburden dewatering, seepage, reclamation releases), flows and water qualities.

3.2 Air

The climate in the Athabasca Oil Sands is characterized by long cold winters and short cool summers. Mean daily temperatures at Fort McMurray in January average about -20C while July temperatures average 17C. The mean annual temperature is 0.2C. There are an average of 84 frost-free days per year.

A background air quality key reference report, Technical Reference for the Meteorology, Emissions and Ambient Air Quality in the Athabasca Oil Sands Region (Golder and Conor Pacific 1998) summarizes the air quality baseline data information to the end of 1997. It describes the status of current air quality parameters and can be used for the preparation and review of future development applications. This report includes: sources of anthropogenic atmospheric emissions in the Athabasca Oil Sands region, ambient air quality observations in the Athabasca Oil Sands region, and meteorological observations in the Athabasca Oil Sands region. The operation of oil sands mining, extraction and upgrading facilities in the Athabasca oil sands region results in gaseous and particulate emissions from controlled and fugitive sources. Additional emissions to the airshed result from other sources, including other industrial operations, transportation and community sources.

3.3 Water

3.3.1 Surface Hydrology and Hydrogeology

Major watercourses in the LSA are the Athabasca and the Steepbank rivers. The Steepbank River is the major tributary to the Athabasca River in the east bank mining area. Smaller watercourses include Unnamed Creek and Creek 2,

both of which drain to Shipyard Lake as well as Shipyard Creek (which flows out of Shipyard Lake), Leggett Creek, Wood Creek and McLean Creek. All these creeks drain to Athabasca River.

The Athabasca River flows from south to north and has eroded through the surficial soils and bedrock to the current floodplain at an elevation of about 235 to 240 masl. The reach of the Athabasca River bordering the east bank mining area is about 14 km. The banks form the Athabasca Escarpment with a total height of about 80 m. The average slope of the Athabasca Escarpment is about 8% with local slopes at the toe of 20 to 40%. The average flow at Fort McMurray is 655 m³/s, while the maximum and minimum recorded mean daily flows are 4,700 m³/s and 89 m³/s, respectively. The maximum recorded instantaneous flow is 4,790 m³/s. Peak flows are typically experienced at Fort McMurray during the month of July.

The average streamflow in the Steepbank River at the WSC gauging station near its confluence with the Athabasca River is approximately 6.0 m³/s, or about 1% of the average flow in the Athabasca River. The maximum recorded mean daily flow is 81.0 m³/s while the maximum instantaneous flow was 92.0 m³/s.

Stream flow has been monitored in the east bank mine area since 1996 at Unnamed Creek, Creek Two, and Shipyard Creek. Monitoring at Wood Creek (2 locations), Leggett Creek and McLean Creek has been monitored since 1997. This length of record is insufficient for inclusion in a regional analysis.

Shipyard Lake receives its water from three sources: Athabasca River, creeks draining the local Shipyard Lake basin and groundwater inputs. Water level is

naturally controlled by a beaver dam complex at the outlet. During periods when the Athabasca River is in flood, water can flow into Shipyard Lake from the Athabasca River across a divide to the south near Inglis Island. For the balance of the year, inflow is from creeks draining the organic plain and areas upslope of the Athabasca River valley escarpment.

Three major aquifers have been identified, including: surficial aquifers in the drift deposits; basal aquifer; and devonian limestone. Water bearing sand and gravel deposits within the drift underlying the organic plain have been identified. These aquifers are discontinuous over the Local Study Area (LSA) and range in thickness from 1 to 10 m, with local accumulations of 16 to 32 m. In the bedrock, the Basal Aquifer and Upper Devonian limestone have both been identified as aquifers. Based on available data they appear to behave as a single aquifer at some locations. The Basal Aquifer is a discontinuous zone of lean oil sands in the McMurray Formation that generally rests upon the Upper Devonian surface.

The bedrock groundwater is brackish, and contains organic compounds, including PAHs and naphthenic acids. The direction of groundwater flow in all aquifers is principally horizontal, toward the Athabasca River. As Shipyard Lake is located in the Athabasca River floodplain, a portion of groundwater flowing towards the river discharges into the wetlands. There is also a small component of groundwater flow toward the Steepbank River.

3.3.2 Water Quality

3.3.2.1 Athabasca River

Water quality of the lower Athabasca River is characterized by a typical pH range of 7.6 to 8.3 and moderate levels of

dissolved salts (TDS), hardness and alkalinity. Spring and summer high flows usually cause a large increase in suspended solids load, which is reflected in elevated concentrations of nutrients (e.g. total phosphorus) and a number of metals (e.g. aluminum, iron, manganese; measured as total metals) which are adsorbed onto suspended sediment during these seasons. Total alkalinity, TDS and total hardness are typically highest in the winter, reflecting seasonal changes in hydrology. Nutrient levels are indicative of moderate enrichment from natural sources and, potentially, from upstream point sources (pulp mills and sewage treatment plants). Levels of dissolved metals, PAHs and naturally occurring hydrocarbons are generally low.

Bottom sediments of the Athabasca River were collected during the Northern River Basins Study (NRBS) for assessment of PAHs, PCBs and pulp mill-related organic compounds. Low levels of individual PAHs (<22 µg/g) were reported at a number of sites along the Athabasca River, including three sites in the lower reaches (above Horse River, above Firebag River and at the mouth of Rifebay River). None of the reported concentrations exceeded the applicable TEL (Threshold Effect Level) guidelines. Levels of PAHs were similar at all sites in the Athabasca River and were generally lower than in Peace and Wapiti river sediments.

3.3.2.2 Steepbank River

The Steepbank River is characterized by relatively clear water, except during the spring when total suspended sediments are elevated. Dissolved salt concentrations are low to moderate and pH ranges between 7.4 and 8. Nutrient levels are moderate. Dissolved organic carbon levels are elevated, reflecting inputs of muskeg drainage water. Concentrations of most total metals are near the detection limits. Naturally

occurring hydrocarbons and naphthenic acids are occasionally detectable, but at very low levels. Trace organic compounds have not been detected.

Bottom sediment samples were collected in fall 1997 from a number of rivers and streams as part of the Regional Aquatics Monitoring Program (RAMP) for the oil sands area. Bottom sediment samples were also collected in 1995 from the Steepbank River as part of the baseline studies for the Syncrude Aurora and Suncor Steepbank Mines. Levels of metals in Steepbank River sediments were typically lower than in the Athabasca River or the North Saskatchewan River. Concentrations of PAHs and total recoverable hydrocarbons were higher in the Steepbank River than in the Athabasca River, especially at the mouth where a relatively large proportion of bottom sediments is composed of oil sands. The Steepbank River along with the Muskeg River and other streams in the region have been identified as potentially susceptible to spring acid deposition.

3.3.2.3 Shipyard Lake and Shipyard Creek

Shipyard Lake is characterized by high suspended solids in seasons with available data. Dissolved salt concentrations and nutrient levels are moderate and pH ranges between 6.8 and 7.8. Naturally-occurring hydrocarbons and naphthenic acids were not detectable and lake water was not toxic to bacteria in samples collected in summer 1996. Shipyard Creek is the outlet of Shipyard Lake. In terms of water quality, this stream is similar to Shipyard Lake.

3.3.3 Fish and Fish Habitat

3.3.3.1 Athabasca River

The Athabasca River in the oil sands area is wide and carries a considerable silt load during the summer months. It

provides relatively low quality, largely depositional habitat for benthic invertebrates. Bottom sediments of the lower Athabasca River support a relatively homogeneous benthic fauna, characterized by low density and number of species, consisting largely of chironomid midge larvae, oligochaete worms and nematode worms.

Fish habitat in the Athabasca River is relatively poor due to the homogeneous habitat and shifting-sand bottom. Fish are usually associated with distinct habitat features such as backwaters, snags and tributary mouths. However, the Athabasca River is an important migration corridor for fish that move from overwintering and feeding areas to spawning areas in tributaries or rapids (e.g. lake whitefish, walleye, longnose sucker). Key Indicator Resources (KIRs) for the Athabasca River include walleye, goldeye and longnose sucker.

Several fish surveys conducted on the Athabasca River provide information for the LSA. Twenty-seven species of fish have been reported from the Athabasca River in the LSA. In the 1997 RAMP fisheries inventories, 16 species were captured in the vicinity of Project Millennium between McLean Creek and the Steepbank River. Similar species composition was reported in 1996. Species abundance and distribution patterns are similar to those reported by the AOSERP studies of the late 1970s and the recent NRBS fish inventories. Fish species that use the Athabasca River near the LSA fall into two categories: migratory populations and resident fish species. Most of the large fish species are migratory. The resident populations are those which overwinter in the river or its tributaries.

3.3.3.2 Steepbank River

The Steepbank River is one of the main tributaries of the Athabasca River in the

oil sands area. Through most of its length it cuts sharply through oil-sands-rich hills resulting in the steep banks for which it is named. The 28.5 km of river within the LSA has an average channel width of 25 m. Detailed habitat maps of representative areas of the Steepbank River are available.

Benthic communities in the Steepbank River were most recently studied at three sites in 1995. The results of this survey documented diverse communities with low to moderate densities of invertebrates, which is characteristic of the erosional habitats sampled. Benthic communities varied moderately among sites, most likely as a result of differences in habitat characteristics. There was a trend of decreasing abundance and taxonomic richness from upstream to downstream, as well as a gradual decline in the proportion of chironomid larvae. The relative proportions of different functional feeding groups were similar at all sites. Overall, the changes in benthic communities with distance downstream appeared to parallel the variation in current velocity and substratum composition.

The fish habitat in the Steepbank River is of high quality, and consists mainly of gravel/cobble/boulder substrate with pool/riffle and run/riffle sequences. In the upper reach, riffles are the most common habitat type, followed by moderate quality runs. Pools are infrequent and occur on meander bends. The middle reach of the river has defined meanders and the riffles have less boulder and more cobble/gravel substrate than the other reaches. The lower reach of the Steepbank River consists of swift, armored riffles separated by run sections with the occasional pool occurring on meander bends.

The Steepbank River supports an abundant and diverse fish fauna. Twenty-five species of fish have been recorded

from the Steepbank River, of which ten (Arctic grayling, northern pike, longnose sucker, white sucker, lake chub, pearl dace, longnose dace, trout-perch, brook stickleback and slimy sculpin) are common and widespread. Fish species that use the Steepbank River fall into three main categories: 1) migratory populations that rely on the Steepbank River for an important part of their life-cycle, 2) occasional migrants which use the Steepbank River for resting or feeding, and 3) residents which live in the Steepbank River year-round.

3.3.3.3 Shipyard Lake and Local Creeks

Shipyard Lake is a shallow wetland located on the east side of the Athabasca River floodplain, south of the Steepbank River. It has one outlet, Shipyard Creek, connecting the wetland to the Athabasca River. Shipyard Lake is suitable habitat for sport fish species such as northern pike and yellow perch, both of which use aquatic vegetation for spawning and rearing. Key Indicator Resource for the Shipyard Lake include northern pike and forage fish guild. It is significant that there is only a limited amount of this habitat in the area. Overwintering habitat in Shipyard Lake is classified as relatively poor. Benthic invertebrate density and diversity were generally low in Shipyard Lake in fall 1996.

Shipyard Creek drains from the northern end of Shipyard Lake and flows into the Athabasca River. Flow conditions can vary dramatically with low flows generally prevalent during late summer. Habitat in Shipyard Creek is composed entirely of low quality runs with sand/silt substrate. Some instream cover is available from wood debris and breached beaver dams. Most fish captured in Shipyard Creek in May 1996 were forage fish species including spottail shiner, lake chub, trout-perch, brook stickleback and emerald shiner. The only sport fish captured were four yellow perch, which were collected

about 350 m from the confluence with the Athabasca River.

Leggett Creek is a small tributary (about 5.6 m wide near the mouth) to the Athabasca River located south of Shipyard Lake. Fish habitat varies in the lower, middle and upper reaches of Leggett Creek. In the lower reach, medium quality runs are the most common habitat type but pools and riffles are also present. The substrate is dominated by fines. The middle and upper portions of the creek (i.e. above the escarpment) are narrow, with stream discharges similar to the lower reach. In the middle segment, riffles are the dominant habitat type and low quality runs were also present. In 1995 and 1996, forage fish species such as spottail shiner, lake chub, emerald shiner and pearl dace were the only fish species captured in the lower reaches of Leggett Creek.

Wood Creek is a moderately sized tributary of the Athabasca River located south of Leggett Creek. The average flow in Wood Creek from April to November 1996 has been estimated at $0.17 \text{ m}^3/\text{s}$. Lower and middle portions of the creek have a moderately high gradient and the creek consists primarily of riffles with some low quality run habitat. Cover for fish is abundant from undercut banks, instream debris and overhanging vegetation. Fish in Wood Creek were found to be present only in the lower reaches. In 1996, three immature mountain whitefish were captured in the lower segment of Wood Creek near its confluence with the Athabasca River, indicating that this portion of the creek is being used to a limited extent as a rearing area for this species. Forage fish species such as spoonhead sculpin, longnose sucker and brook stickleback were also captured near the mouth of Wood Creek.

McLean Creek is a small stream (3.0 m wide and 0.6 m deep near the mouth) located south of Wood Creek. Habitat surveys in 1997 indicated the lower reach of McLean Creek had a moderate-to-high stream gradient and fish habitat consisted of riffle-run-pool sequences and occasional backwaters. Woody debris piles and chutes present in McLean Creek pose potential barriers to the upstream migration of fish. Fish habitat and substrate is similar to the lower reaches, except where flooded beaver ponds are present. Young-of-the-year Arctic grayling have been captured in the lower section of McLean Creek, near the confluence of the Athabasca River. The presence of young-of-the-year Arctic grayling indicates lower McLean Creek may provide spawning habitat for this species in spring.

3.4 Terrestrial

3.4.1 Terrain and Soils

The LSA is characterized as having subdued relief and nearly level topography. Elevations rise gradually, west to east, from approximately 320 masl (metres above sea level) along the Athabasca River escarpment to roughly 400 masl along the Steepbank River escarpment. A few minor uplands occur on the east side of the LSA rising to nearly 440 masl. From the northwest, the elevation rises gently from 320 masl at the confluence of the Athabasca and Steepbank river valleys to 380 masl in the extreme southeast. Overall, the slopes in the LSA are less than 0.5%.

The surficial geology of the LSA has been mapped as primarily thin ground moraine composed of loamy Kinosis till in the north and thick, bedded glaciolacustrine sands and silts to the south. The valleys of the Athabasca and Steepbank Rivers are classed as erosional or slumping on the slopes (i.e. colluvium) with alluvial

deposits along the floodplains. Small, isolated inclusions of glaciofluvial outwash sands and gravels are found in old channel bottoms and are often associated with medium to fine textured aeolian sands that occur in sheets and dunes.

The bedrock geology in west portion of the LSA is principally marine origin Lower Cretaceous silty shale, siltstone and fine sandstone of the Clearwater Formation. McMurray Formation sandstone, siltstone and silty shales, of deltaic origin, are exposed along the Athabasca River valley and limited amounts of Waterways Formation (marine shales and argillaceous limestone) may be found in the Athabasca floodplain. In the east portion of the LSA, the Grand Rapids formation, consisting of fine-grained, deltaic-marine sandstone, siltstone and shale dominate the bedrock geology.

Two classes of soils are found in the LSA: 1) those which have developed on organic deposits which have accumulated over poorly drained mineral materials; and 2) those formed directly from mineral parent materials. Organic soil orders include the McLelland and Muskeg series of the Mesisolic great group. Mineral soils include: Bitumount and Steepbank series of the Gleysolic order; Kinosis series of the Luvisolic order, Mildred series of the Brunisolic order and McMurray series of the Regosolic order. Additional units are mapped as Rough Broken 2, 3 as they are soil-like in nature but do not meet the criteria for classification as an order in the Canadian system.

3.4.2 Vegetation

The LSA is located in the Central Mixedwood subregion of the Boreal Forest Natural Region of Alberta. This subregion is the largest in spatial extent in the province and characterized by a cool, moist (i.e. boreal) climate regime conducive to the growth of mixed aspen-

spruce forests with a significant component of bogs and fens in poorly drained areas. This is classified as the Mid-Boreal Mixedwood Ecoregion of the Boreal Ecoprovince.

Eight upland ecosites and 17 associated ecosite phases have been identified within the boreal mixedwood forest. All but three of the ecosite phases are represented within the LSA. In total, upland forest vegetation units comprise 36% of the LSA. Soils are highly absorbent, poorly drained and characterized by a high water table. Fen soils average 0.8 to 1.5 m in thickness and are underlain by aeolian sands, glacio-fluvial sands and gravels, and glacio-lacustrine sand silts and clays. Previous studies documented the existence of four species of vascular plants listed as rare within the LSA. These plants were: turned sedge; small-water lily; wool-grass; and prairie cord grass. Within the RSA, 25 species have previously been documented. During 1997 field studies, four species of rare plants were found within the LSA. None of the rare plants occurring in the LSA or RSA is considered to be rare nationally.

The Alberta Wetland Inventory (AWI) describe the wetlands that are common in Alberta. Of the fifteen wetland types found, eight are recognized in the LSA. Among the wetlands classified are four types of fens and two bogs. Included within the LSA. In total, wetlands vegetation comprise 62% of the LSA. Within the LSA, 6 rare plants have been identified in wetlands, which include bogs, fens, swamps and marshes. These plants were: cyperus-like sedge; turned sedge; stemless lady's slipper; small water-lily, pitcher plant; wool-grass; and prairie cord grass. Two rare plants, Prairie Cord Grass and Turned Sedge were observed in the riparian area along the Athabasca River.

Key Indicator Resources for Project Millennium include aspen-white spruce communities, riparian shrub communities, patterned fens, old growth forests, rare plant species and traditional use plants.

3.4.3 Wildlife

Important wildlife resources of the RSA include large mammals (ungulates, furbearers), small mammals and birds (waterfowl, upland game birds, breeding birds, raptors).

Ungulates (moose, white-tailed deer, and woodland caribou) are important to the public from both a consumptive and non-consumptive viewpoint. These large herbivores also play important roles in the boreal ecosystem. Ungulates are also important from a traditional perspective.

Moose populations in the region have remained low and relatively stable over the years. Low moose densities may reflect the shortage of preferred winter habitat (deciduous and mixedwood forest) in the area.

Mule deer are traditional residents of the western boreal forest, and are frequently associated with cleared or disturbed habitats. Populations are generally small and localized. At one time, white-tailed deer were not found in the oil sands area. However, recent changes to access and the creation of open habitat has resulted in a northern range expansion.

At one time, woodland caribou and elk were residents of the oil sands area. Currently, caribou exist at low densities 60 km northwest of the Aurora Mine site, while elk are restricted to the Athabasca River valley south of Fort McMurray.

Terrestrial furbearers (e.g. coyote, Canada lynx, marten, and weasel) are important from both an economic and ecological perspective within the LSA as

are semi-aquatic furbearers including beaver, muskrat, mink and river otter). Most are trapped for their pelts or other traditional uses.

Semi-aquatic furbearers (e.g. beavers, muskrats, mink, and river otters) are important from both an economic and ecological perspective within the LSA. All are trapped for their pelts, and mink and otters are important carnivores in the boreal ecosystem. Beavers, through their dam-building activities, act as agents of change and thus are also important components of the ecosystem.

Small mammals (e.g. hares, squirrels, shrews, voles, and mice) form an important component of the food chain. They are also one of the more diverse mammal groups in the LSA, making them good indicators of biodiversity. Numerous species of small mammals are likely to occur in the LSA. For the purposes of this study, only red-backed voles, snowshoe hares, and red squirrels will be discussed. Red-backed voles and snowshoe hares were selected as KIRs for the EIA, and snowshoe hares and red squirrels are important economically and traditionally.

Waterfowl commonly found in the LSA can be categorized as dabbling or diving ducks. Dabbling ducks feed on aquatic insects and plant material on the surface and within the first 20 to 30 cm of the water column. Diving ducks, in contrast, forage deeper in the water column, enabling them to exploit different food resources than dabblers. Both dabbling and diving ducks are important economically and traditionally.

Upland game birds (e.g. grouse, ptarmigan) are important game species, are enjoyed by non-consumptive users and form an important part of the food chain. Three species of upland game birds potentially occur in the LSA: spruce, ruffed and sharp-tailed grouse. Willow ptarmigan may also be observed infrequently in the area.

Breeding birds (i.e. birds which are resident to the area or which migrate to the area to breed) are an important group to wildlife biologists because the number of species and abundance of breeding birds make them suitable for studies of biodiversity. Breeding birds are particularly valued by non-consumptive users.

Raptors (birds of prey) are important carnivores within the boreal ecosystem and are highly valued by birdwatchers. They are also important for indigenous cultures. Owl surveys conducted early in 1997 indicated the presence of great gray owls in the LSA. Great gray owls were also observed during completion of other winter field studies. A great horned owl was recorded in the Shipyard Lake area during ungulate monitoring surveys. No boreal owls were recorded.

Key Indicator Resources were selected for the EIA based on the selection process used for the Suncor Steepbank Mine EIA, the Syncrude Aurora Mine EIA, the Shell Muskeg River Mine EIA, and input from Alberta Environmental Protection (AEP). The KIRs are listed below:

Key Indicator Resource (KIR)

Moose
Fisher
Black bear
Beaver
Red-backed vole
Snowshoe hare

Selection Rationale

Economic importance, early successional species
Use of late seral stages, economic importance, carnivore
Economic importance, carnivore
Economic importance, semi-aquatic habits
Importance in food chain
Importance in food chain

Dabbling ducks	Importance in food chain, economic/recreational importance
Ruffed grouse	Economic and recreational importance
Cape May warbler	Use of white spruce forests, neotropical migrant
Western tanager ^(a)	Use of open forest mixedwood, neotropical migrant
Pileated woodpecker ^(a)	Use of late seral stages, large diameter trees and snags
Great gray owl	Raptor, use of wetlands

(a) KIRs added to those used for the Steepbank and Aurora mines; based on input from AEP.

Species with vulnerable, threatened or endangered status according to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or listed on Alberta's blue or red list and which may occur within the LSA, are as follows.

Species	COSEWIC	Alberta
Wolverine	Vulnerable	Blue List
Woodland Caribou	Vulnerable	Blue List
Peregrine Falcon	Endangered	Red List
Whooping Crane	Endangered	Red List
Bay-Breasted Warbler	Not listed	Blue List
Black-Throated Green Warbler	Not listed	Blue List
Cape May Warbler	Not listed	Blue List
Short-Eared Owl	Vulnerable	Blue List

3.5 Human Health

The study area for the human health component was selected based on the areas identified for evaluation of changes in air quality and aquatics, and the location of the nearest residential communities. The human health study area includes the air and aquatic RSAs. Results of a baseline human health study completed as part of the Northern River Basins Study are summarized here to provide an indication of the general health of populations residing within the region.

The Northern River Basins Study (NRBS) Human Health Monitoring Program summarized the overall population health status of communities within the NRBS area. The NRBS area includes the Alberta and Northwest Territories portions of the Peace, Athabasca and Slave river basins. The Northern Lights Health Region of the NRBS area is similar to the RSA for this EIA. The NRBS Human Health Monitoring Program also considered cause-effect relationships between the reported human health conditions and chemicals from industrial

and agricultural development in the north. However, it was not possible to correlate or assess the influence of environmental factors, such as levels of airborne chemicals, with disease incidences. This is because a variety of genetic, socio-economic and lifestyle factors (e.g. smoking, exercise, diet) may contribute to incidence, prevalence and severity of a particular disease.

In general, the health status of the NRBS area is not significantly different from that of other areas of Alberta or Canada. Certain types of health outcomes, including pneumonia, chronic bronchitis, endometriosis and post neonatal death have a higher incidence in the NRBS area. This may be due to several factors, including age, family history, lifestyle, socio-economics and environmental exposure.

3.6 Socio-Economic Conditions

3.6.1 Economics

The boundaries of the socio-economic study area are coincident with those of the Regional Municipality of Wood Buffalo and reflect the trading, traffic and communication patterns in the region. The study area encompasses the urban service area of Fort McMurray and associated rural residential communities of Sapræe Creek and Gregoire Lake, Fort Chipewyan, Fort McKay, Anzac, Janvier and Conklin. The study area includes the reserve lands located within the Regional Municipality of Wood Buffalo. These include reserve lands of the Mikisew Cree First Nation, the Athabasca Chipewyan First Nation, the Fort McKay First Nation, the Fort McMurray First Nation, and the Chipewyan Prairie First Nation.

The regional economy has four major pillars: 1) oil sands industry, 2) forestry, 3) conventional oil and gas exploration, and 4) Tourism. Other, smaller economic activities in the region include mineral exploration, commercial fishing, hunting, and trapping. All these activities are supported by a range of contracting and other service providers, in the area of transportation, construction, logistics, wholesale and retail trade, and others.

The urban service area of Fort McMurray is a thriving community, which is looking forward to a sustained period of growth and development. The population growth it has experienced in the last two years and the further growth that is expected is posing challenges, but generally the public and private sector agencies are positioned to deal with these challenges. There is a well-developed social fabric and a sense of cohesion, experience with growth from past development periods, enthusiasm, and lots of talent and energy to deal with the current challenges.

Fort McMurray has developed into an urban area that offers a wide range of services and amenities. The size and sophistication of the retail sector has increased over the past years, the business sector is growing, and the leisure and recreational opportunities are varied. The recent influx of people into the urban service area has increased housing prices and created a tight housing market, contributing to an increased cost of living.

3.6.2 Traditional Land Use

The aboriginal communities of North America traditionally practice ways of life intimately tied with the landscapes on which they live. The resources provided by the land allow these communities flourish and to maintain their traditional way of life. A detailed understanding of the environment and its resources is important for ensuring the identity of these communities today, when non-aboriginal commercial and recreational uses increase, and frequently compete with traditional uses of the land.

The regional aboriginal community closest to Project Millennium is Fort McKay, which includes both Chipewyan and Cree Treaty Indians, non-status Indians and Metis who live in and around the community of Fort McKay. Fort McKay has become a permanent base of residence in recent times for this community, as schools, government services and employment opportunities have gained importance for community members. However, this area has always served as a focal point in the seasonal round of traditional activities associated with hunting, trapping and fishing, practiced for generations throughout the surrounding region.

Natural resources make a significant contribution to the economic, social and

spiritual life of aboriginal communities. The people who traditionally occupied the Regional Study Area were nomadic hunting and gathering groups whose seasonal round of activities covered relatively extensive areas. These groups used a wide variety of plant and animal species found throughout the region. The species mentioned were (and still are) harvested for numerous purposes including: food, drink, medicines, ceremonial uses, firewood, smoking and curing food, clothing, decoration and building materials.

3.7 Physical and Cultural Heritage

3.7.1 Archaeology

Previous historical resource investigations, which have taken place in the RSA, have primarily centred on the assessment of development areas. Only a few key studies have been conducted in which the primary goal was research oriented. The studies have resulted in a basic understanding of the prehistoric record within the RSA. Previous archaeological studies undertaken within the LSA have been limited. There have been no previous archaeological field studies conducted within the Project area itself. The only Heritage Resources Impact Assessment (HRIA) completed within the LSA was conducted on behalf of Suncor for the Steepbank Mine in 1995.

A total of seven historical resource sites have been previously recorded within the LSA. Two are prehistoric historical resource sites are small lithic find locations that were recorded during the HRIA of the Steepbank Mine. Five historic period sites are also on record within the LSA. These sites are locations at which early exploratory drilling attempts were made. The sites include four wellsite locations drilled by Count Alfred Von Hammerstein in the early 1900s. The

remaining site also relates to an early 1900s well drilled by the Athabaska Oil and Asphalt Company. These sites have not been documented except in the historical literature.

3.7.2 Traditional Resources

Several historic trails and beaver dams were also identified during Traditional Land Use investigations conducted for the Steepbank Project which are present in or extend through the Project Millennium HRIA study area. Several vegetation gathering sites, hunting and trapping locations were also noted. No cabins or graves were identified as present within the Project Millennium HRIA study area during this study.

3.7.3 Palaeontological Resources

Palaeontological resource sensitivity in the vicinity of Project Millennium is shown as low to probable in maps provided by the Tyrrell Museum of Palaeontology. "Low" potential is present along the east and west banks of the Athabasca River in Township 90 and 91, Range 9, West of the Fourth Meridian. "Probable" potential is identified in Sections 21, 28 and 33 of Township 91, Range 9, W4M and for much of the west half of Twp92-R9-W4M at the confluence of the Steepbank and Athabasca Rivers.

3.8 Relationships Among Components

The relationship among environmental and social components is shown schematically in Figure 6. Within each of the components assessed as part of the Project Millennium EIA, a linkage diagram was developed to overview how project activities could potentially lead to environmental changes, which could affect specific components of the environment. Linkage diagrams were

developed for each of the environmental components in the EIA. They included consideration of project activities, potential changes in the environment, key questions related to the activities and potential changes, and connections to or from different component areas.

3.9 Sensitivity to Disturbance

The impact analysis for each of the environmental components in the EIA included consideration of: 1) type and timing for disturbances (magnitude and frequency), 2) reversibility or non-reversibility, 3) uniqueness of habitats and 4) species or resources. The methodology for considering these factors included sensitivity to disturbance, and is detailed in the Project Millennium EIA. Air, water and land components were determined to be the most sensitive to disturbance. The degree of sensitivity varies according to the project component and activity in relation to the LSAs in question. Further component-specific information is provided in the impact assessment sections within the EIA.

Figure 6. Linkages Between Project Components.

Chapter 4

Environmental Assessment of Effects

4.1 Methods and Overview

Impact analyses for the Project Millennium Environmental Impact Assessment (EIA) were performed for key questions on each EIA component. The analyses address each link on the component linkage diagram (Figure 5). The impact analysis consisted of four main steps: 1) identification of activities that could contribute to environmental change, 2) analysis of potential linkages, 3) analysis and classification of impacts, and 4) identification and description of mitigation measures and monitoring requirements.

Validation of the link included consideration of mitigation measures. Mitigation, within the context of the EIA, was defined as follows: "the application of design, construction or scheduling principles to minimize or eliminate potential adverse impacts and, where possible, enhance environmental quality". For certain activities, ongoing mitigation (e.g. operating practices changes) served to minimize or eliminate physical or chemical stresses, thereby rendering invalid the link between Project Millennium activity and environmental changes.

Residual effects for air, aquatics, terrestrial and human health components were classified using quantitative factors to determine environmental consequence. Each effect was first described in terms of direction, magnitude, geographic extent, duration, reversibility and frequency (including seasonal effects). Criteria for

direction, reversibility and frequency were the same for all environmental components while magnitude, geographic extent and duration varied depending on the component. Environmental consequence of residual effects was assigned a total score and rated according to the following scale: 0-5 negligible, 6-10 low, 11-15 moderate, and >15 high. These evaluations were developed and assigned by the Proponent and do not necessarily represent the views of federal departments.

The environmental effects are covered in the following subsections:

- Section 4.2 Air
- Section 4.3 Water
- Section 4.4 Terrestrial
- Section 4.5 Human Health
- Section 4.6 Socio-Economic Conditions
- Section 4.7 Physical and Cultural Heritage
- Section 4.8 Current Land Use and Resource Use by Aboriginal Persons
- Section 4.9 Sustainable Use of Renewable Resources
- Section 4.10 Effects of the Environment on the Project
- Section 4.11 Effects of Malfunctions or Accidents

4.2 Air Quality

Project Millennium, in combination with existing and approved developments in the study area, will result in changes to ambient air quality concentrations as reviewed below for the compounds of interest. The upgrading and energy services components of Project Millennium have the greatest potential for adverse impact on the air environment. Bitumen production (surface preparation and mining) also impacts the air environment but to a lesser extent.

4.2.1 Sulfur Dioxide (SO₂)

i) Environmental Effects

- The ISC3BE model used by the proponent to predict SO₂ concentrations resulting from the Project indicated:
- The predicted effects of hourly SO₂ emissions and concentrations on the air quality were classified in the EIA as moderate in magnitude, short-term in duration, moderate in frequency, regional in geographic extent and reversible with low environmental consequence.
- The predicted effects of daily SO₂ emissions and concentrations on the air quality were classified in the EIA as moderate in magnitude, short-term in duration, moderate in frequency, local in geographic extent and reversible with low environmental consequence.
- The predicted effects of annual SO₂ emissions and concentrations on the air quality were classified in the EIA as high in magnitude, mid-term in duration, high in frequency, local in geographic extent and reversible with moderate environmental consequence.

Cumulative Effects. The ISC3BE model was used in the EIA to predict the SO₂ concentrations resulting from the Project and facilities. The predicted cumulative impacts of hourly, daily and annual SO₂ emissions and concentrations were very similar to Project Millennium. The hourly and daily SO₂ concentrations were considered to be reversible, of moderate magnitude, short term in duration, moderate in frequency and regional in geographic extent. The environmental consequence of these effects was determined by the proponent to be low.

The annual SO₂ concentrations were classified as having a high magnitude, moderate duration, high frequency, reversible effect and local in geographic extent. The resulting environmental consequence of these effects was determined by the proponent to be moderate.

The moderate environmental consequence assigned to the annual SO₂ concentrations was determined on areal extents and maximum concentrations that occur within the development areas of existing operations. There were no exceedences projected outside of the development areas. Outside of the Suncor and Syncrude, lease boundaries the maximum annual concentrations are predicted to be below the annual Alberta Guideline of 30 g/m³. Viewed in this context, the environmental risk was considered low by the proponent and, this effect was not considered significant.

ii) Mitigation

- Continue use of the Flue Gas Desulphurization (FGD) plant to reduce SO₂ and particulate emissions associated with coke combustion.

- Install a flare gas recovery project (scheduled for completion in 1999).
- Recompression of gases currently being continuously flared, for treatment and use in the planned flare gas recovery project.
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

- Environment Canada has concerns with the use of the ISC3BE model selected to predict pollutant concentrations and stated that further spatial validation with observed data particularly in populated areas is required to increase confidence in model choice and results.
- Environment Canada encourages the application of the fully capable CALPUFF model for regulatory dispersion and deposition predictions in the oil sands region.

4.2.2 Nitrogen Dioxide (NO₂)

i) Environmental Effects

The ISC3BE mode used by the proponent to predict NO₂ concentrations resulting from the Project Millennium indicated:

- The predicted effects of hourly NO₂ concentrations on the air quality were classified in the EIA as low in magnitude, short-term in duration, low in frequency, local in geographic extent and reversible with low environmental consequence.

- The predicted effects of daily NO₂ concentrations on the air quality were classified in the EIA as high in magnitude, short-term in duration, moderate in frequency, local in geographic extent and reversible with moderate environmental consequence.
- The predicted effects of annual NO₂ concentrations on the air quality were classified in the EIA as high in magnitude, mid-term in duration, high in frequency, local in geographic extent and reversible with moderate environmental consequence.

Cumulative Effects. The ISC3BE model was used in the EIA to predict NO₂ concentrations resulting from the combined Project and cumulative emission sources. The predicted hourly NO₂ concentrations were classified as having effects on the air quality which were low in magnitude, short term in duration, low in frequency, local in geographic extent and reversible. The environmental consequence of these effects was determined by the proponent to be low.

The predicted daily NO₂ concentrations were classified as having air quality effects which are described as high in magnitude, short term in duration, moderate in frequency, local in geographic extent and reversible. The environmental consequence of these effects was determined by the proponent to be moderate.

Effects based on the predicted annual NO₂ concentrations are classified as high in magnitude, mid term in duration, high in frequency, local in geographic extent and reversible. The environmental consequence of these effects was

determined by the proponent to be moderate.

Effects on the daily and annual NO₂ concentrations were assigned a moderate environmental consequence. The maximum daily concentration plus the areal extent were confined to a small area within the existing operations. There were no exceedences projected outside of the development areas. The maximum annual concentration plus the areal extent were also centred in the existing operational area but occupied a larger area. There were no exceedences predicted outside the development areas. Viewed in this context, the environmental consequence of the NO₂ emissions was rated as low and, therefore, this effect was considered not significant by the proponent.

ii) Mitigation

- Use low-NO_x burners for new plant equipment.
- Use of mine fleet vehicles with improved emission control technology.
- Improve the quality of diesel fuels used for mine fleet vehicles.
- Implementation of a site-wide NO_x management plan.
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

Environment Canada is concerned that the model results for NO₂ using the ISC3BE and a simplified steady-state mode of CALPUFF are quite different. ISC3BE predicts no AAAQG exceedences while the CALPUFF

predicts exceedences over large areas beyond the development area suggesting that NO_x emissions are an issue. **Until the discrepancy in model results is resolved, there is also doubt regarding the predictions which have been made for other pollutants. Because of the linkage between NO_x and the formation of ground level ozone, secondary particulates and acid deposition, it is important that the potential concentrations of this pollutant be understood, so that the development of mitigative measures for the "secondary pollutants" will address the appropriate issue.**

4.2.3 Carbon Monoxide (CO)

i) Environmental Effects

The ISC3BE model was used by the proponent to predict CO concentrations resulting from the Project. The model results indicated:

- The predicted effects of hourly CO emissions and concentrations on the air quality were classified in the EIA as low in magnitude, short-term in duration, low in frequency, local in geographic extent and reversible with low environmental consequence.
- The predicted effects of 8-hour CO emissions and concentrations on the air quality were classified in the EIA as low in magnitude, short-term in duration, low in frequency, local in geographic extent and reversible with low environmental consequence.

Cumulative Effects. The hourly and 8-hour CO concentrations resulting from the cumulative emission sources were predicted in the EIA using the ISC3BE dispersion model. The effects of both the hourly and 8-hour CO concentrations were classified as having impacts that are

low in magnitude, short term in duration, low in frequency, local in geographic extent and reversible. The resulting environmental consequence of these impacts was viewed by the proponent as low.

ii) Mitigation

- Use mine fleet vehicles with improved emission control technology.
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

No specific concerns were documented.

4.2.4 Particulate Matter (PM)

i) Environmental Effects

The ISC3BE model was used by the Proponent to predict PM concentrations resulting from the Project Millennium case. The model results indicated:

- The predicted effects of daily PM concentrations on the air quality were classified in the EIA as moderate in magnitude, short-term in duration, moderate in frequency, local in geographic extent and reversible. The environmental consequence of these effects was rated as low.
- The predicted impacts of annual PM concentrations on the air quality were classified in the EIA as low in magnitude, short-term in duration, low in frequency, local in geographic extent and reversible. The environmental consequence of these

impacts was determined to be negligible.

Cumulative Effects. The ISC3BE model was used in the EIA to predict daily and annual PM concentrations resulting from the cumulative emission sources. The predicted effects of the daily concentrations are classified as moderate in magnitude, short term in duration, moderate in frequency, local in geographic extent and reversible. The predicted effects of annual PM emissions and concentrations on the air quality were classified as low in magnitude, short term in duration, low in frequency, local in geographic extent and reversible. The environmental consequence of both these sets of effects was determined by the proponent to be low.

ii) Mitigation

- Water roads and active areas of the coke pile during warm weather periods to suppress dust.
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

Environment Canada **has concerns that suggested that secondary particulates and size fractions have not been should be considered when evaluating the PM predictions. It is important to understand the secondary component so that compliance with future Canada Wide Standards for PM10 and PM 2.5 can be evaluated and if required, mitigative measures can be applied to the appropriate size fraction and component.**

4.2.5 Volatile Organic Compounds (VOC)

i) Environmental Effects

The effects related to VOC emissions are evaluated under the human health section.

ii) Mitigation

- Recompression of gases currently being continuously flared, for treatment and use in the planned flare gas recovery project.
- Tie-in of any new diluted bitumen and diluent tanks to the Vapour Recovery System.
- Modification of the diluent (e.g. narrower boiling range, and less benzene and light ends) for use in secondary extraction to improve recovery in the NRU and reduce volatile organic
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

No specific concerns were documented.

4.2.6 Total Reduced Sulfur (TRS)

i) Environmental Effects

The ISC3BE model was used by the Proponent to predict TRS concentrations resulting from the Project. The model results indicated:

- The predicted effects of hourly TRS concentrations on the air quality are classified in the EIA as high in magnitude, short-term in duration, moderate in frequency, local in

geographic extent and reversible. The environmental consequence of these effects was rated as moderate.

- The predicted effects of daily TRS concentrations on the air quality were classified in the EIA as high in magnitude, short-term in duration, moderate in frequency, regional in geographic extent and reversible. The environmental consequence of these impacts was rated as moderate.

Cumulative Effects. The ISC3BE model was used in the EIA to predict TRS concentrations resulting from the cumulative case. The major source of TRS was assumed to be the Suncor ponds, with the TRS emissions increasing in proportion to the increase in VOCs. This may result in an overestimate of TRS emissions. The predicted effects of hourly TRS concentrations on the air quality were classified as high in magnitude, short term in duration, moderate in frequency, regional in geographic extent and reversible. The environmental consequence of these impacts was considered moderate by the proponent.

The predicted effects of daily TRS concentrations on the air quality were classified as high in magnitude, mid-term in duration, high in frequency, local in geographic extent and reversible. The environmental consequence of these impacts was rated by the proponent as moderate.

Effects on hourly and daily TRS concentrations were assigned a moderate environmental consequence based on the assumption that the TRS emissions will be increasing in proportion to the increasing VOC emissions from the ponds. The assumption may have been conservative, as it may be just as likely that there will be no significant increase in the TRS releases from the existing Baseline rates. TRS emissions are

principally a concern for causing odours, and both Suncor and Syncrude have ongoing abatement programs in place. Over the past few years, there has been a decrease in the number of odour complaints from over 275 to less than 20 per year. Viewed in the context of low concentrations outside the existing operational areas, the potential of no net increase in emission rates, and the nuisance nature of off-site odours, the environmental consequence of the TRS emissions is rated as low. This impact was considered not significant by the proponent.

ii) Mitigation

- Install two Claus sulphur recovery trains with a downstream tail gas treatment unit for the Millennium Upgrader.
- Manage greenhouse gas emissions on a corporate basis through implementation of a seven-point plan.
- Maintain its active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

The Athabasca Chipewyan First Nation expressed concern that some members of Fort Chipewyan will detect H₂S.

4.2.7 Acid-Forming Compounds (NO_x and SO₂)

i) Environmental Effects

The CALPUFF model was used by the Proponent for predicting the PAI resulting from the Project. Comparisons of

emissions and concentrations are discussed below:

- The predicted PAI exceeds the Alberta interim critical loading for sensitive soils (0.25 keq/ha/y) over an area of 861,263 ha (35.5% of the RSA). The areal extents where the PAI exceeds the critical loadings being considered for less sensitive soils are: 195,695 ha (8.1% of the RSA) above 0.50 keq/ha/y; and 9,598 ha (0.4% of the RSA) above 1.0 keq/ha/y.
- The maximum predicted PAI of 2.13 keq/ha/y occurs in the development area, in the immediate vicinity of the open pit mines.
- The maximum predicted sulfate deposition rate of 1.15 keq/ha/y is predicted to occur in the active plant area.
- The highest predicted deposition rate of nitrates (1.01 keq/ha/y) occurs in the development area, adjacent to the open pit mines.
- The maximum wet and dry deposition rates (including both the sulfate and nitrate species) are 0.78 and 1.81 keq/ha/y, respectively. These predicted maximums would occur near the active open pit mines.

Cumulative Effects. The CALPUFF model was used in the EIA for predicting the deposition of acid forming compounds (measured as PAI) resulting from the cumulative emission sources. The CALPUFF model takes into account the chemical transformations of the emitted SO₂ and NO_x and predicts both wet and dry deposition of SO₂, SO₄²⁻, NO, NO₂, NO₃ and HNO₃. Comparisons of emissions and concentrations are as follows:

- The predicted PAI exceeds the Alberta interim critical loading for sensitive soils (0.25 keq/ha/y) over an area of 1,417,300 ha (58.4% of the RSA). The areal extents where the PAI exceeds the critical loadings being considered for less sensitive soils are: 420,086 ha (17.3% of the RSA) above 0.50 keq/ha/y; and 20,430 ha (0.8% of the RSA) above 1.0 keq/ha/y.
- The maximum predicted PAI of 2.1 keq/ha/y occurs in the development area, in the immediate vicinity of the open pit mines.
- The maximum predicted sulphate deposition rate of 1.13 keq/ha/y is predicted to occur in the active plant area.
- The highest predicted nitrate deposition rate of 1.1 keq/ha/y is predicted to occur in the development area, adjacent to the open pit mines.

No predictions and environmental consequences have been established by the proponent for PAI in the air section as PAI is used as an input into the water quality, soils and terrain, and terrestrial vegetation and wetlands evaluations.

ii) Mitigation

- Continue use of the Flue Gas Desulphurization (FGD) plant to reduce SO₂ and particulate emissions associated with coke combustion.
- Install a flare gas recovery project (scheduled for completion in 1999).
- Recompression of gases currently being continuously flared, for treatment and use in the planned flare gas recovery project.
- Install two Claus sulphur recovery trains with a downstream tail gas

treatment unit for the Millennium Upgrader.

- Use of low-NO_x burners for new plant equipment.
- Use of mine fleet vehicles with improved emission control technology.
- Improvement in the quality of diesel fuels used for mine fleet vehicles.
- Implementation of a site-wide NO_x management plan.
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

Environment Canada stated that uncertainties in soil sensitivity and background PAI need to be deduced through monitoring and measurements. **Because of the large percentage of the RSA which is affected by acidifying emissions, it may be necessary expand the RSA boundaries for this issue. While the proponent is undertaking some work to further understand of ecological effects of acidifying emissions, it is presently unclear how or when this work will be completed and how new findings will be incorporated into the project. A mechanism that will ensure studies proposed by the proponent will be successfully completed, interpreted, and implemented in the region must be identified. Results from this monitoring should be used to recalculate the prediction of ecological impacts of acidifying emissions. This mechanism should also address the implementation of mitigative measures should they be required. If required, steps should be taken to further mitigate**

~~potential effects of acid deposition.~~

The Oil Sands Environmental Coalition (OSEC) believes that the assessment of current and increased acid loading in the region presented in the Project Millennium EIA are incomplete and inadequate. The assessment of potential impacts must be addressed before the full assessment of the project can continue.

4.2.8 Ground Level Ozone

i) Environmental Effects

The effect of Project emissions on concentrations of ground level ozone was not evaluated as part of the EIA because of the known inaccuracy of the model (SMOG) previously used for oil sands developments. Suncor is participating in a joint industry and government working group to research and assess ground level ozone issues in the oil sands region. This project includes development of a new modeling framework for ground level ozone in the region. The initial results of this new model were released in July 1998.

ii) Mitigation

- Participate in a regional ground-level ozone modelling program.
- Maintain active role in the Regional Air Quality Coordinating Committee (RAQCC).

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

~~Environment Canada stated that O_3 production VOCs may be an important component and must be considered to understand the NO_x / VOCs / O_3 cycle in the RSA. Environment Canada concurs with the proponent that until the NO_x / VOCs / O_3~~

study is completed, impacts of increasing NO_x / VOCs emissions on O_3 are undetermined. **Once completed, model predictions must be validated through monitoring. If the impact of the regional development on ozone concentrations are moderate or high, it will be necessary to develop appropriate mitigative measures. Environment Canada is concerned that no timelines have been given for the completion of this work.**

The Athabasca Chipewyan First Nation expressed concern that the lack of the ozone assessment and GLC predictions hampers the assessment of PM and acidifying emissions due to the linkages with human and plant health, respectively.

The Oil Sands Environmental Coalition (OSEC) noted that there is a lack of information and assessment on ground level ozone in the Project Millennium EIA. OSEC recommended that Suncor complete the assessment of impacts of increased precursor emissions on the ground-level concentrations of ozone, and that the assessment include predicted effects of potential changes in ground-level ozone on receptors. OSEC is further concerned that current ozone assessment may be critically flawed due to the lack of direct involvement and input of other stakeholders.

4.2.9 Noise

i) Environmental Effects

Operation of an open pit oil sands mine and associated extraction and upgrading equipment produces noise. The effects of this noise on residents in surrounding communities was assessed with consideration of the location of Fort McKay, the nearest community, and the locations of other operations relative to the Project and to Fort McKay. The predicted impact of noise from Project

Millennium was classified as negligible in magnitude, high in frequency and of regional geographic extent. The impact ceases upon closure. The relatively large distance from the Project to Fort McKay means the effects of noise related to the Project are negligible.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

No specific concerns were identified.

4.2.10 Green House Gases

i) Environmental Effects

As reported by the Mackenzie Basin Impact Study (MBIS), climate change will have major impacts in the region (Environment Canada 1997a). For example, the total commercial forest yield may only be 50% of the pre-change yield when all factors are considered. Lower river stages and warmer winters could have a dramatic effect on transportation and water availability for hydro-electric generation. Many aspects of First Nation people's traditional lifestyles will be impacted by the identified climate change effects [Environment Canada, 1997b].

ii) Mitigation

(for completion by Suncor)

ii) Residual effects

Concerns

Environment Canada acknowledges Suncor's efforts to improve their operational efficiency and other

measures that it has and is adopting to minimize greenhouse gas emissions from its operations. The cumulative emissions of greenhouse gases from all developments in the oil sands region will affect Canada's emissions profile and its ability to meet international commitments arising from the Kyoto conference. The climate change challenge ultimately requires that we reduce emissions in total not just emissions on a per capita or per unit of industrial output basis.

Other Air Concerns:

Environment Canada stated that improving emission estimates will provide more confidence in the prediction of the effects of planned developments on air issues and resulting ecological impacts. Emission factors should continue to be validated. Environment Canada also requested that the proponent clarify the relative contribution of emissions from non-combustion sources, and if appropriate, whether they were included in the assessment.

The Fort McKay Industry Relations Corporation expressed concern that:

- Air quality provided in the EIA is deficient with respect to the modeling results presented. The high number of predicted exceedences of NO₂ and SO₂ is of concern.
- The acknowledged lack of an ozone analysis means that the air quality assessment with regards to particulate matter and acidifying emissions cannot be complete. The absence of PM_{2.5}, PM crustal and background data is significant.
- A monitoring program that includes organic soils and acid-sensitive wetlands/lakes and research into the effects of acid deposition on revegetation and reclamation needs to be implemented.

The Athabasca Chipewyan First Nation has expressed concern that the analysis, predictions and general assessment of air quality to be significantly deficient and not adequate to address the terms of reference in the EIA. They are concerned that there may be some effects on air quality in Fort Chipewyan. The following questions were raised:

- What is the impact of these deposition areas on reclamation/revegetation efforts and how will this be affected by the anticipated increase in ozone ground level concentrations?
- How many monitoring sites will incorporate organic soil and acid sensitive wetlands/lakes and what distance from the emission sources will they be located?

The Oil Sand Environmental Coalition (OSEC) is concerned that the proposed Project will result in significant absolute increases in the releases of air pollutant emissions as compared to the previously assessed and approved rates. OSEC is also concerned that even at the current rates of air pollutant emissions in the region the environmental thresholds are being exceeded.

4.3 Water

The bitumen production component of Project Millennium has the greatest potential for adverse impact on the water environment. The upgrading and energy service components impact the water environment to a lesser extent.

Key questions were developed to address the overall question of whether impacts to the Athabasca River will result from changes in hydrogeology, surface water hydrology, surface water quality, fisheries and fish habitat associated with Project Millennium and the combined

developments. The following summaries characterize the effects of existing, approved and planned developments on aquatics in the RSA.

4.3.1 Surface Hydrology and Hydrogeology

The change in flow to the Athabasca River from both surface water and groundwater sources for various times in the Project life cycle, by basin and year is less than 0.03% of the mean annual flow in Athabasca River. Low flows from surface water in the LSA are estimated in the EIA to be zero for all periods less frequent than the 1 in 10 year drought.

4.3.2 Water Quality

Combined developments will not cause exceedences of acute or chronic toxicity guidelines for aquatic life. A number of metals exceed water quality guidelines in the Athabasca River naturally and the combined developments would not contribute an appreciable, additional load of these metals. These metals are not considered to be of concern, because they are largely associated with suspended particulate matter and are thus not in a bioavailable form.

Based on the evidence provided in the Water Quality impact assessment on PAHs, the proponent considers it is unlikely that PAHs released from combined oil sands developments will result in substantial accumulation in sediments of surface waters.

Analysis of potential waterbody acidification presented in the environmental assessment also applies to the cumulative assessment. The difference between air quality model results for the cumulative assessment and those presented in the assessment consists of an increase in the area of exceedence of the Critical Load under the

cumulative assessment (from 90 x 150 km to 120 x 170 km).

4.3.2.1 Maintenance of Water Quality Guidelines

i) Environmental Effects

The proponent states in the EIA that the Project, in combination with existing and approved developments in the study area, will not cause exceedences of acute or chronic toxicity guidelines for aquatic life. A number of metals exceed water quality guidelines in the Athabasca River naturally and the Project would not contribute an appreciable, additional load of these metals. These metals are not considered to be of concern, because they are largely associated with suspended particulate matter and are thus not in a bioavailable form.

Exceedance of the human health water quality guideline for benzo(a)anthracene may occur in the Athabasca River downstream of the Muskeg River due to the incremental contribution of the Project and approved, but not yet developed, oil sands operations in the Muskeg River basin. This exceedance is primarily related to the initial discharges from EPLs. It is expected that continued examination of this issue will demonstrate that this hydrophobic compound will precipitate out or be bioremediated in EPLs and wetlands before reaching any receiving streams. Follow-up human health risk analysis rejected this compound as being of concern to wildlife and human health. A similar pattern of background exceedences for metals occurs in McLean Creek, which receives muskeg dewatering flows during operation. No other mine related flows reach the creek during operation. McLean Creek will not be affected by reclamation seepage. However, the Creek will receive direct EPL waters into the far future. This effect would be of moderate environmental consequence.

Although limited baseline water chemistry data are available for the Shipyard Lake wetlands, worst-case projections can be made. These wetlands will be largely protected from the influence of Project-related flows by directing reclamation landscape flows to the EPL during periods of CT flux.

ii) Mitigation

- Control the sediment released from the east bank mine area to levels compatible with the receiving watercourses.
- Use of an interceptor ditch around the tailings pond to capture seepages.
- Operate sedimentation ponds to polish muskeg dewatering flows (and equilibrate temperatures).
- Direct CT surface flows exclusively into the EPL.
- Develop wetlands systems to provide retention and bioremediation of process-affected waters.

iii) Residual Effects

The environmental risk to water quality posed by the Project was considered by the proponent to be low and, therefore, this effect was not considered to be significant. The residual effect was classified as of low environmental consequence.

iv) Concerns

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- Guideline criteria have been exceeded for the baseline and the incremental effect of Project Millennium.

- The rationale for rating exceedences to guideline criteria as insignificant should be provided.
- An explanation how exceedences for arsenic, chromium, iron and selenium affects the development potential for McLean Creek under the no net loss fisheries objective.

Environment Canada also expressed concerns regarding potential exceedences of water and sediment quality guidelines.

4.3.2.2 Thermal Regime

i) Environmental Effects

The EIA states that temperature changes in McLean Creek and Shipyard Lake, because of changing flow regimes, would remain within acceptable ranges. Uncertainty regarding the conservative analysis for McLean Creek indicates that temperature monitoring should be conducted in this stream under baseline conditions and during the life of the Project.

ii) Mitigation

Equilibrate temperature of muskeg drainage waters entering small streams by increasing the retention times of sedimentation ponds.

iii) Residual Effects

Residual effect of the thermal regime was classified by the proponent as negligible to low.

iv) Concerns

The Department of Fisheries and Oceans is concerned with the effects of changes in water temperature in McLean Creek associated with the EPL. It is not clear that the diversion of water from the EPL is a necessary component of the Project. There is also concern with the criteria

used to evaluate the effects of temperature changes.

4.3.2.3 Dissolved Oxygen

i) Environmental Effects

Dissolved oxygen effects from muskeg drainage waters are not expected to occur for the Project. The magnitude of impacts associated with dissolved oxygen was rated by the proponent as negligible.

ii) Mitigation

Oxygen levels will be controlled in muskeg drainage waters. **All drainage waters will meet regulatory requirements set by AEP for DO and BOD.**

iii) Residual Effects

The residual effect of dissolved oxygen was determined by the proponent to be negligible.

iv) Concerns

- 1-
2. ~~Environment Canada requested information on what values for DO, BOD or organic matter will trigger sediment pond treatment of muskeg drainage waters.~~

4.3.2.4 Polycyclic Aromatic Hydrocarbons (PAHs)

i) Environmental Effects

Concentrations of the benzo(a)anthracene group were conservatively predicted by the Proponent to exceed the human health water quality guideline in the Athabasca River, downstream of the confluence of the Muskeg River. This is due to the incremental contribution of the Project and approved, but not yet developed oil sands operations in the Muskeg River basin. Predicted effects of PAH releases were classified in the EIA as negligible in

magnitude, high in frequency and of regional geographic extent.

ii) Mitigation

- Use an interceptor ditch around the tailings pond to capture seepages.
- Operate sedimentation ponds to polish muskeg dewatering flows (and equilibrate temperatures).
- Direct CT surface flows exclusively into the EPL.
- Develop wetlands systems to provide retention and bioremediation of process-affected waters.
- **Monitoring of sediment and water chemistry will be conducted during and after filling of the EPL, and an ongoing research program will provide additional information on the potential bioaccumulation of PAHs and metals**

iii) Residual Effects

The residual effect of PAHs was determined by the proponent to be low.

iv) Concerns

Environment Canada recommendations regarding PAHs include:

- Air concentrations of PAHs and metals should be considered in the cumulative effects assessment for human health and water quality.
- **Environment Canada supports the continued monitoring of PAHs within water and sediments through RAMP and the R&D efforts to understand bioavailability of PAHs to The accumulation of PAHs in EPL sediments should be assessed and the bioavailability to benthic organisms and fish should be examined.**

- ~~Predicted PAH levels in EPL should be compared to the Canadian Sediment Quality Guidelines for PAHs.~~
- ~~BAP and BAA concentrations in EPL waters should be compared to water quality guidelines as well as acute and chronic toxicities of these compounds.~~

The Department of Fisheries and Oceans expressed concern that the RSA does not extend far enough down the water basin to the Slave River Delta or possibly Great Slave Lake where there is evidence of a plume of PAHs.

4.3.2.5 End Pit Lake

i) Environmental Effects

Suncor predicts the strategic design and management of the EPL will enable acute and chronic toxicity guidelines to be achieved before the outflow reaches the receiving stream. There are a number of potential issues that require resolution and further evaluation. Predicted impacts of the EPL water quality are classified in the EIA as low in magnitude and local in geographic extent.

ii) Mitigation

- Direct CT surface flows exclusively into the EPL.
- Develop wetlands systems to provide retention and bioremediation of process-affected waters.
- Initially direct the release of EPL water to the Athabasca River, rather than to McLean Creek.

iii) Residual Effects

The residual effects of EPL was rated by the proponent as low.

iv) Concerns

The Department of Fisheries and Oceans is concerned that water from the EPL will be routed directly to the Athabasca River until such time when water quality improves to allow diversion to McLean Creek.

Environment Canada has concerns regarding the ability to establish a viable ecosystem within the EPL because of naphthenic acids PAHs and high TDS within the CT waters. R&D will be required to evaluate the potential impact of naphthenic acids and high concentrations of dissolved salts on the development of a viable ecosystem in the EPL.

4.3.2.6 Acidification

i) Environmental Effects

Acidification of waterbodies, because of air emissions, is considered by the proponent to be unlikely. However, questions remain about possible spring pH depression in rivers and acidification of a small number of sensitive lakes in the RSA. The Fort McMurray oil sands area is subject to a higher than background rate of sulfate deposition, which has not been attributed to specific sources. There are no acid-sensitive lakes in the Aquatics LSA, and to date, fewer than ten lakes have been designated acid-sensitive within the RSA. These lakes are located just east of the oil sands area and to the northwest, in the Birch Mountains uplands. Running waters may be sensitive to acidification during the spring, when runoff from rapid snowmelt may quickly reach streams by travelling over frozen ground. Acid deposition from oil sands operations is not expected to cause large-scale acidification of lakes in the RSA, but sensitive lakes may be at risk. Changes in the occurrence and severity of spring pH depression in rivers cannot be evaluated using the available information, but also cannot be ruled out.

The effect of acidification of lakes was classified in the EIA as low in magnitude, long-term in duration and regional in geographic extent.

ii) Mitigation

No additional mitigation measures were proposed.

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

The Department of Fisheries and Oceans and Environment Canada have expressed concern over the potential for acidification of sensitive water bodies in the region and has requested that all such water bodies in the RSA be identified. The Departments -recommends that RAMP undertake the necessary monitoring to identify if effects are in fact occurring. Fisheries and Oceans and Environment Canada are also concerned that the acidification issues is the least understood in terms of mitigation measures and has requested clarification on what measures are feasible for addressing the problem should acidification become a serious issue. Contingencies need to be defined should acidification become a serious issue.

Other Water Quality Concerns:

The Fort McKay Industry Relations Corporation expressed the following concerns:

- Toxicity testing needs to be done on the operational muskeg drainage water. The exceedences of chromium and copper suggest that it would be prudent to do so early in the drainage process.
- The behavior of PAHs and sediments requires further research.

Fate studies are needed to as well as toxicity testing of sediments.

- The potential for acidification of sensitive wetlands needs further research.

4.3.3 Hydrogeology and Hydrology

4.3.3.1 Hydrogeology

i) Environmental Effects

Groundwater from surficial deposits is expected to be diverted to Shipyard Lake and the Athabasca River, via Unnamed Creek and McLean Creek. The magnitude of these effects is low; duration is short-term; geographic extent is local and impacts are irreversible. The environmental consequence is rated as low. The porewater from CT is expected to seep through the bedrock aquifers, and discharge to the Athabasca River, Steepbank River and Shipyard Lake. The magnitude of the changes from groundwater flow is low. The frequency is high, while the geographic extent is local and irreversible. The environmental consequence is rated by the proponent in the EIA as low. In terms of groundwater quality, the magnitude for the effect is low; duration is long-term; geographic extent is local and the effects are irreversible.

ii) Mitigation

- Dewater groundwater areas impacted by the mine operation, with diversion to the interception drainage system for discharge or containment in the process water recycle system.

iii) Residual Effects

The proponent rated residual effects on groundwater as low.

iv) Concerns

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- The groundwater inputs to Shipyard Lake should be evaluated and mitigated if necessary.
- The effects of mine depressurization (over a 2 km area) on the Steepbank River and local streams and wetlands needs to be determined.

4.3.3.2 Hydrology

i) Environmental Effects

The proponent identified the following effects on surface hydrology in the Project Millennium EIA:

- Annual flows in Unnamed Creek downstream of the interception drainage system will increase. Flood peaks and the timing of flood flows are not expected to change. With the mitigation measures in place, there will be negligible environmental consequence to the water balance or levels of the Shipyard Lake wetlands.
- Leggett Creek and Wood Creek will be eliminated in the development area and flows reduced to nil. The impact on both creeks is considered high in magnitude, local in extent and long-term. Other effects of these changes to the creeks are discussed in the Fisheries and Fish Habitat section.
- Annual and flood flows in McLean Creek downstream of the interception drainage system will increase. The timing of flood flows is not expected to change. The effect on McLean Creek is considered to be high in magnitude, local in extent and short-term. The effect on the

Athabasca River is negligible. Other effects are discussed in the Fisheries and Fish Habitat section.

- The change in mean annual flow to the Athabasca River for various times in the mine life cycle from both surface water and groundwater sources by basin and year is negligible to low. The maximum change in flow is less than 0.02 % throughout the life of the Project.
- Low flows from surface water in the local study area are estimated to be zero for all periods greater than the 1 in 10 year drought. Groundwater discharges will likely remain at baseline levels.
- Sediments will be released from the east bank mine area will increase suspended sediment levels in the receiving water courses.

These flow and sediment effects were rated low in magnitude, local in geographic extent, long-term and irreversible. Therefore, the environmental consequence was determined by the proponent to be negligible.

ii) Mitigation

- Divert natural surface waters from the mining operation area.
- Maintain flows to Shipyard Lake during the mining operations, with incorporation of a self-sustaining drainage stream to provide flows to this wetlands on Project closure.

iii) Residual Effects

The residual effects due to changes in surface hydrology and hydrogeology were determined by the proponent to be not significant.

iv) Concerns

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- **The effects of the Project on wetland areas and headwater streams do not appear to have been addressed in detail. In particular, it is not clear how effects from mine pit depressurization on these areas have been addressed.**
- **Clarification is needed on how it was determined that elimination of Leggett and Wood creeks would impact the Athabasca River by less than 1%.**
- **Further information on how increased flows from Shipyard Lake and McLean Creek would not effect the water balance and water levels is needed.**

4.3.3.3 Closure Drainage Systems

There is uncertainty on the ultimate success of the various reclamation and closure activities integral to re-establishment of the groundwaters and surface water. Consequently, the proponent assigned a low rather than negligible environmental consequence associated with the expected level of sustainability for closure landscape drainage systems.

i) Environmental Effects

There is uncertainty on the ultimate success of the various reclamation and closure activities integral to re-establishment of the groundwaters and surface hydrology. Uncertainty means there is a low rather than negligible environmental consequence associated with the expected level of sustainability for closure landscape drainage systems.

ii) Mitigation

Re-establish self-sustaining surface hydrology systems on the closure landscape.

iii) Residual Effects

No further residual environmental effects were identified.

iv) Concerns

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- Clarification is requested on the actual increase in volumes of water being diverted from the Athabasca River and any incremental effects associated with this diversion.
- Further details on the proposed routing of EPL water to the Athabasca River should be provided.
- The ultimate disposal of water that is presently discharged from the EPL to bedrock needs to be defined.
- The time-frame for Wood Creek to establish a new channel regime based upon the increased flows needs to be determined.
- Further clarification should be provided on the rationale for the diversion of Wood Creek into EPL.
- The environmental consequence of proposed reclamation and closure activities should be considered as uncertain.

Environment Canada also expressed concerns regarding the use of Athabasca River water to dilute EPL waters. If the EPL demonstrates toxicity, appropriate treatment should be employed.

Other Water Concerns:

The Fort McKay Industry Relations Corporation expressed the following concerns:

- There is an outstanding concern to review detailed monitoring programs to assess their adequacy to detect unpredicted results.
- Special attention needs to be paid to the potential for CT seepage to groundwater and hence to surface waters.

4.3.4 Fish and Fish Habitat**4.3.4.1 Fish Habitat****i) Environmental Effects**

No effects on fish or fish habitat in the Steepbank River are expected by the proponent from Project Millennium. The Project occupies a very small portion of the Steepbank River watershed and will not affect the hydrology of this river. Overburden dumps and Pit 1 are located just south of the Steepbank River. However, erosion protection will be put in place to prevent sedimentation and the area will be reclaimed rapidly. Fish habitat in the Athabasca River will not be affected by Project Millennium. The EIA states that small changes in flow will occur in the Athabasca River, which are not expected to influence fish habitat. All project facilities located near the Athabasca River will be placed above the 1-in-100 year floodline. No impacts on northern pike and forage fish habitat in Shipyard Lake are predicted. McLean Creek will receive increased flows from diversion of the upper catchment of Wood Creek, as well as waters from muskeg and overburden dewatering operations. Two small Athabasca River tributaries, Leggett and Wood creeks, will be lost due to Project Millennium. Suncor has applied for Fisheries Act authorization for these creeks and will be working closely with the

Department of Fisheries and Oceans to ensure that habitat losses are compensated for by replacement habitat.

Cumulative Effects. In the EIA, no effects on fish habitat in the Athabasca River are expected by the proponent in relation to Project Millennium. No further analysis of cumulative effects was presented in the EIA for Athabasca River fish habitat. Approximately 1.2 ha of fish habitat in the lower reaches of Wood, Leggett and McLean creeks will be lost as a result of Project Millennium. Suncor will mitigate habitat loss in these creeks by creating new habitat or enhancing existing habitat. The quality and quantity of habitat created/enhanced will be determined in consultation with the Department of Fisheries and Oceans to ensure that the "no net loss" objective is achieved. Habitat creation/enhancement will occur at the same time as habitat loss so that there will be no net loss of fish habitat at any given time. The proponent states that Project Millennium will not result in any net loss of fish habitat, no cumulative effects on fish habitat will result from Project Millennium and no further analysis is required.

Conclusions in the EIA relative to fish abundance are as follows:

- No cumulative impacts on fish habitat are expected in relation to Project Millennium since habitat impacts from the Project will be compensated.
- No acute and chronic effects on fish are expected from Project Millennium and the combined developments.
- Change in fishing pressure on a regional basis is not expected to impact fish abundance.

Regulation of angling is within the jurisdiction of Fisheries Management

Division of Alberta Environmental Protection. It is assumed that decreases in fish abundance would be prevented by appropriate enforcement of legislation.

Based on existing data from field and laboratory analyses, sufficient bioaccumulation of chemicals to cause direct effects on fish health or to cause exceedences of guidelines for human consumption is not expected to occur by the proponent. Flavor impairment (i.e. tainting) is also not expected. No impacts on fish tissue quality are predicted by the proponent.

ii) Mitigation

- Avoid habitat impacts in the Athabasca River.
- Avoid impacts in the Steepbank River (minimal disturbance of watershed, 100 m setback from the escarpment, mitigation to prevent sedimentation).
- Adjust inflows to Shipyard Lake to maintain fish habitat.
- Implement additional mitigation of fish habitat in McLean Creek if necessary.
- Fish habitat lost will be replaced and monitored to ensure that the "no net loss" objective is achieved.

iii) Residual Effects

The residual effects on fish habitat was assessed by the proponent as negligible because of no net loss of fish habitat. Since the in-channel works installed in the construction and operation phases will have been designed to accommodate higher flows in McLean Creek, no significant residual effects were anticipated.

(iv) Concerns

Environment Canada recommended that spawning temperature tolerances of fish

species in McLean Creek be determined to predict whether this temperature will have an effect. **Environment Canada recommended that spawning temperature tolerances of fish species in McLean Creek be determined to predict whether this temperature will have an effect.**

The Department of Fisheries and Oceans has expressed concern over the manipulation of water flows from Wood to McLean Creeks at various times throughout the project. Suncor has suggested that the diversion of flows into the EPL is necessary to help establish the lake in a reasonable time frame. It is not clear that this is in fact necessary or desirable given that McLean Creek is part of Suncor's fish habitat enhancement objective. Fisheries and Oceans has also expressed concern with the potential water quality of any EPL releases to McLean Creek.

The Department of Fisheries and Oceans expressed concern that there is an apparent lack of baseline information on the benthic invertebrate community and determining the contribution to the fish habitat condition, particularly for Shipyard Lake and McLean and Wood creeks. Consideration of ecological interdependence of various components appears to be lacking.

4.3.4.2 Acute and Chronic Effects on Fish

i) Environmental Effects

Water quality modeling results in the EIA indicate that no toxic effects on fish or other aquatic organisms will result from Project Millennium because modeled concentrations of acute and chronic toxicity are less than guidelines for the protection of aquatic life. The environmental consequences of residual effects of the Project on acute or chronic toxicity were assessed by the proponent as negligible.

ii) Mitigation

- Recycle all process-affected waters throughout construction and operation of the Project.
- Use water retention structures to regulate flows and control sediment in muskeg drainage and other water diversions.
- Implement measures to minimize water quality impacts.
- Use tailings release waters and other process-affected water for operational waters, to reduce raw water withdrawal from the Athabasca River.
- Distribute muskeg drainage and overburden dewatering evenly throughout the life of the mine to avoid a large increase in flows to receiving streams.

iii) Residual Effects

Negligible acute or chronic impacts are predicted by the proponent on fish in the Athabasca and Steepbank rivers, Shipyard Lake and McLean Creek.

iv) Concerns

Environment Canada expressed concerns and made recommendations regarding acute and chronic effects on fish as follows:

- The proponent should investigate long-term effects of CT waters as planned, and that data from these exposures be compared to predicted EPL discharges into McLean Creek and the Athabasca River.
- ~~The acid or base generating potential of CT waters and subsequent exposure to the atmosphere should be discussed.~~
- **the continued R&D Data** on acute and chronic toxicity of naphthenic

acids to algae, invertebrates and fish **will be essential for determining the viability of the EPLs** should be provided.

- **Ongoing monitoring of the toxicity and chemistry data for of drainage from muskeg dewatering and stockpiled overburden and muskeg to ensure release waters are nontoxic is supported** be provided.

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- The Project Millennium EIA does not provide very much information on polycyclic aromatic hydrocarbons and naphthenic acids, but a recent report by CONRAD is available.
- Suncor appears to have done largely regulatory toxicology that is not very informative for PAHs.
- There is no genetic toxicological work and the proposed contaminants monitoring is restrictive.
- Reported concentrations of naphthenic acids are high enough to cause toxicities.
- Further work is required to characterize mixtures of naphthenic acids in bedrock aquifers and CT porewaters to make them comparable.
- Toxicity studies done under the NRBS should be included.

4.3.4.3 Fish Abundance

i) Environmental Effects

The Proponent predicts that the Project will not have any impact on fish habitat or on increased acute or chronic toxicity to fish, thus it will not have any impact on fish abundance. Therefore, the environmental consequences of the

Project on fish abundance were determined in the EIA to be negligible.

ii) Mitigation

- Avoidance of habitat impacts in the Athabasca River.
- Avoidance of impacts in the Steepbank River (minimal disturbance of watershed, 100 m setback from the escarpment, mitigation to prevent sedimentation).
- Recycle all process-affected waters throughout construction and operation of the Project.
- Use water retention structures to regulate flows and control sediment in muskeg drainage and other water diversions.
- Implement measures to minimize water quality impacts.
- Use tailings release waters and other process-affected water for operational waters, to reduce raw water withdrawal from the Athabasca River.
- Distribute muskeg drainage and overburden dewatering evenly throughout the life of the mine to avoid a large increase in flows to receiving streams.

iii) Residual Effects

Negligible residual effects on KIRs habitats in the Athabasca and Steepbank rivers were predicted by the proponent.

iv) Concerns

No specific concerns were documented.

4.3.4.4 Fish Flavor

i) Environmental Effects

People living in the oil sands region have expressed concern that Project Millennium will negatively affect (i.e. taint)

the flavor of fish from the Athabasca and Steepbank rivers. As part of Project Millennium, Suncor plans to reduce, by at least 50%, the amount of wastewaters released to the Athabasca River. Hence, any potential for tainting from the wastewater treatment system waters would be reduced by Project Millennium. The environmental consequences of residual effects of the Project on fish tissue quality were predicted by the proponent to be negligible because any impacts are negligible in magnitude.

ii) Mitigation

- Reduce, by at least 50%, the amount of wastewaters released to the Athabasca River.
- Recycling of all process-affected waters throughout construction and operation of the Project.
- Implementing measures to minimize water quality impacts.

iii) Residual Effects

The residual effect on fish tissue quality was predicted by the proponent to be negligible in magnitude and environmental consequence.

iv) Concerns

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- A commitment from Suncor is required to examining wastewater effluent streams for fish tainting potential.
- Suncor should hold taste panels using experts for commercial fish species that are located closer to the market and farther from the oil sands industry.

4.3.4.5 Chemicals in Fish Tissue

i) Environmental Effects

Fish exposed to oil sands waters in the laboratory, as well as wild fish captured from the Athabasca River near Suncor showed very limited uptake of organic chemicals such as polycyclic aromatic hydrocarbons (PAHs). The EIA indicate it is unlikely that the Project will result in direct effects on fish or cause exceedences of guidelines for human consumption of fish. No studies have been conducted on the potential for chemicals from CT water to accumulate in fish. Levels of PAHs and metals in CT water are predicted to be similar to those found in TID water. Bioaccumulation studies on CT water will also be conducted in conjunction with the fish health studies.

ii) Mitigation

- Recycle all process-affected waters throughout construction and operation of the Project.
- Implement measures to minimize water quality impacts.
- Distribute muskeg drainage and overburden dewatering evenly throughout the life of the mine to avoid a large increase in flows to receiving streams.

iii) Residual Effects

Residual effects of the Project on chemicals in fish tissue were assessed by the proponent as negligible in magnitude. The environmental consequence was also rated as negligible.

iv) Concerns

The Department of Fisheries and Oceans recommends that the proposed extensive study to further understand the effects of CT reclamation on fish health should

include all aspects on fish habitat including benthic invertebrates.

4.3.4.6 Reclamation Streams, Wetlands and End Pit Lake

i) Environmental Effects

The EPL and reclamation drainage system will be designed by the proponent to evolve into a productive, self-sustaining ecosystem. A 20% littoral zone, consisting of shallow wetlands and shoreline areas, will be incorporated in the EPL to enhance productivity and provide fish habitat. Several constructed wetlands will also provide aquatic habitat. The EPL will be managed so that once it is filled, it is non-toxic to aquatic life. Suncor recognizes that there are a number of issues that will need to be addressed to demonstrate long-term ecological viability of the EPL and reclamation streams. Suncor is committed to participate in research to ensure that the EPL meets regulatory and stakeholder end land use goals. Suncor is also committed to exploring alternatives to the EPL. The EPL was determined in the EIA to likely support a viable aquatic ecosystem.

ii) Mitigation

- Manage the EPL so that once it is filled, it is non-toxic to aquatic life.
- Develop a sustainable closure landscape and drainage systems by vegetating reclaimed surfaces to minimize surface erosion, building drainage networks and regime channels to minimize gully and channel erosion, and constructing wetlands and lakes to reduce flood peak discharges and sediment loadings to receiving streams.
- Develop wetlands systems on the reclaimed CT deposit areas, the reclaimed tailings pond area as well as in conjunction with reclamation drainage systems to provide

retention and bioremediation of operational and reclamation waters.

iii) Residual Effects

Because of uncertainties about the design and functioning of this system, the residual effect was determined by the proponent to be uncertain.

iv) Concerns

The Department of Fisheries and Oceans expressed concerns and posed questions as follows:

- The rationale for maintaining velocities for spawning Arctic grayling while those conditions may not be conducive to other life cycle stages of fish.
- A comparison of water quality and the implications on fish habitat for discharge points from the EPL should be provided.
- Further details on the suggested pipeline routing from EPL to the Athabasca River should be provided.

Environment Canada has concerns regarding the potential impact of naphthenic acids PAHs and high concentrations of dissolved salts on the development of a viable ecosystem in the EPL.

Other Fish and Fish Habitat Concerns:

The Fort McKay Industry Relations Corporation expressed the following concerns:

- Lack of recognition within the EIA of adequate population surveys to quantify baseline data.
- The potential for fish tainting needs further study, including the inclusion of Fort McKay residents in taste panels.

4.4 Terrestrial

The bitumen production component of Project Millennium has the greatest potential for impact on the terrestrial environment. In comparison, the upgrading and energy service components have relatively minor impacts on the terrestrial environment.

4.4.1 Soils and Terrain

i) Environmental Effects

Organic soils of the McLelland and Muskeg series comprise just over half the area of the local study area (LSA). For the remainder (i.e. the mineral soils), the largest unit is the Kinosis series at roughly 20%. Terrain units reflect a similar pattern, which is to be anticipated since they are based on the parent materials of the soils. Combined bog and fen units make up just over 50% of the LSA, with the morainal/till unit accounting for roughly another 20%. Removal of soils and terrain and reconstruction of landforms and soils will result in a return of the area to a condition similar to, but altered from pre-development conditions. These effects were assessed in the EIA by the proponent as being of low to moderate environmental consequence.

Cumulative Effects. The construction and operation phases of the combined developments will cause a loss of 3.2% of the natural soil and terrain units in the RSA. Reclamation of the developed areas and existing disturbed areas with reconfigured terrain units covered by a reclamation soil mixture will achieve positive effects by increasing the diversity of terrain units. The effects associated with this are estimated by the proponent to be: negative in direction, low in magnitude, regional in extent, of long-term duration, irreversible and low in frequency. The environmental consequence was rated by the proponent as low.

As a result of alterations in the quantity and distribution of soil and terrain units between the pre-development and closure landscapes, changes in land capability will be produced. These are estimated by the proponent to be positive in direction, low in magnitude, regional in extent and of long-term duration. The positive direction of change is the result of significant areas of non-productive Class 5 land being reclaimed to low capability Class 3. The environmental consequence was rated by the proponent as low.

Operational activities of the developments will increase acidifying emissions released into the RSA air shed. The environmental consequence was rated by the proponent as being undetermined because of the high level of uncertainty associated with soil acidification.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

Because of the demonstrated success of reclamation in the oil sands areas, the residual effects were rated by the proponent as not significant.

iv) Concerns

The Oil Sands Environmental Coalition (OSEC) is concerned that Project Millennium would accelerate the rate of disturbance of new lands such that it far exceeds the rate at which these lands could be successfully reclaimed, thereby adding to the total debt of unreclaimed land in the region.

4.4.1.1 Quality of Soils and Terrain Units

i) Environmental Effects

Over half the LSA is rated as non-productive (Class 5) for commercial forestry, while moderately productive

lands account for another quarter of the area. Within the disturbance footprint, roughly 60% of the area is rated Class 5, while Classes 2, 3 and 4 range about 12% each. The reclamation soils and terrain are predicted to result in a significant increase in land capability ratings for the development area. The net result is an increase in land capabilities of at least low capability of approximately 5,681 ha. There will be an elimination of some 5,380 ha of class 5, non-productive land capability areas. The effects of the Project on soils and terrain quality were rated by the proponent as positive in direction.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The proponent determined that there were no residual effects and therefore a positive environmental consequence.

iv) Concerns

No specific concerns were documented.

4.4.1.2 Acidification of Soils

i) Environmental Effects

The Project operations, in conjunction with existing and approved operations that generate air emissions leading to acidification potentials have been modeled to identify areas where acidifying emissions may contribute potential acid input (PAI). Results of modeling by the proponent indicate that existing and Project emissions have the potential to exceed the interim critical load of 0.25 keq/ha/y for highly sensitive environments in an approximately 90 x 150 km area. Uncertainties associated with the soil sensitivity ratings, as well as the fact that the PAI results are generated by model simulations leads to a high level of scientific uncertainty about the predicted

impact of acidifying emissions on regional soils. This rating was qualified through recognition that if the modeling results are representative of actual field conditions, and if there are sensitive soils within the influence area, then these soils have the potential to be impacted.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The residual effect of acidifying emissions on soils was rated by the proponent as undetermined.

iv) Concerns

See sections 7.2.1.7 Acid Forming Compounds and 7.2.3.6 Acidification.

Other Soils and Terrain Concerns

The Fort McKay Industry Relations Corporation expressed the following concerns:

- There appears to be no explanation why the LSA extends a number of kilometers south of the EMBA. Changes tend to be discussed as a percentage of the LSA and not the area actually affected.
- The impact of Class 1 and 2 capability lands should be rated as moderate and mitigation should be addressed.
- Why was there no material balance in the soils and terrain section?
- More information is needed on the impact of acidifying emissions.

4.4.1.3 Terrestrial Vegetation and Wetlands

i) Environmental Effects

The Project will result in the clearing of 9,281 ha or 57% of the LSA. Baseline information for the LSA, indicates that

36% of community types identified represent terrestrial ecosite phases, while 62% represent wetlands. During construction and operation, 46% of terrestrial ecosite phases and 65% of wetlands community types will be lost in the development area. Reclaimed landscapes will result in the addition of 7,239 ha of terrestrial ecosite phases and loss of 5,387 ha of wetlands community types in the LSA. Thus, upon closure, relative to pre-development, terrestrial ecosite phases will increase by 28% and wetlands communities will decrease by 34% within the LSA. An EPL of approximately 935 ha will account for 6% of the area. Hence, a dominantly wetlands community area will be converted to a dominantly upland mixedwood forest area.

Cumulative Effects. For the assessment of cumulative effects, loss of terrestrial vegetation communities (16,129 ha or <1%) was predicted in the RSA. Project Millennium contributes 5,644 ha to this loss. Reclamation will increase terrestrial vegetation by 306% to 49,444 ha or 2% of the RSA.

The residual effects on loss or alteration of terrestrial vegetation communities as low in magnitude, regional in geographic extent, long-term in duration and reversible. The environmental consequence was rated by the proponent as low:

The total loss to wetlands from the combined developments is 33,661 ha or 1% of the RSA. The Project's contribution to this loss is 6,501 ha. Reclamation activities and reforestation will result in changes to the distribution of wetlands types in the RSA. Overall, wet open swamp will be reduced by 24%, but (black spruce) marshes will increase by 595% in the RSA.

The residual effect on wetlands is low in magnitude, regional in geographic extent, and long-term in duration. Some effects, such as those to bogs and fens, are not reversible; therefore, the environmental consequence has been rated by the proponent as low.

The impact of air emissions on vegetation health is undetermined. Additional data are required to assign an environmental consequence.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

No further residual effects were identified

iv) Concerns

No specific concerns were documented.

Community Changes

i) Environmental Effects

Within the uplands (terrestrial) ecosite phases, the greatest impacts occur within the: lichen Pj (a1); Labrador tea-mesic Pj-Sb (c1); and Labrador tea-subhygric Sb-Pj (g1) ecosite phases, where 3 ha or 100% of the ecosite phases within the LSA will be cleared. The blueberry ecosite, will experience a loss of 279 ha or 77% of the blueberry ecosite within the LSA. The low-bush cranberry ecosites will experience a loss of 2,230 ha or 46% within the LSA. In addition, the dogwood ecosites will experience a loss of 16% or 63 ha within the LSA. Reclamation of the development area will result in the development of a much greater area of uplands terrestrial vegetation. Wetlands are the dominant community types lost to the development because they occupy 62% of the LSA. The Project will remove 6,502 ha or 65% of wetlands. Reclamation and closure of the development area will result in return of

some wetlands types, with 12% of the development area returned to wetlands. The environmental consequences were determined by the proponent to be high. However, the wetlands areas lost to development are common throughout the region and are unlikely to have a high magnitude impact on wetlands in the region. The loss of wetlands has been assessed by the proponent as not significant on a regional basis. The replacement of the wetlands areas by uplands areas with higher forest capability can be viewed as directionally positive. Some wetlands areas as well as shallow open water areas and lakes will be replaced as part of the closure plan. There was a moderate degree of uncertainty associated with this rating as the effectiveness of some of the reclamation practices is yet unproved.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The residual effects of the changes to terrestrial and wetlands vegetation communities were rated as low in environmental consequence.

iv) Concerns

No specific concerns were documented.

Diversity Changes

i) Environmental Effects

The overall impact on terrestrial patches was described by the proponent as moderate in magnitude based on percentages of change from baseline conditions while for wetlands it is high. The geographic extent is local while the direction of the impact will extend throughout the life of the Project. The environmental consequence is considered high for wetlands, however the number of wetlands patches in the RSA indicates

that the impact is not significant. The overall change in patch size is negative for both terrestrial ecosite phases and wetlands, however the magnitude is low for terrestrial patches given that there will be both an increase and decrease in patch size as reclamation proceeds. The geographical extent is local for both terrestrial ecosite phases and wetlands, reversible for terrestrial and irreversible for wetlands. The potentially high environmental consequence associated with the reduction of wetlands diversity is tempered by the fact that unique wetlands will not be removed and that there is a large quantity and diversity of wetlands on a regional scale.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The residual effect due to reduction of wetland diversity in the closure landscape was not considered significant by the proponent.

iv) Concerns

~~No specific concerns were documented.~~

Environment Canada has concerns that although habitat may be reclaimed, biodiversity for the area could still be negatively affected. Environment Canada supports the review of this issue by the cumulative effects working group.

Air Emissions and Water Releases

i) Environmental Effects

Airborne emissions from oil sands developments can have both short and long-term effects on vegetation vigor and health. Short-term exposure effects are usually restricted to a localized area and can include chlorosis or necrosis of plant tissues that can decrease growth rates or

eventually result in plant mortality. Long-term effects can occur over a much larger area and may result from the accumulation of contaminants in plant issues, either by direct absorption into plant tissues from the air, or indirectly through deposition into the soil and into the roots.

Although monitoring of the effects of air emissions is proceeding, the lack of current data on the potential effects of air emissions on regional vegetation means that the assessment of residual impacts is currently undetermined. Water-borne pollutant releases can also result in changes to vegetation productivity, vigor and health. Water emissions may include the release of light to heavy hydrocarbons during Project development. These chemicals, once released into water systems and soils can affect plant health and vigor once they are adsorbed onto the plant tissues. Suncor has completed a number of studies to assess the impacts of process-affected waters on terrestrial and aquatic plants. However, the research to assess the impacts of waters associated with the consolidated tailing (CT) materials has just been initiated, with few results available.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

Based on the results to date the proponent determined the residual effects to be low.

iv) Concerns

~~No specific concerns were documented~~ **Environment Canada stated that uncertainties in soil sensitivity and background PAI need to be deduced through monitoring and measurements. Environment Canada also has concerns regarding**

uncertainties in ground level ozone concentrations. (refer to sections 7.2.1.8)

4.4.1.4 Key Indicator Resources

i) Environmental Effects

The only key indicator resource assessed as having both a high magnitude and negative direction was old growth forests. An assessment of old growth forests within the LSA was considered to have a high environmental consequence based on the rating system used. The overall impact of the east bank mining area development on "old-growth" forest was negative in direction and high in magnitude, given that 21% of the old-growth forest communities will be cleared by the project. However this assessment was tempered by the facts that the net increase of old growth forest impact over the approved Steepbank Mine area is only 9 ha or 2% of the old growth forest within the LSA; the creation of more upland conditions after closure will ultimately allow for substantially greater old growth forest in the far future; and the loss of old growth forest (92 ha) is low in terms of the total amount in the RSA.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The loss of old growth forests due to development of the east bank mining area, and particularly the loss due to Project Millennium development, was not considered significant.

iv) Concerns

~~No specific concerns were documented.~~ **Environment Canada stated that the proponent should endeavor to make every possible effort to preserve as much old growth forest as possible.**

Other Terrestrial Vegetation and Wetlands Concerns:

The Fort McKay Industry Relations Corporation expressed the following concerns:

- Issues of high environmental consequence in the LSA are explained as insignificant at the regional level. These consequences should be dealt with further in the context of the LSA.
- Differences in detail levels of mapping between the LSA and RSA preclude useful comparisons.
- Further detail should be given on the criteria for assessment of the RSA.
- More information is required on the impact of loss of uncommon ecosite units, replacement of wetlands with uplands and potential loss of rare plants on the region.
- More information is needed on the impacts of acidifying emissions on vegetation and reclamation.

4.4.2 Wildlife

4.4.2.1 Habitat Changes

i) Environmental Effects

Habitat loss due to site clearing was predicted in the EIA to have the greatest effect on wildlife. The magnitude of this effect is high for most of the KIR species. However, this impact is viewed as reversible, and it is expected that wildlife habitat will be progressively reclaimed during closure. Habitat loss due to changes in hydrology, barriers to movement and sensory disturbance was also predicted to have an effect on wildlife. Changes in hydrology were determined to be low in magnitude because most wildlife habitat will be lost through site clearing. Barriers to movement will have the greatest impact on the larger, more mobile wildlife species

(e.g. moose, bear, and fisher). Sensory disturbance affecting habitat use will affect some wildlife species, particularly during the breeding seasons or when species are overwintering and may be energetically stressed. Progressive reclamation practices will result in gains in wildlife habitat. This effect is expected by the proponent to be positive for all of the KIR species. Preliminary indications of the effectiveness of the reclamation activities show that wildlife species readily use the areas. Some uncertainty exists because some of the selected KIRs for wildlife frequent mature ecosystems, which have not had time to develop on oil sands reclamation areas.

4.4.3 Wildlife

During the construction phase of the oil sands developments, the EIA states that the combined developments will cause relatively small losses of wildlife habitat due to site clearing. These impacts are predicted to be negative in direction, low in magnitude, regional in geographic extent, long-term in duration and of varying frequency. The environmental consequence for the cumulative effects was determined by the proponent to be low.

As well, minor changes in wildlife abundance and diversity are expected to occur as a result of site clearing, sensory disturbance, removal of nuisance wildlife, wildlife-traffic mortalities and wildlife interactions with infrastructure. These effects represent a worst case scenario, as it is unlikely that all sites will be cleared to their maximum extent at the same time. The phased nature of site clearing and progressive reclamation will mitigate the cumulative effects of habitat loss. Eventual reclamation of all sites should result in equivalent habitat capability for wildlife within the region.

With the expectation of equivalent habitat capability, the residual effect to wildlife abundance and diversity was rated by the proponent as being of low environmental consequence.

In the far future when equilibrium conditions have been established for all combined developments, a potential impact has been identified. The residual effect (i.e. affected population) is likely to be enhanced in the cumulative assessment, relative to the impact predicted for the Project, since there is a greater likelihood on a regional basis for this exposure pathway to be realized. However, the magnitude of exposure and associated health risks for a given individual animal should not be increased. Cumulative effects on wildlife health are predicted to be low in magnitude, regional in geographic extent, long-term in duration, reversible and of moderate to high frequency. The environmental consequence was rated by the proponent as low.

ii) Mitigation

- Locate the development away from important habitat (e.g. minimum of 100 m from the Steepbank and Athabasca rivers).
- Minimize the footprint of development (e.g. restricting dump size, use of common access and utility corridors).
- Leave movement corridors around the development area.
- Progressively reclaiming the development area.
- Maintain vegetation free shoreline in tailings pond areas.
- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.

iii) Residual Effects

The residual effect of the Project on wildlife habitat and movement was rated as low in environmental consequence.

iv) Concerns

Environment Canada stated that the proponent should endeavor to make every possible effort to preserve as much old growth forest as possible. **Of particular value, small enclaves of mature trees with buffer zones, wildlife corridors and riparian areas should be protected.** Environment Canada recognized the multistakeholder process which was used to develop KIRs, but is concerned that some of the species are not ~~and expressed a number of concerns related to the use of non-representative indicator species, for the selection of some species chosen and~~ the assessment of habitat to evaluate environmental effects. **The use of KIRs should be reevaluated if the success of mitigation and reclamation measures is to be evaluated based on habitat development rather than the return or presence of specific species.**

4.4.3.1 Wildlife Abundance and Diversity

i) Environmental Effects

Abundance and diversity of wildlife species will be affected by site clearing, sensory disturbance, removal of problem or nuisance wildlife, wildlife-vehicle collisions and interactions with infrastructure. Site clearing will result in a loss of wildlife abundance, particularly of smaller, less mobile species (e.g. red-backed voles, snowshoe hares) and will reduce wildlife diversity and the potential for diversity. Sensory disturbance may affect all of the KIR species, especially during reproductive periods or periods of energetic stress. Removal of problem wildlife will be a concern for beavers and black bears, however the magnitude of this impact will probably be low. Wildlife-

vehicle collisions are expected to occur to some extent on Highway 63 from Fort McMurray to the Suncor turn-off, as a result of increased traffic levels. The magnitude of this effect is expected to be low on the highway and negligible on-site where reduced habitat and reduced speed limits will reduce the probability of collisions.

Interactions with infrastructure (e.g. tailings pond, power lines, towers) will mainly affect bird species. Most effects related to change in wildlife abundance and diversity will result from site clearing or direct removal of vegetation communities. Wildlife species with small home ranges or limited mobility, or wildlife species with young will be most affected. As clearing is anticipated to take place during the winter months, most of the bird species will not be affected. As well, some of the larger, more mobile species (e.g. moose, bear, fisher) will most likely move out of the area. Changes in wildlife abundance and diversity attributed to sensory disturbance, removal of nuisance wildlife, increased wildlife-vehicle collisions and interactions with infrastructure were all determined to be of negligible to low environmental consequence.

ii) Mitigation

- Locate the development away from important habitat (e.g. minimum of 100 m from the Steepbank and Athabasca rivers).
- Minimize the footprint of development (e.g. restricting dump size, use of common access and utility corridors).
- Complete most clearing and construction activities during the winter when wildlife species are typically not in breeding season.
- Leave movement corridors around the development area.

- Progressively reclaim the development area.
- Maintain vegetation free shoreline in tailings pond areas.
- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.
- **Monitor for biodiversity following the recommendations of the Ecological diversity Monitoring Guidelines for Reclamation of Forest Vegetation**

iii) Residual Effects

The residual effects of wildlife collisions with infrastructure, site clearing and sensory disturbance were determined to be low.

iv) Concerns

Environment Canada expressed a number of concerns and provided several recommendations relating to wildlife abundance and diversity:

- **The final reclamation plan should consider the potential impacts of proposed roads cannot be assessed until details on their location are available and recommended that the proponent evaluate the cumulative effects of a network of roads in the area, as they further fragment habitat and increase disturbances. The direct impact of ongoing access to the site on wildlife resources should also be discussed.**
- **A minimum width of 1 km should be maintained on all corridors to ensure that all species are accommodated. Environment Canada recognizes that the proponent will develop a wildlife A-detailed monitoring program, but no details are provided. It will be important that this program provide sufficient data for the should evaluation of**

- the effectiveness of wildlife corridors, and the cumulative effect of development in the RSA.** ~~be initiated to determine wildlife use of the corridors.~~
- ~~The proponent should identify proposed mitigation for wildlife movement and provide measures to protect riparian zones.~~
 - Mitigation measures should be taken to ensure that a suitable level of biodiversity is maintained in the RSA throughout the life of the Project.
 - ~~A complete list of mitigation measures designed to address wildlife abundance and diversity should be provided.~~
 - **Environment Canada supports Suncor's efforts to address** ~~Changes in biodiversity of the LSA and RSA through the cumulative effects working group as this is an interest to all~~ **proponents should be monitored during construction, operation and closure phases of the Project.**
 - Activities around riparian areas and other critical wildlife areas in the LSA should be timed to avoid critical breeding, nesting and fledgling periods for migratory birds and other wildlife.
 - Development should be staggered to provide a continuous supply of young deciduous vegetation to minimize the impact on bird populations attracted to the deciduous forests.
 - **Data for waterfowl surveys should be corrected and future surveys should be conducted in a manner which provides more meaningful results.** ~~repeated in an acceptable manner to collect meaningful results, and that the proponent should re-evaluate predicted impacts on waterfowl and adjust mitigation accordingly.~~ **Owl surveys should be**
- repeated on the site to provide a meaningful baseline.**
- The proponent should provide mitigation for raptors including provision for nest boxes, nest platforms and hunting perches.
 - ~~The EIA include a discussion of the impact of development on the habitat of the short-eared owl.~~
 - **While rare within the RSA, the proponent should include wolverines within their monitoring program to make every effort to improve the baseline data set for wolverines and define mitigation measures to address these concerns.**
- #### 4.4.3.2 Wildlife Health
- ##### Operations
- ##### i) Environmental Effects
- Chemical concentrations in the water of the Athabasca River, McLean Creek and Shipyard Lake, because of the Project, are predicted by the proponent to be safe for consumption by wildlife during the operational phase of the Project. The levels of Project-related chemicals in fish and aquatic invertebrates are also predicted to be safe for ingestion by wildlife during the operational phase. Effects on wildlife health were predicted to be negligible for the chemicals evaluated during the operational phase. However, there is some uncertainty associated with the toxicity of naphthenic acids to wildlife, and therefore the environmental consequence of the residual effect was classified in the EIA as low.
- ##### ii) Mitigation
- Measures to protect wildlife health through reduction in air and water emissions.
 - Implement additional mitigation as required based upon results from further studies.

- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.

iii) Residual Effects

The environmental consequence of the residual effect was classified by the proponent as low.

iv) Concerns

The Oil Sands Environmental Coalition (OSEC) **stated that the assessment of animal health risk presented in the Project Millennium EIA is incomplete as it does not include the latest information from Suncor's survey of particulates.**

Closure

i) Environmental Effects

The levels of substances in resultant waterbodies, with the exception of the EPL, at closure and in the far future were not predicted to result in impacts to wildlife health. There was some uncertainty associated with consumption of water from the EPL for a period of time between closure and far future. The risk assessment predicted marginal and inconsequential wildlife health risks for exposure to molybdenum in EPL water. An evaluation of the potential for impacts to wildlife health because of exposures to chemicals on the reclaimed landscape, including exposure to ponded surface water/streams, soils and vegetation. It should be noted that these risk estimates have been conservatively modeled assuming the home range of a moose is confined to the LSA, despite the fact that the home range of a moose would extend beyond this range. If the modeling procedures allowed moose to forage outside the LSA in undisturbed areas, the risk estimates would be lower. The scientific uncertainty associated with this prediction was moderate, based on the limited available data for chemical

concentrations in aquatic plants growing on reclaimed landscapes.

ii) Mitigation

- Restrict access to this waterbody by wildlife as required based upon results from monitoring.
- Participate in the Oil Sands Bird Protection Committee to discuss mitigation results and strategies.

iii) Residual Effects

The residual effect was classified by the proponent to be low, rather than negligible.

iv) Concerns

Environment Canada recommends that the final reclamation plan should consider minimizing access to the site, and the cumulative effects of a network of roads in the area, as they further fragment habitat and increase disturbances. No specific concerns were documented.

Other Wildlife Concerns:

Environment Canada also recommended that the tailings and CT ponds be closely monitored to determine the use by avifauna, mortality, phenology and chronology of bird species affected, and outlined measures to minimize use of tailings and CT ponds by migratory birds, and that the bird deterrent program and oil rehabilitation programs continue with special emphasis on spring and fall migration periods.

Some species of neotropical migrant birds breed almost exclusively within the Canadian Boreal forest. While the impact of Project Millennium on this breeding bird habitat may be small relative to the impact of forestry operations, the projects contribution to the cumulative impact must be acknowledged. Environment Canada

supports the consideration of this issue by the cumulative effects working group.

The Fort McKay Industry Relations Corporation expressed the following concerns:

- The overall issue of habitat connectivity/fragmentation, movement corridors and increased human access needs further discussion and mitigation planning. This is particularly important from the cumulative assessment aspect.
- Further discussion is required relating to the 20% threshold for exposure ratios. It is unclear how individual effects were extrapolated to the population level.
- The issue of biomagnification and bioaccumulation of toxins up the food chain needs further analysis
- More specific details, or at least directions, should be discussed with regard to future monitoring strategies.

4.5 Human Health

The bitumen production component of Project Millennium has a moderate impact on human health in the region. In comparison, the upgrading and energy service components have relatively smaller impacts on human health.

i) Environmental Effects

The levels of substances in the water of the Athabasca River and Shipyard Lake as a result of the Project are predicted by the proponent to be safe for occasional swimming and drinking during recreational activities. The levels of Project-related substances in fish are also predicted to be safe for eating.

However, there is some uncertainty associated with the toxicity of naphthenic

acids to people. Further studies are being conducted to help resolve this uncertainty. The levels of substances in air are predicted to be safe for people living in the communities of Fort McKay, Fort Chipewyan and Fort McMurray. In addition, breathing air while outside in areas closer to the Project site (for example, while hunting, fishing, boating, gathering plants) is not predicted to result in health problems.

Analysis of the recently conducted Suncor stack emissions survey is in progress to provide further resolution on this topic. This assessment included an evaluation of a hunter/trapper who may live on the site after it has been cleaned up and returned to a forest. The levels of substances in water from the Athabasca River and Shipyard Lake, in air and soils on the site, and in plants and animals harvested from the site, are not predicted to result in impacts to the health of hunters/trappers who live on the site for long periods of time. The levels of substances on the site after closure of the Project are also not predicted by the proponent to result in health effects for people who occasionally use the Athabasca River or Shipyard Lake for recreational activities following closure of the Project.

A potential effect on human health was identified if people use the EPL for recreational activities at the start of the closure period. Although the environmental consequence of this effect is considered to be moderate in the EIA, it is not considered to be significant because there will be a Suncor monitoring presence at the EPL to establish whether the water quality is not acceptable; and the potential effects can be mitigated by restriction of access until the water quality is acceptable. Based on the available data, air and water releases from Project Millennium, combined with releases from other developments in the area, are not

predicted to result in health problems for people living in the oil sands area.

Cumulative Effects. Based on the previous analyses of answers to key questions, the combined exposure to substances in water, air and traditional foods was not expected by the proponent to result in health problems for local people. Analyses of the recently conducted Suncor stack emission survey will provide further resolution of this topic.

Based on the available data, air and water releases from Project Millennium, combined with releases from other developments in the area, are not predicted by the proponent to result in health problems for people living in the oil sands area. Analysis of the recently conducted Suncor stack emissions survey is in progress to provide further resolution of this topic

ii) Mitigation

- Suncor to maintain commitment to human health.
- Control air emissions and water discharges.
- Design closure landscapes to ensure acceptable risk.

iii) Residual Effects

Residual effects on human health were determined by the proponent to be low.

iv) Concerns

Health Canada mentioned the importance of the perceived risk to people practicing their culture in the Project area because they no longer use country food or practice their culture, resulting in changes in traditional ways of life for future generations.

The Oil Sands Environmental Coalition (OSEC) stated that the assessment of human and animal health risk presented

in the Project Millennium EIA is incomplete as it does not include the latest information from Suncor's survey of particulates.

The Fort McKay Industry Relations Corporation expressed the following concerns:

- Further information and clarification is required to support the use of a high lifetime cancer risk for public health protection from exposure to Millennium industry pollutants.
- The federal and provincial governments were asked to answer this question: "What frequency of guideline exceedences is acceptable for the protection of human health and the environment?"

4.6 Effects on Socio-Economic Conditions

The bitumen production component of Project Millennium has a relatively small overall adverse impact on socio-economic conditions in the region. In comparison, the upgrading and energy service components have minor impacts on socio-economic conditions.

i) Environmental Effects

Project Millennium creates significant employment, household income, and government fiscal benefits to the region, the province, and the country. The population growth induced by Project Millennium can be accommodated by the regional service providers. Indeed, the urban service area of Fort McMurray is already coping with population increases of similar magnitude in anticipation of a range of oil sands projects. The outlying communities, especially Fort McKay, which is located in close proximity to the Suncor plant, will likely experience a modest increase in population as well. This could create additional stress on their physical and service infrastructure.

Cumulatively, the region is preparing for a population increase of about one-third. This will create challenges for the municipality and the local and regional service providers. The current development phase of the oil sands industry is different from those in the past due to the scale of the total investment and the number of companies involved. This increases the need for regional cooperation between project proponents, the Regional Municipality of Wood Buffalo, and service providers. This cooperation is already emerging through the work of the Regional Infrastructure Working Group (RIWG) and the Athabasca Oil Sands Development Facilitation Committee (AOSDFC) and will need to be continued throughout the construction and operations phases of Project Millennium and the other proposed projects. The main regional concerns include local employment, housing, education, social services, health services, emergency services and highway transportation. Sub-committees of the RIWG have been struck to develop resolution strategies.

Cumulative Effects. Cumulatively, the region is preparing for a population increase of about one-third. This will create challenges for the municipality and the local and regional service providers. The current development phase of the oil sands industry is different from those in the past due to the scale of the total investment and the number of companies involved.

Concerns

Heritage Canada commented that the continued participation of Suncor in the Regional Aquatics Monitoring Program to identify and address cumulative effects of oil sands developments is important.

Environment Canada expressed concern about limited progress in the development

of a common framework for assessing cumulative environmental effects. Regarding environmental limits for the area, Environment Canada noted some initial progress but stated that there is still considerable work to be done.

Environment Canada is concerned that some of the established environmental limits for the area will be exceeded, particularly with respect to air emissions. **Modeling is still ongoing, along with monitoring to validate predictions. No timelines have been set for the completion of this work. Because of the large percentage of the RSA which is affected by acidifying emissions, it may be necessary expand the RSA boundaries for this issue. Environment Canada is working with Saskatchewan to evaluate whether there may be a potential transboundary effect that is currently not considered with the cumulative effects assessment in the oil sands development applications. While the proponent is undertaking some work to further understand the ecological effects of acidifying emissions, it is presently unclear how or when this work will be completed and how new findings will be incorporated into the project. A mechanism must be identified that will ensure studies being undertaken and proposed by the proponent will be successfully completed, interpreted, implemented and publicly reported on. This mechanism should also address the implementation of mitigative measures.** Regarding the scope of the study area, Environment Canada is working with Saskatchewan to evaluate whether there may be a potential transboundary effect that is currently not considered with the cumulative effects assessment in the oil sands development applications.

Environment Canada also expressed concern about cumulative effects on

wildlife in the EIA. Environment Canada acknowledges that the proponent will implement a wildlife monitoring program which will be useful for evaluating impact predictions and reclamation success, and has referred the issue of cumulative impacts on biodiversity to the cumulative effects working group. Regardless, Environment Canada and presented the following recommendations still has some concerns regarding the cumulative effects on wildlife:

- The Project's contribution to impacts along the Athabasca River valley within the entire RSA need to be addressed.
- The cumulative impact of changes in importance of habitat distribution needs to be addressed and considered when evaluating reclamation success in the cumulative impact assessment.
- Because of limited baseline data, the cumulative effects of oil sands development on important wildlife corridors cannot be adequately predicted. in the LSA should be addressed in the EIA.
- The cumulative effects of water quality should be related to the potential impact on wildlife populations.
- The cumulative impact of landscape changes on avifauna in the RSA needs to be addressed cannot be adequately predicted.
- The proponent should clearly identify how end-land use objectives were derived and discuss the implications to biodiversity.

The Department of Fisheries and Oceans has expressed the concern that the review of individual oil sands projects may not be the appropriate mechanism for addressing cumulative effects in the

region. A regional review of oil sands development might be more appropriate as it would not be constrained to individual projects and their impacts, would not be limited by lease boundaries, and could consider cooperative or complementary approaches to development thereby minimizing the environmental effects within the region.

In the absence of a regional review, Fisheries and Oceans is supportive of the CEA initiative and RAMP as recently advanced by the oil sands industry. The formation of the WBEA is another positive step in dealing with cumulative effects on air quality and terrestrial resource components. These initiatives, although preliminary at this time, are based on a model of industry, stakeholders and regulators working cooperatively towards addressing issues revolving around cumulative effects.

The Oils Sands Environmental Coalition (OSEC) expressed concern about deficiencies in the information and analyses in the Project Millennium EIA with regard to cumulative effects and other matters. In particular OSEC stated that there is an urgent need to establish environmental limits of the region before any additional development can be approved. Meaningful assessment of the regional environmental and human health impacts from acid deposition and ground-level ozone accumulation, as well as other air, water and land impacts, cannot be adequately conducted on a project-by-project basis. OSEC views the assessment of cumulative impacts in the Project Millennium EIA as inadequate and must be broadened.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

No further residual effects were identified

iv) Concerns

The Athabasca Chipewyan First Nation raised the following concerns and questions:

- The EIA fails to address effects on its members in Fort Chipewyan.
- The EIA does not address any of the effects of having to relocate to Fort McMurray to obtain employment with Project Millennium.
- What percentage of aboriginal people will be employed during the construction phase?
- The EIA fails to address any meaningful training opportunities.

The Fort McKay Industry Relations Corporation expressed the following concerns:

- Vol. 2C makes no mention of programs, processes and relationship building efforts the Proponent has in place in Fort McKay. These should be referenced.
- Vol. 2C does not refer to the Fort McKay Socio-economic Key Concerns Areas which was issued to the Proponent in April/May of this year.

4.7 Physical and Cultural Heritage**i) Environmental Effects**

The degree of concern for local negative effects Project Millennium on physical and cultural heritage resources are reported to be negligible in the EIA. The effects on cultural sites identified will be negative in direction, long-term in duration, local in geographic extent and irreversible. The scientific uncertainty is low, with a high

likelihood of occurrence. The overall degree of concern is negligible.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The residual effect of the project on physical and cultural heritage was determined by the proponent to be negligible.

iv) Concerns

- Canadian Heritage stated in their comments on the Project Millennium EIA that the level of analysis undertaken substantiated the conclusion that the regional effect of the Project on cultural resources is negligible.
- With respect to Wood Buffalo National Park Canadian Heritage views the participation of Suncor in the Regional Aquatics Monitoring Program as important.

4.8 Effects on Current Land Use and Resource Use by Aboriginal Persons**4.8.1 Traditional Land Use****i) Environmental Effects**

The effect of the Project on traditional land use practices was rated by the proponent as low. This rating was assigned considering reported use patterns and the limited area to be affected by the project in comparison to the total traditional territory of the aboriginal communities. This rating is based on a low magnitude impact, which is local in area and reversible. The impact occurs once, although it will be long-term in duration.

Project Millennium, in culmination with existing, approved and planned developments in the region, would affect 12% of the traditional lands of the Fort McKay community. The direct effects of regional development on traditional land use practices would be considered moderate in magnitude, considering the portion of the traditional land use base that would be directly affected. The magnitude of indirect effects associated with increasing, sometimes competitive, land uses in the region is difficult to evaluate, but would probably be low as proposed population increases associated with the Project are small. Both these effects would be regional in geographic extent. Direct effects should be reversible with implementation of appropriate mitigation measures and closure planning. The indirect effects may also be reversible over the long term as developments cease operation and regional populations decrease. The likelihood of occurrence would be based on a variety of factors, including the economic viability of the oil sands and forestry resources and is considered moderate.

The degree of concern for loss of the traditional lifestyle in regional aboriginal communities that has been reported in studies conducted for projects in the region and other more general studies ranges from low through high. On-going consultation with each community will further clarify this situation.

Cumulative Effects. Project Millennium, in culmination with existing, approved and planned developments in the region, would affect 12% of the traditional lands of the Fort McKay community.

Cumulative effects were evaluated in a qualitative way by the proponent because there were no major effects as the result of Project Millennium. Results of the cumulative effects assessment is that

Project Millennium will have a low impact on the land use in the RSA.

ii) Mitigation

No additional mitigation measures have been proposed.

iii) Residual Effects

The residual effect of the Project on traditional land use was rated as negligible.

iv) Concerns

Indian and Northern Affairs Canada expressed concerns as follows:

- The majority of effects were not quantified. The department has an interest in better understanding the effects of the potential impacts.
- Transfer payments to First Nation communities are based, in part, on population data. Changes in community populations may have a long-term effect on services.
- While effects may not be significant to the whole of Project Millennium and the cumulative effects of the other proposed projects, they may be significant to First Nations communities.

Health Canada expressed concerns and provided suggestions as follows:

- A local resident of the region embracing the Project should be used to obtain comprehensive information on the local study area.
- The information presented in the EIA may not be as complete and comprehensive as originally assumed.
- Consideration should be given to providing aboriginal people with equal opportunity in another location to practice traditional land use.

The Fort McKay Industry Relations Corporation expressed the following concerns:

- A cooperative monitoring, mitigative and planning process will be necessary to address impacts over the next 50 years. This topic closely relates to the viability of wildlife populations and human health assessment.
- Utilize Fort McKay's traditional knowledge to identify environmental disturbances from previous, existing and approved activities considered part of baseline conditions.
- Utilize Fort McKay's traditional knowledge to identify limitations that the available information may place on the conclusions of the EIA.
- Identify and give full consideration to aboriginal reclamation practices.
- The scope of the direct impacts on the land must be addressed based on traditional knowledge.

4.8.2 Resource Use

i) Environmental Effects

The EIA states that Project Millennium will have effect on sand and gravel resources because of the need for roads and infrastructure. The agricultural potential for the LSA is very limited and, therefore, will not be impacted by the development. Forestry will be impacted on the LSA during the life of Project Millennium, but forestry potential will be regained after closure. Essentially, there was no access to the area prior to development and this will continue during the lifetime of Project Millennium. After closure access to the area may improve because of the remaining mine infrastructure. Detailed description of impacts on vegetation (berries), wildlife (hunting and trapping) and fisheries are in the appropriate

sections of the EIA. Trapping revenues will not be affected because of a compensation agreement between the trappers and Suncor.

Non-consumptive resource use will not be negatively impacted by Project Millennium. Like berry-picking, hunting, fishing and trapping; the access to the area will not change. Because access is currently limited and will continue to be limited, the potential for non-consumptive resource use will not change. After closure, the opportunity for non-consumptive resource use may improve because of improved access. Project Millennium may have a positive effect on the potential for non-consumptive use by increasing the population and profile of the area; therefore increasing the number of visitors.

ii) Mitigation

- Suncor will use all available material on the mine footprint to minimize the impact on regional gravel resources.
- Trees will be salvaged from areas impacted by development to reduce the loss of this resource.

iii) Residual Effects

The residual effects on consumptive and non-consumptive resource use were determined to be low.

iv) Concerns

See Traditional Resource Use.

4.9 Effects on Sustainable Use of Renewable Resources

Renewable resources that will be directly impacted by Project Millennium include fish, wildlife and vegetation in the LSAs. Indirect effects on fish, wildlife and forests in the RSA will occur through changes in air and water quality. Further information related to effects of Project Millennium on

resource sustainability is provided in the cumulative effects sections of the EIA.

The EIA states that approximately 1.2 ha of fish habitat in the lower reaches of Wood and Leggett creeks will be lost as a result of Project Millennium. Suncor will compensate for habitat loss in these creeks by creating new habitat or enhancing existing habitat (Shipyard Lake and McLean Creek). The quality and quantity of habitat created/enhanced will be determined in consultation with the Department of Fisheries and Oceans to ensure that the "no net loss" objective is achieved. Habitat creation/enhancement will occur at the same time as habitat loss so that there will be no net loss of fish habitat at any given time. The proponent states that Project Millennium will not result in any net loss of fish habitat, no cumulative effects on fish habitat will result from Project Millennium and no further analysis is required.

Loss of terrestrial vegetation communities was predicted in the EIA to be (16,129 ha or <1%) for the RSA. Project Millennium will contribute 5,644 ha to this loss. Reclamation will increase terrestrial vegetation by 306% to 49,444 ha or 2% of the RSA. The total loss to wetlands from the combined developments is estimated to be 33,661 ha or 1% of the RSA. The Project's contribution to this loss is 6,501 ha. Reclamation activities and reforestation will result in changes to the distribution of wetlands types in the RSA. Overall, wet open swamp will be reduced by 24%, but (black spruce) marshes will increase by 595% in the RSA. Further, Suncor is required by approval conditions to establish commercial forest on 60% of reclaimed land

The EIA states that the combined developments will cause relatively small losses of wildlife habitat due to site clearing during the construction phase of oil sands development. As well, the

proponent expects minor changes in wildlife abundance and diversity to occur as a result of site clearing, sensory disturbance, removal of nuisance wildlife, wildlife-traffic mortalities and wildlife interactions with infrastructure. These effects represent a worst case scenario, as it is unlikely that all sites will be cleared to their maximum extent at the same time. The phased nature of site clearing and progressive reclamation will mitigate the cumulative effects of habitat loss. Eventual reclamation of all sites should result in equivalent habitat capability for wildlife within the region.

4.10 Effects of Environment on the Project

Potential environmental hazards that could impact the project are relatively limited. The project site is located where winter conditions are extreme with an annual average temperature of 0.2 °C and temperatures in January averaging -20 °C. Flooding is an environmental hazard common to oil sands development area. Low-lying areas along the Athabasca River and at the confluence of the Athabasca and Clearwater rivers are particularly vulnerable. Forest fires also pose a threat to resources, property and infrastructure in the northeast Alberta region.

~~Is CC an issue, we have not raised it before.~~

4.11 Effects of Malfunctions or Accidents

Major accidents including tailings pond failure, pipeline break or bridge collapse have the potential to cause catastrophic environmental as well as socio-economic effects upstream to the Fort McMurray area and downstream to the Peace-Athabasca Delta, Wood Buffalo National Park, Lake Athabasca, Slave River and even Great Slave Lake. A shutdown of the Suncor extraction or upgrading

facilities necessitates release of process systems into available containment areas. Fire can have major environmental consequences to the Suncor plant and immediate vicinity as well as the RSA.

Suncor's approach to managing emergencies is integrated into its existing and ongoing environmental, health and safety programs. Management systems are based on recognized standards such as the Det Norske Veritas (formerly the International Loss Control Institute) and ISO 14000 Environmental Management System standards. In the Project EIA, certain types of upset events such as emergency flaring and equipment outages are factored into air modeling and processing flow variations are addressed by the use of calendar day versus stream day data. Addition of a second Upgrader will minimize the need to shut down systems during plant emergencies.

Although Environment Canada has no direct comment, the potential effects and management of malfunctions or accidents needs to be expanded.

***Unused Material From the Suncor Energy Inc. Project
Millenium Comprehensive Study Report***

The following pages from the proponent's original CSR include information that would not clearly be part of an Environmental Assessment Summary.

Chapter 8

Cumulative Effects

8.1 Methods

Cumulative effects related to Project Millennium were assessed after considering the residual effects associated with Project Millennium in combination with two development scenarios (Table 1). The first scenario centres around the baseline conditions, which include the environmental and socio-economic conditions within the project region based on the existing and approved developments. The effects associated with Project Millennium are considered in addition to the baseline conditions. Mitigation and monitoring programs are reviewed in detail under this scenario. The second assessment scenario considers the potential effects of Project Millennium as well as other oil sands developments that have advanced to the formal public disclosure stage or are known to be planned for the region.

Regional Study Area (RSA) developments for the assessment of cumulative effects is shown in Figure 5. The cumulative effects assessment identifies and assesses likely environmental effects associated with Project Millennium and the planned developments on the existing and approved developments. Consideration of mitigation and monitoring programs in the cumulative effects assessment is based on the programs employed by current operators as well as on such programs as proposed for Project Millennium.

The assessment of cumulative effects includes consideration of air quality,

aquatics and terrestrial resources. In relation to the Canadian Environmental Assessment Act (CEAA) cumulative environmental effects means the effects that are likely to result from the project in combination with the effects with other projects or activities that have been or will be carried out.

8.2 Air

The air emissions from Project Millennium, combined with those from all of the approved and disclosed projects in the region will result in changes in the ambient air quality and in the deposition of acid forming compounds. Compounds of interest are reviewed individually below.

- (i.)
- (iii.)
- (v.)
- (vii.)
- (ix.)
- (xi.)

8.3 Terrestrial

This cumulative effects assessment evaluated the potential effects of Project Millennium plus existing, approved and planned developments on the terrestrial resources including soils, terrain, vegetation, wetlands and wildlife, in the RSA. It was difficult to quantify cumulative effects with certainty due to the multitude of variables associated with various developments, including the phased nature of various developments such as oil sands mining. As well, reclamation

practices may reduce various impacts by returning resources to equivalent capabilities, often resulting in enhancement of the land. For these reasons, a conservative approach was taken in the EIA for the assessment, under the assumption that all developments occurred concurrently over the entire project area.

8.4 Physical and Cultural Heritage

The cumulative effects of Project Millennium and other existing, approved

and planned developments in the region are more difficult to address. The regional database concerning the distribution, quantity and significance of historical resources is incomplete. A model of historical resource potential was created as part of the Project Millennium HRIA in an effort to quantify and illustrate the cumulative effects of regional oil sand developments. The model indicates that the impacts will be moderate to low in severity, long-term and irreversible.

Chapter 9

Significance

9.1 Introduction

Under the development scenario utilized for the cumulative effects assessment, which includes existing, approved and publicly announced developments there could be at least 10 individual mining sites, two significantly expanded upgraders, associate roadways, pipelines and supporting utilities operating in the area. During the next fifty to one hundred years, the mining sites will be in various stages of reclamation, and new mine sites may be under development. It can be expected that the upgraders will continue to operate for at least the next thirty years. It must be expected that during the next 100 years, the environment within this local area will be significantly different.

The oil sands developers are continuously developing new mining and upgrading technologies and techniques. Their most recent mine development proposals include new tailings disposal methods and reclamation techniques. There is ongoing and further commitments for monitoring and research to validate operating performance and impact predictions. At the present time however, there remains many unknowns that cannot be validated until some of these operations are fully functional.

On an individual project basis, there are no residual significant adverse effects predicted. The uncertainty in these predictions, which would be validated through monitoring, appear acceptable.

However, the magnitude of this cumulative development amplifies the concern regarding these uncertainties. Regardless, the proposed remedy for dealing with these uncertainties, remains the same - monitoring and validation of predictions.

Given these limitations, it is critical that the industry and regulators remain responsive to monitoring results and ensure that where required, solutions are developed and implemented in response to environmental, social and economic issues.

In this context the following comments are the specific issues which Environment Canada has identified which will require attention and future mitigation.

9.2 Air Quality Issues

Environment Canada (EC) has identified unresolved discrepancies in the predictions of ambient air concentrations of nitrogen dioxide from the two models, ISCBE and CALPUFF. Under the regional development scenario, NO_x emissions are projected to at least double. ISC3BE predicts this increase will not cause any exceedances of the NO₂ Alberta Ambient Air Quality Guideline outside of the development area. However CALPUFF predicts many guideline exceedances over large areas beyond the mine site. Therefore the potential exceedance of the ambient air quality guidelines is presently model dependent.

Nitrogen oxides are important precursors in acid deposition, ground level ozone formation and secondary particulate matter generation. These secondary pollutants can cause vegetation damage, soil and water acidification, and human health impacts. Until concentration and deposition of nitrogen oxides are acceptably quantified in the oil sands region, which will not likely occur until facilities are operational, the actual environmental effects due to potential atmospheric emissions remains unknown.

Further refinement of the models will not likely provide a resolution to this issue. EC recommends ambient monitoring of nitrogen oxides, secondary issues of ozone, particulate matter and acidification and their environmental effects. In the event adverse effects are observed, mitigation will be required to reduce emissions. Monitoring and any required mitigation will be most effective if it is conducted on regional basis by all of the oil sands developers.

Environment Canada is evaluating potential transboundary effects of acid deposition. The proponent's modeling suggests that the effects are restricted to the regional study area. At a provincial scale of 1° by 1°, all of Alberta, including the Ft. McMurray area, lies below the critical load for soils (Cheng, 1997). Provincially the effects of increased urbanization, power generation and transportation may also be having transboundary effects. These preliminary predictions must still be validated through monitoring.

9.3 Wildlife Issues

The development of open pit mines and associated infrastructure will, significantly impact wildlife and wildlife habitat within the development areas. Environment Canada recognizes that wildlife will be displaced to some degree, and that oil sands developers are committed to

minimizing impacts to wildlife and wildlife habitat by establishing movement corridors, maintaining buffer zones along important riparian zones, implementation of a bird deterrent program around tailings ponds and a nuisance wildlife program, and minimizing unnecessary disturbance to wildlife habitat in and around the development areas. Environment Canada also recognizes that considerable mitigation with regard to the long-term maintenance of wildlife habitat, will be addressed by a comprehensive and phased-in reclamation program. Environment Canada supports the formation of a Cumulative Effects Assessment Working Group to address any cumulative impacts regional development will have on wildlife and wildlife habitat.

Recognizing that the some effects of widespread, regional oil sands development on wildlife populations and wildlife movement are poorly understood or unknown, a comprehensive wildlife monitoring program that addresses the cumulative effects of oil sands development on regional wildlife populations needs to be established immediately. This program will be critical for evaluating the effectiveness of wildlife corridors, bird deterrents, and other mitigative measures. The monitoring program must utilize proper survey methodology and baseline data needs to be complete. For example, owl surveys to date have not been adequate. The impacts of regional development on any rare species must also be carefully monitored. This information will be necessary for determining the success of the phased-in reclamation program in creating and reestablishing a functional and healthy environment. The region must be returned to a healthy state.

The potential impact on biodiversity within the RSA is also unknown. All oil sands developers within the RSA will need to

collaborate on ensuring that a suitable level of biodiversity is maintained within the RSA. This will require the establishment of regional goals with monitoring to evaluate the effects of a changing biodiversity on wildlife populations. In the event monitoring indicates that the regional goals cannot be met, mitigative measures will be required.

9.4 Water Quality Issues

The final reclamation plan proposes an end pit lake (EPL) that contains a mixture of fine tails and water released from consolidate tailings (CT). Because of potentially high concentrations of naphthenic acids and total dissolved solids (TDS) within the CT waters, the viability of the EPL ecosystem and the potential toxicity of release waters from this lake is unknown. Research and development are ongoing to evaluate the acute and chronic toxicity of naphthenic acids to algae, invertebrates and fish. However, these tests should be longer focusing on long-term health, developmental and reproductive effects in

fish and invertebrates, rather than the acute and short sublethal tests which are currently referred to in the EIA. There is also a lack of data on sediment PAHs, and the fate of these compounds. Bioaccumulation studies with invertebrates and fish, and monitoring of PAHs in EPL waters and sediments will be vital for determining the fate and effects of these potentially toxic/mutagenic persistent compounds.

It will be at least thirty years before an end pit lake is developed. This should provide sufficient time to confirm whether release waters from the EPL will require treatment prior to release. Although the proponent has indicated that release water toxicity could be reduced through dilution, Environment Canada does not consider dilution to be a form of treatment. The success of the Regional Aquatic Monitoring Program (RAMP) and continued research into the toxicity of naphthenic acids, TDS, and PAHs will be essential for ensuring the success of this reclamation option.

Chapter 10

Follow-up Program

Follow-up programs proposed by Suncor for Project Millennium are reviewed below by environmental component.

10.1 Air

Air quality follow-up includes:

- Routine source monitoring of approved major air emission sources on a continuous basis as well as smaller sources on a more limited basis.
- Participation in the Air Monitoring System operated by the Wood Buffalo Environmental Association.
- Participation in the Terrestrial Environmental Effects Monitoring Committee to evaluate changes in vegetation and soils resulting from air emissions.
- Participation in the Alberta Oil Sands Community Exposure and Health Effects Assessment Program.
- **Ozone modeling working group?**

10.2 Water

10.2.1 Hydrology and Hydrogeology

Suncor will continue operational monitoring programs to confirm predicted effects on groundwater and surface water systems. These programs will monitor groundwater levels and quality, as well as flows and quality in surface drainage systems. The riparian wetlands of Shipyard Lake will be monitored

throughout the operations of the Project Millennium to ensure that adequate supplies of water are maintained. Reclamation surface drainage systems will ensure that a self-sustaining system for provision of these waters is established as part of the Project closure plan.

10.2.2 Water Quality

Water quality follow-up includes:

- Participation in the Regional Aquatic Monitoring Program (RAMP).
 - Evaluation of the potential for muskeg drainage waters to cause declines in dissolved oxygen levels in receiving streams and sedimentation ponds.
 - Monitoring the thermal regimes for McLean Creek and Shipyard Lake.
 - Monitoring during the critical snowmelt period to evaluate the sensitivity of selected rivers and streams to spring acid pulses.
 - Monitoring end pit lake, once established, for PAHs and other constituents.
 - **Monitoring acid deposition through linkage with RAMP.**
-

10.2.3 Fish and Fish Habitat

The assessment for fisheries and fish habitat was based on mitigation inherent in the Project Millennium design.

Negligible effects are expected on fisheries and fish habitat. However, there are some uncertainties. Suncor will address these uncertainties by further studies or monitoring as appropriate.

Follow-up actions include:

- Survey of Arctic grayling spawning for Wood and McLean creeks to determine fish utilization of these creeks.
- Evaluation of compensation options, and habitat design and construction to determine viable options for habitat compensation.
- Monitoring existing and created/enhanced habitat to ensure that mitigation is working and no net loss objective is achieved.
- Monitoring benthic invertebrates in conjunction with water quality monitoring, to assess the effects on aquatic resources from the end pit lake discharge.
- Completing a fish health laboratory study on consolidated tailings water using trophic level toxicity testing and chemical analyses.
- Monitoring fish health, including fish tissue chemical residue analyses, as part of RAMP; to include walleye, goldeye, longnose sucker and lake whitefish in the Athabasca River and longnose sucker in the Steepbank River.
- Development of a plan to confirm end pit lake ecosystem viability once the design for the lake is finalized.

10.2.4 Regional Aquatics Monitoring Program

In 19979, Suncor submitted a proposal to conduct a Regional Aquatics Monitoring Program (RAMP) to satisfy terms of its operating approval. Recognizing that aquatic issues are regional in nature and

that all oil sands developers have the potential to make an impact, Suncor invited Syncrude, Shell, other oil sands developers and stakeholders to join the initiative. Objectives of RAMP are:

- Design and execute a program which satisfies aquatic monitoring requirements in environmental operating approvals
- Monitor aquatic environments in the oil sands region to allow assessment of regional trends and cumulative effects
- Provide data against which impact assessment predictions for water quality and aquatic resources will be verified

It is the intention of RAMP participants that, in future years, the program will include a multi-stakeholder committee that will provide direction for future initiatives.

Concerns:

~~Environment Canada recommended that all parties with approved and proposed projects in the oil sand area form a joint task force to undertake intensive sediment quality studies to address knowledge gaps and reduce uncertainty regarding the effects of chemical constituents. In addition, a more specific description of future water and sediment quality monitoring plans is required.~~

Fisheries and Oceans Canada and Environment Canada supports the proposed RAMP to collectively understand the aquatic effects of oil sands operations in the region. Suncor's commitment to such a program is an essential element of the ongoing assessment of environmental effects. Fisheries and Oceans Canada requested that further details of a proposed regional hydrology monitoring program be provided.

10.3 Terrestrial

10.3.1 Soils and Terrain

Follow-up for soils and terrain includes:

- Continuation of Suncor's routine monitoring of soil salvage and handling procedures, soil reconstruction activities and development of reclamation soils.
- Evaluation of the development of soil capability characteristics, using the land capability guidelines.
- Monitoring soil acidification through linkage with the environmental effects monitoring program under RAQCC.

10.3.2 Terrestrial Vegetation and Wetlands

Follow-up to verify impact predictions or to allow resolution of undetermined effects include:

- Continuation of Suncor's routine program of monitoring reclamation areas, including both terrestrial and aquatic sites.
- Continuation of monitoring of the effects of consolidated tailings waters on terrestrial and aquatic vegetation.
- Development of a field-scale consolidated tailings reclamation demonstration in 2000, following completion of preliminary design studies.
- Participation in efforts to monitor the potential impacts of oil sands development air emissions on regional vegetation, as part of Suncor's participation in RAQCC and its environmental effects monitoring program.

- **Biodiversity working group (to be provided by Suncor)?**
 - **Monitoring program to address information gaps for project-specific and cumulative effects of oil sands development, and preparation of a monitoring plan including a regular reporting system prior to development of the Project.**
-

10.3.3 Wildlife

Monitoring is required to assess the affects of habitat change on wildlife including an evaluation of the use of designed wildlife corridors by wildlife. Monitoring of vegetation (and hence wildlife habitat) is required.

Monitoring wildlife numbers will be undertaken on reclaimed lands. As many wildlife species depend on mid to late forest seral stages, monitoring of these species numbers will not be useful, at least not in the short-term. Rather, monitoring for wildlife in the short-term will be based on whether the reclaimed area has been successfully set on a successional pathway that will eventually result in good habitat for the wildlife species of interest.

Monitoring of success of mitigation of effects on wildlife interacting with tailing ponds will continue. Suncor will also continue further research to determine the potential for toxicity of naphthenic acids to wildlife.

Concerns:

Environment Canada recommended a comprehensive monitoring program to address information gaps for project-specific and cumulative effects of oil sands development, and preparation of a monitoring plan including a regular reporting system prior to development of the Project.

10.4 Human Health

The following are key areas of monitoring and research identified or discussed in the Human Health Assessment:

- Continue to monitor the levels of substances in the water, air, soils, plants and animals that people may be exposed to, both while the Project is operating and after closure.
- Monitoring of end pit lake water will be conducted, and, if necessary, human access to this water body will be restricted or future mitigation measures will be implemented to reduce or eliminate the impact.
- Continue further research to determine the potential for toxicity of naphthenic acids and interpret the new information as it relates to this EIA.
- Continue to participate in regional studies related to ecological and human health, such as the Alberta Oil Sands Community Exposure and Health Effects Assessment Program, the Regional Aquatics Monitoring Program (RAMP) and the Wood Buffalo Environmental Association (WBEA).

Suncor is committed to protecting the health of people who live near the Project. To do this, Suncor will:

- Continue to monitor the levels of substances in the water, air, soils, plants and animals that people may be exposed to, both while the Project is operating and after it has closed down.
- Keep air and water emissions as low as possible to protect human health.
- Clean up and re-vegetate the site after the Project has closed down to provide a safe area for people to use.

- Continue further research to determine the potential for toxicity of naphthenic acids and interpret the new information as it relates to this EIA.
- Continue to participate in regional studies related to ecological and human health, such as the Alberta Oil Sands Community Exposure and Health Effects Assessment Program (AOSCEHEAP), the Regional Aquatics Monitoring Program (RAMP) and the Wood Buffalo Environmental Association (WBEA).

10.5 Physical and Cultural Heritage

No follow-up requirements were defined.

10.6 Traditional Land and Resource Use

10.6.1 Traditional Land Use

The long-term effects of the project will be addressed in closure and end use planning that takes into account the potential of the landscape for sustainable traditional land use. Suncor supports the multi-stakeholder efforts underway and is committed to active participation in efforts to establish a regional strategy that balances development objectives with the concerns of regional residents.

10.6.2 Resource Use

No follow-up requirements were identified.

10.7 Socio-economics

There is an increased need for regional cooperation between project proponents, the Regional Municipality of Wood Buffalo, and service providers. This cooperation is already emerging through the work of the Regional Infrastructure

Working Group (RIWG) and the Athabasca Oil Sands Development Facilitation Committee (AOSDFC). It will need to be continued throughout the construction and operations phases of Project Millennium and the other proposed projects.

10.8 Other Concerns

The Athabasca Chipewyan First Nation expressed concern that monitoring must be structured to provide a comparison of predicted and actual outcomes and that formal community involvement also needs to be part of this process.

10.9 Implementation

Mitigation measures and follow-up requirements outlined in the Project Millennium EIA will be implemented by Suncor Energy Inc. in accordance with approvals issued by Alberta Energy and Utilities Board and Alberta Environmental Protection. Implementation of the Comprehensive Study Report decision will be in accordance with an Environmental Protection Plan (EPP) for Project Millennium. The EPP will identify

appropriate mitigation and follow-up and identify associated responsibilities and reporting requirements.

10.9.1 Responsibilities

Responsibility for implementing mitigation measures and conducting required follow-up rests with Suncor Energy Inc. The Department of Fisheries and Oceans, as Responsible Authority for the Comprehensive Study is required to ensure that appropriate mitigation measures are implemented and arrange for follow-up to be carried out.

10.9.2 Reporting

Suncor Energy Inc. is required to report to Alberta Environmental Protection monthly for air and water monitoring, and annually for air, water and resource monitoring. Results from emission source surveys are also reported annually. Reporting to Department of Fisheries and Oceans on implementation of the EPP will be on an annual basis.

Chapter 11

Conclusions, Decision, and Approvals

11.1 Conclusions

Cumulative air emissions will increase as a result of Project Millennium and other projects. When taken together, the modelled emissions generally remain under Alberta Environmental Protection guidelines for ground-level concentrations. Acid deposition is predicted to increase, but further work is required to understand the relationship between loading and environmental sensitivity. **Uncertainties also exist regarding ground level ozone concentrations.** A comprehensive, cooperatively-planned and integrated air monitoring system will continue to monitor regional air quality. As well, a program for environmental effects monitoring is in place.

Athabasca River water quality is not predicted to be impacted by Project Millennium nor with combined developments. Any potential impact would be reduced with a substantial reduction of plant wastewater and cooling water discharge to the River. The Shipyard Lake wetland ecosystem will be protected. There will be no net loss of fish habitat in the east bank mining area.

A closure plan which integrates Lease 86/17 and the east bank mining areas was assessed to have a high likelihood of meeting objectives. Consolidated tailings technology is proving to be a key factor in reclamation performance. At the closure of the mine, the end pit will be reclaimed by a lake. Further research and development is required to establish

design criteria.

Based on available information, the cumulative health impacts of Project Millennium, together with regional projects, will be of acceptable risk. Work is progressing in the area of naphthenic acids and particulates to add further knowledge to the health risk assessment database. Also, the proponent is participating in cooperative health studies and environmental effects monitoring in the region.

There will be moderate effects on the local community during Project construction and as the Project comes on-stream, heightened by the significant cumulative oil sands development in the region. These cumulative effects are being addressed through a high level of consultation and cooperation among the Regional Municipality of Wood Buffalo, the Province of Alberta, community stakeholders and developers.

The Project will provide significant economic benefits to the region, Alberta and Canada. The proponent is committed to ensuring that the aboriginal community shares in the benefits through employment and business opportunities.

11.2 Outstanding Concerns

Environment Canada has concerns that outside of this environmental assessment review process, no comprehensive mechanism has been created to ensure studies being undertaken and proposed by the

proponent will be successfully completed, interpreted, implemented and publicly reported on in the region. The regulation of the industry by Alberta Environmental Protection and the Alberta Energy and Utilities Board will constitute a portion of this mechanism. The industry-lead cumulative effects assessment working group has also been tentatively identified as a body to address some of the cumulative effects issues. Within the context of the existing regulatory framework, Environment Canada strongly promotes the formalization of a multistakeholder organization that will take responsibility for addressing the cumulative impacts of the regional development.

The Fort McKay Industry Relations Corporation stated that a meaningful and formal consultation process, including participatory decision making, between the community and the proponent needs to be developed and implemented to address project related issues prior to the AEUB giving approval to the project.

The Oil Sands Environmental Coalition (OSEC) is extremely concerned that the Millennium Project will have a long-term adverse impact on the environment in the region and beyond. OSEC believes that the Project would result in substantial residual impacts to the environment that would far exceed the environmental threshold and carrying capacity of the region. OSEC provided this concern and a list of 46 other concerns to Alberta Environmental Protection. Many of the other concerns have been incorporated into the Environmental Assessment of Effects and Cumulative Effects sections of this Comprehensive Study Report.

11.3 Regulatory Approvals

Project Millennium Application

The Project Millennium Application, and its supporting Environmental Impact Assessment, was designed as an integrated application to the Alberta Energy and Utilities Board (AEUB) and Alberta Environmental Protection (AEP). The Application seeks approval from the AEUB) and Alberta AEP in accordance with the following legislation:

- Review and acceptance of the Project Millennium Environmental Impact Assessment Report by the Director of Environmental Assessment Division, AEP under the *Alberta Environmental Protection and Enhancement Act (AEPEA)*.
- Amendment of Approval No. 8101 under the *Alberta Oil Sands Conservation Act (OSCA)*.
- Amendment of the existing Approval No. 94-01-00 (as amended) under AEPEA.
- Amendment of the existing File No. 27549/27551 and Licence No. 10400 under the *Water Resources Act*.

Other Associated Project Applications

Suncor will file applications for other aspects of Project Millennium under other legislation. Following is a list of identified federal and provincial application and approval requirements applicable to the Project:

Federal:

- *Fisheries Act* authorization for the harmful alteration, disruption or disturbance of fish habitat in Wood Creek, McLean Creek, Leggett Creek, unnamed creeks and Shipyard Lake.

Provincial:

- *Alberta Hydro and Electric Energy Act*, for exemption under the Act to construct and operate turbogenerators.
- *Alberta Electric Utilities Act*, for exemption under the Act for power rates and tariffs for power generated by Suncor in its operations.
- *Alberta Pipeline Act*, for construction and operation of hot water, raw bitumen, natural gas, gypsum and water pipelines.
- *Municipal Government Act, Part 17*, for a development permit from the Regional Municipality of Wood Buffalo for construction and operation of Project Millennium and related infrastructure.
- *Public Lands Act*, for surface rights.
- *Historical Resources Act*, for clearance to construct facilities.

11.4 Decision Statement**Harmonization**

The federal and provincial environmental assessment review processes are being conducted concurrently in the spirit of the Canada/Alberta Harmonization Accord. The provision of the CSR within the period of review by the Director of AEP was deemed necessary to facilitate a timely joint review should one be necessary.

Chapter 12

References

12.1 Literature

- Alberta Environmental Protection. 1996. Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan. Publication No. I/358. Edmonton, Alberta. 57p.
- BOVAR Environmental. 1996a. Environmental Impact Assessment for the Syncrude Canada Limited Aurora Mine. Report prepared for Syncrude Canada Ltd.
- BOVAR 1996b. Environmental Effects of Oil Sand Plant Emissions in Northeastern Alberta. Regional Effects of Acidifying Emissions. Report for Environmental Effects Subcommittee Southern Wood Buffalo Regional Air Quality Coordinating Committee. 69p.
- Environment Canada. 1997a. Mackenzie Basin Impact Study Final Report, Summary of Results, 20pp.**
- Environment Canada. 1997b. Submission of the Department of the Environment (Environment Canada). Alberta Energy and Utilities Board Application No. 960552 Syncrude Canada Limited, 55pp.**
- Golder Associates Ltd. 1996. Fish Flavour Impairment Study. Report for Suncor Inc., Oil Sands Group, Fort McMurray, Alberta.
- Golder Associates Ltd. 1997. Report on Winter Aquatics Surveys – Steepbank River, Shipyard Lake and Leases 19, 25 and 29. For Suncor Inc., Oil Sands Group, Fort McMurray, Alberta.
- Golder Associates Ltd. 1998a. Report on Suncor Project Millennium – 1997 Fall Fisheries Investigations, March 1998. For Suncor Inc., Oil Sands Group, Fort McMurray, Alberta.
- Golder Associates Ltd. 1998b. Report of Project Millennium Conceptual Plan for "No Net Loss" of Fish Habitat. Submitted to Suncor Energy Inc., Fort McMurray, Alberta.
- Hydroqual Laboratories Ltd. 1996a. Laboratory Studies on Trophic Level Effects and Fish Health Effects of Suncor Tar Island Dyke Wastewater. Report for Suncor Inc., Oil Sands Group, Calgary, Alberta.
- Hydroqual Laboratories Ltd. 1996b. Laboratory Tests of Trophic Level Effects and Fish Health Effects and Tainting Potential of Suncor Refinery Effluent. Report for Suncor Inc., Oil Sands Group, Calgary, Alberta.
- Sadar, M.H. 1994. Environmental Impact Assessment. Carleton University Press for the Impact Assessment Centre. Carleton University.

Suncor Energy Inc. Oil Sands, or Suncor Inc., Oil Sands Group. 1988. Environmental Impact Assessment for the Debottlenecking Project of the Suncor Oil Sands Project.

Suncor. 1996. Suncor Inc., Oil Sands Group - Steepbank Mine Application. April 1996. Fort McMurray, Alberta.

Suncor 1998a. Project Millennium Application. Suncor Energy Inc., Oil Sands. April 1998.

Suncor 1998b. Supplemental Information Response, Federal Agencies. Suncor Energy Inc., Oil Sands. July 1998.

12.2 Contacts

Anne Seguin, Natural Resources Canada, Ottawa, Ontario.

Bruce Young, Canadian Environmental Assessment Agency, Ottawa/Hull.

Dale Kirkland, Environment Canada, Environmental Protection, Edmonton, Alberta.

Dan Smith, Oil Sands Environmental Coalition, Calgary, Alberta.

Dave Grogan, Health Canada, Ottawa, Ontario

Don Klym, Suncor Energy Inc., Fort McMurray, Alberta.

John Gulley, Golder Associates Ltd., Calgary, Alberta.

Keith McDonald, Indian and Northern Affairs Canada, Edmonton, Alberta.

Ken Shipley, Fort McKay Industry Relations Corporation, Fort McKay, Alberta.

Lyle Lockhart, Department of Fisheries and Oceans, Winnipeg, Manitoba.

Martin Holysh, Suncor Energy Inc., Fort McMurray, Alberta.

Mark Shaw, Suncor Energy Inc., Fort McMurray, Alberta.

Pauline Erickson, Environment Canada, Canadian Wildlife Service, Edmonton, Alberta.

Ralpy Dyer, Alberta Environmental Protection, Edmonton, Alberta.

Ryerson Christie, Canadian Environmental Assessment Agency, Edmonton, Alberta.

Shauna Mercer, Environment Canada, Environmental Protection, Edmonton, Alberta.

Suzanne Therrien-Richards, Canadian Heritage, Winnipeg, Manitoba.

List of Acronyms

ACFN	Athabasca Chipewyan First Nations
AEP	Alberta Environmental Protection
AEUB	Alberta Energy Utilities Board
AOSCEHAP	Alberta Oil Sands Community Exposure and Health Effects Association Program
AOSDFC	Athabasca Oil Sands Development Facilitation Committee
AOSERP	Alberta Oil Sands Environmental Research Program
AWI	Alberta Wetlands Inventory
BBL	Barrel
BOD	Biological Oxygen Demand
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Act Canadian Environmental Assessment Agency
CO ₂	Carbon Dioxide
CO	Carbon Monoxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSR	Comprehensive Study Report
CT	Consolidated Tailings
DFO	Department of Fisheries and Oceans
DO	Dissolved Oxygen
EIA	Environmental Impact Assessment
FMFN	Fort McKay First Nations
FWI	Freshwater Institute
EPL	End Pit Lake
FGD	Flue Gas Desulphurization
GLC	Ground Level Concentration
GTG	Gas Turbine Generator
HRIA	Heritage Resources Impact Assessment
INAC	Indian and Northern Affairs Canada
IRP	Integrated Resources Plan
KIR	Key Indicator Resources
LSA	Local Study Area
MOU	Memorandum of Understanding
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NRBS	Northern Rivers Basin Study
OSEC	Oil Sands Environmental Coalition
PAH	Polycyclic Aromatic Hydrocarbons
PAI	Potential Acid Input
PCB	Polychlorinated Biphenyls
PM	Particulate Matter
RAQCC	Regional Air Quality Coordinating Committee
RAMP	Regional Aquatics Monitoring Program
RIWG	Regional Infrastructure Working Group
RMWB	Regional Municipality of Wood Buffalo
RSA	Regional Study Area
SO ₂	Sulphur Dioxide

TEL	Threshold Effect Level
TOR	Terms of Reference
TRS	Total Reduced Sulphur
VOC	Volatile Organic Compounds
WBEA	Wood Buffalo Environmental Association
WBNP	Wood Buffalo National Park

LIST OF FIGURES

(a) Page

1.	Suncor Project Millennium Location Map	4
2.	Suncor Aerial Photograph	9
3.	Project Millennium Overall Location	10
4.	Project Millennium Schematic	11
5.	Regional Study Area for Cumulative Effects	17
6.	Linkages Between Project Components	33

(ii.) LIST OF TABLES

1.	Project Millennium Impact Assessment Scenarios	18
----	--	----

C) LIST OF APPENDICES

1.	List of Acronyms.	
2.	Environmental Impact Statement Terms of Reference Terms of Reference – Environmental Impact Statement – Comprehensive Study Report Cross – Reference.	
3.	Suncor Energy Inc. Public Consultation Summary.	
4.	Responsible Authority Consultation Summary.	
5.	Sources of Concerns Listed in Comprehensive Study Report.	
6.	Suncor Energy Inc. Application for Fisheries Act Authorization.	
7.	Supporting Documents.	

DRAFT

SUNCOR ENERGY INC. PROJECT MILLENIUM

COMPREHENSIVE STUDY REPORT

Department of Fisheries and Oceans
Habitat Management Division
Freshwater Institute
Winnipeg, Manitoba

July 1998

SUNCOR ENERGY INC.

PROJECT MILLENIUM

COMPREHENSIVE STUDY REPORT

Prepared by:

**Mel R. Falk
Falk Environmental
Winnipeg, Manitoba**

and

**John R. Gulley
Golder Associates Ltd.
Calgary, Alberta**

Prepared for:

**Department of Fisheries and Oceans
Habitat Management Division
Winnipeg, Manitoba**

July 1998

TABLE OF CONTENTS

		<u>Page</u>
1.1	Introduction	1
1.1	1.1 Comprehensive Study	1
1.2	1.2 Proponent	1
1.3	1.3 Project Overview	2
1.4	1.4 Purpose	2
1.5	1.5 Need	3
1.6	1.6 Timing	3
2.0	Project Description	5
2.1	2.1 Scope of Project	5
2.2	2.2 Development Schedule	5
2.3	2.3 Project Components	5
	2.3.1 Bitumen Production - Mining and Extraction	6
	2.3.2 Upgrading	7
	2.3.3 Energy Services	7
3.0	Project Alternatives	12
3.1	3.1 Alternatives to the Project	12
3.2	3.2 Project Alternatives	12
	3.2.1 Mining Options	12
	3.2.2 Extraction Options	12
	3.2.3 Tailings Disposal Options	13
	3.2.4 Upgrading Options	13
	3.2.5 Energy Services Options	13
4.0	Scope of Assessment	14
4.1	4.1 Factors	14
	4.1.1 Project Issues	14
	4.1.2 Canadian Environmental Assessment Act	14
4.2	4.2 Spatial and Temporal Boundaries	14
	4.2.1 Spatial Boundaries	14
	4.2.2 Temporal Boundaries	16
5.0	Public Consultation Program	19
5.1	5.1 Suncor's Public Consultation	19
5.2	5.2 Project Millennium Consultation	20
5.3	5.3 Responsible Authority Consultation	20
6.0	Description of the Environment	21
6.1	6.1 Environmental Components	21
	6.1.1 Air	21
	6.1.2 Water	21
	6.1.2.1 Surface Hydrology and Hydrogeology	21
	6.1.2.2 Water Quality	22
	6.1.2.3 Fish and Fish Habitat	23
	6.1.3 Terrestrial	26

6.1.3.1	Terrain and Soils	26
6.1.3.2	Vegetation	26
6.1.3.3	Wildlife	27
6.1.4	Human Health	29
6.1.5	Socio-Economic Conditions	30
6.1.5.1	Economics	30
6.1.5.2	Traditional Land Use	30
6.1.6	Physical and Cultural Heritage	31
6.1.6.1	Archaeology	31
6.1.6.2	Traditional Resources	31
6.1.6.3	Palaentological Resources	32
6.2	Relationships Among Components	32
6.3	Sensitivity to Disturbance	32
7.0	Environmental Assessment of Effects	34
7.1	Methods	34
7.2	Air	34
7.2.1	Ambient Air Quality Concentrations	34
7.2.1.1	Sulphur Dioxide	35
7.2.1.2	Nitrogen Dioxide	35
7.2.1.3	Carbon Monoxide	36
7.2.1.4	Particulate Matter	37
7.2.1.5	Volatile Organic Compounds	37
7.2.1.6	Total Reduced Sulphur	38
7.2.1.7	Acid-Forming Compounds	38
7.2.1.8	Ground Level Ozone	39
7.2.1.9	Noise	40
7.3	Water	41
7.3.1	Hydrogeology and Hydrology	41
7.3.1.1	Hydrogeology	41
7.3.1.2	Hydrology	42
7.3.1.3	Closure Drainage Systems	43
7.3.2	Water Quality	44
7.3.2.1	Maintenance of Water Quality Guidelines	44
7.3.2.2	Thermal Regime	45
7.3.2.2	Dissolved Oxygen	46
7.3.2.3	Polycyclic Aromatic Hydrocarbons	46
7.3.2.4	End Pit Lake	47
7.3.2.5	Acidification	48
7.3.3	Fish and Fish Habitat	49
7.3.3.1	Fish Habitat	49
7.3.3.2	Acute and Chronic Effects on Fish	50
7.3.3.2	Fish Abundance	51
7.3.3.3	Fish Flavor	51
7.3.3.4	Chemicals in Fish Tissue	52
7.3.3.5	Reclamation Streams, Wetlands and End Pit Lake	53
7.4	Terrestrial	54
7.4.1	Soils and Terrain	54
7.4.1.1	Soil Quality and Terrain Units	54
7.4.1.2	Acidification of Soils	55

7.4.1.3	Terrestrial Vegetation and Wetlands	56
7.4.1.4	Key Resource Species	58
7.4.2	Wildlife	59
7.4.2.1	Habitat Changes	59
7.4.2.2	Wildlife Abundance and Diversity	60
7.4.2.2	Wildlife Health	62
7.5	Human Health	63
7.6	Physical and Cultural Heritage	65
7.7	Effects on Socio-Economic Conditions	65
7.8	Effects on Current Land Use and Resource Use by Aboriginal Persons	66
7.8.1	Traditional Resource Use	66
7.8.2	Resource Use	68
7.9	Effects on Sustainable Use of Renewable Resources	69
7.10	Effects of Environment on the Project	69
7.11	Effects of Malfunctions or Accidents	69
8.1	Cumulative Environmental Effects	71
8.1	Overview	71
8.2	Air	71
8.2.1	Sulphur Dioxide	71
8.2.2	Nitrogen Dioxide	72
8.2.3	Carbon Monoxide	72
8.2.4	Particulate Matter	72
8.2.5	Volatile Organic Compounds	72
8.2.6	Total Reduced Sulphur	73
8.2.7	Acid Forming Compounds	73
8.3	Water	74
8.3.1	Surface Hydrology and Hydrogeology	74
8.3.2	Water Quality	74
8.3.3	Fish and Fish Habitat	74
8.4	Terrestrial	75
8.4.1	Soils and Terrain	75
8.4.2	Terrestrial Vegetation and Wetlands	75
8.4.3	Wildlife	76
8.5	Human Health	76
8.6	Physical and Cultural Heritage	77
8.7	Traditional Land Use and Resource Use	77
8.7.1	Traditional Land Use	77
8.7.2	Resource Use	77
8.7.3	Socio-economics	77
9.0	Significance	79
10.0	Follow-up Program	80
10.1	Air	80
10.2	Water	80
10.2.1	Hydrology and Hydrogeology	80
10.2.2	Water Quality	80
10.2.3	Fish and Fish Habitat	80
10.2.4	Regional Aquatics Monitoring Program	81

10.3	Terrestrial	81
10.3.1	Soils and Terrain	81
10.3.2	Terrestrial Vegetation and Wetlands	82
10.3.3	Wildlife	82
10.4	Human Health	82
10.5	Physical and Cultural Heritage	83
10.6	Traditional Land Use and Resource Use	83
10.6.1	Traditional Land Use	83
10.6.2	Resource Use	83
10.7	Socio-economics	83
10.8	Other Concerns	84
10.9	Implementation	84
10.9.1	Responsibilities	84
10.9.2	Reporting	84
11.0	Conclusions, Decision and Approvals	85
11.1	Conclusions	85
11.2	Outstanding Concerns	85
11.3	Regulatory Approvals	86
11.4	Decision Statement	87
12.0	References	88
12.1	Literature	88
12.2	Contacts	89

Appendices

LIST OF FIGURES**(a) Page**

1.	Suncor Project Millennium Location Map	4
2.	Suncor Aerial Photograph	9
3.	Project Millennium Overall Location	10
4.	Project Millennium Schematic	11
5.	Regional Study Area for Cumulative Effects	17
6.	Linkages Between Project Components	33

(ii.) LIST OF TABLES

1.	Project Millennium Impact Assessment Scenarios	18
----	--	----

C) LIST OF APPENDICES

1.	List of Acronyms.	
2.	Environmental Impact Statement Terms of Reference Terms of Reference – Environmental Impact Statement – Comprehensive Study Report Cross – Reference.	
3.	Suncor Energy Inc. Public Consultation Summary.	
4.	Responsible Authority Consultation Summary.	
5.	Sources of Concerns Listed in Comprehensive Study Report.	
6.	Suncor Energy Inc. Application for Fisheries Act Authorization.	
7.	Supporting Documents.	



Appendix A:

Canadian Environmental Assessment Act

Third Session, Thirty-fourth Parliament,
40-41 Elizabeth II, 1991-92

Troisième session, trente-quatrième législature,
40-41 Elizabeth II, 1991-92

STATUTES OF CANADA 1992

LOIS DU CANADA (1992)

CHAPTER 37

CHAPITRE 37

An Act to establish a federal environmental assessment
process

Loi de mise en œuvre du processus fédéral d'évaluation
environnementale

BILL C-13

ASSENTED TO 23rd JUNE, 1992

PROJET DE LOI C-13

SANCTIONNÉ LE 23 JUIN 1992

40-41 ELIZABETH II

CHAPTER 37

An Act to establish a federal environmental assessment process

[Assented to 23rd June, 1992]

Preamble

WHEREAS the Government of Canada seeks to achieve sustainable development by conserving and enhancing environmental quality and by encouraging and promoting economic development that conserves and enhances environmental quality;

WHEREAS environmental assessment provides an effective means of integrating environmental factors into planning and decision-making processes in a manner that promotes sustainable development;

WHEREAS the Government of Canada is committed to exercising leadership within Canada and internationally in anticipating and preventing the degradation of environmental quality and at the same time ensuring that economic development is compatible with the high value Canadians place on environmental quality;

AND WHEREAS the Government of Canada is committed to facilitating public participation in the environmental assessment of projects to be carried out by or with the approval or assistance of the Government of Canada and providing access to the information on which those environmental assessments are based;

NOW, THEREFORE, Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

40-41 ELIZABETH II

CHAPITRE 37

Loi de mise en œuvre du processus fédéral d'évaluation environnementale

[Sanctionnée le 23 juin 1992]

Préambule

Attendu :

que le gouvernement fédéral vise au développement durable par des actions de conservation et d'amélioration de la qualité de l'environnement ainsi que de promotion d'une croissance économique de nature à contribuer à la réalisation de ces fins;

que l'évaluation environnementale constitue un outil efficace pour la prise en compte des facteurs environnementaux dans les processus de planification et de décision, de façon à promouvoir un développement durable;

que le gouvernement fédéral s'engage à jouer un rôle moteur tant au plan national qu'au plan international dans la prévention de la dégradation de l'environnement tout en veillant à ce que les activités de développement économique soient compatibles avec la grande valeur qu'accordent les Canadiens à l'environnement;

que le gouvernement fédéral s'engage à favoriser la participation de la population à l'évaluation environnementale des projets à entreprendre par lui ou approuvés ou aidés par lui, ainsi qu'à fournir l'accès à l'information sur laquelle se fonde cette évaluation,

Sa Majesté, sur l'avis et avec le consentement du Sénat et de la Chambre des communes du Canada, édicte :

	SHORT TITLE	TITRE ABRÉGÉ	Titre abrégé
Short title	1. This Act may be cited as the <i>Canadian Environmental Assessment Act</i> .	1. <i>Loi canadienne sur l'évaluation environnementale</i> .	
	INTERPRETATION	DÉFINITIONS	
Definitions	2. (1) In this Act,	2. (1) Les définitions qui suivent s'appliquent à la présente loi.	Définitions
"Agency" « Agence »	"Agency" means the Canadian Environmental Assessment Agency established by section 61;	« Agence » L'Agence canadienne d'évaluation environnementale constituée par l'article 61.	« Agence » "Agency"
"assessment by a review panel" « examen par une commission »	"assessment by a review panel" means an environmental assessment that is conducted by a review panel established pursuant to section 33 and that includes a consideration of the factors required to be considered under subsections 16(1) and (2);	« autorité fédérale »	« autorité fédérale » "federal authority"
"comprehensive study" « étude approfondie »	"comprehensive study" means an environmental assessment that is conducted pursuant to section 21 and that includes a consideration of the factors required to be considered under subsections 16(1) and (2);	a) Ministre fédéral; b) agence fédérale ou organisme constitué sous le régime d'une loi fédérale et tenu de rendre compte au Parlement de ses activités par l'intermédiaire d'un ministre fédéral;	
"comprehensive study list" « liste d'étude approfondie »	"comprehensive study list" means a list of all projects or classes of projects that have been prescribed pursuant to regulations made under paragraph 59(d);	c) ministère ou établissement public mentionnés aux annexes I et II de la <i>Loi sur la gestion des finances publiques</i> ;	
"environment" « environnement »	"environment" means the components of the Earth, and includes (a) land, water and air, including all layers of the atmosphere, (b) all organic and inorganic matter and living organisms, and (c) the interacting natural systems that include components referred to in paragraphs (a) and (b);	d) tout autre organisme désigné par les règlements d'application de l'alinéa 59e).	
"environmental assessment" « évaluation environnementale »	"environmental assessment" means, in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with this Act and the regulations;	Sont exclus le commissaire en conseil du territoire du Yukon et des Territoires du Nord-Ouest et tous les organismes de ces territoires, tout conseil de bande au sens donné à « conseil de la bande » dans la <i>Loi sur les Indiens</i> , les commissions portuaires constituées par la <i>Loi sur les commissions portuaires</i> , les commissaires nommés en vertu de la <i>Loi des commissaires du havre de Hamilton</i> et de la <i>Loi de 1911 concernant les commissaires du havre de Toronto</i> , et les sociétés d'État au sens de la <i>Loi sur la gestion des finances publiques</i> .	« autorité responsable » "responsible authority"
"environmental effect" « effets environnementaux »	"environmental effect" means, in respect of a project, (a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on	« autorité responsable » L'autorité fédérale qui, en conformité avec le paragraphe 11(1), est tenue de veiller à ce qu'il soit procédé à l'évaluation environnementale d'un projet.	« développement durable » "sustainable development"
		« développement durable » Développement qui permet de répondre aux besoins du présent sans compromettre la possibilité pour les générations futures de satisfaire les leurs.	
		« document » Tous éléments d'information, quels que soient leur forme et leur support,	« document » "record"

any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and

(b) any change to the project that may be caused by the environment,

whether any such change occurs within or outside Canada;

"exclusion list"
• liste
d'exclusion •

"exclusion list" means a list of all projects or classes of projects that have been prescribed pursuant to regulations made under paragraph 59(c);

"federal authority"
• autorité
fédérale •

"federal authority" means

(a) a Minister of the Crown in right of Canada,

(b) an agency of the Government of Canada or other body established by or pursuant to an Act of Parliament that is ultimately accountable through a Minister of the Crown in right of Canada to Parliament for the conduct of its affairs,

(c) any department or departmental corporation set out in Schedule I or II to the *Financial Administration Act*, and

(d) any other body that is prescribed pursuant to regulations made under paragraph 59(e),

but does not include the Commissioner in Council or an agency or body of the Yukon Territory or the Northwest Territories, a council of the band within the meaning of the *Indian Act*, The Hamilton Harbour Commissioners constituted pursuant to *The Hamilton Harbour Commissioners' Act*, The Toronto Harbour Commissioners constituted pursuant to *The Toronto Harbour Commissioners' Act, 1911*, a harbour Commission established pursuant to the *Harbour Commissions Act* or a Crown corporation within the meaning of the *Financial Administration Act*;

"federal lands"
• territoire
domanial •

"federal lands" means

(a) lands that belong to Her Majesty in right of Canada, or that Her Majesty in right of Canada has the power to dispose of, and all waters on and airspace above those lands, other than lands the administration and control of which have been transferred by the Governor

notamment correspondance, note, livre, plan, carte, dessin, diagramme, illustration ou graphique, photographie, film, micro-formule, enregistrement sonore, magnétoscopique ou informatisé, ou toute reproduction de ces éléments d'information.

« effets environnementaux » Tant les changements que la réalisation d'un projet risque de causer à l'environnement que les changements susceptibles d'être apportés au projet du fait de l'environnement, que ce soit au Canada ou à l'étranger; sont comprises parmi les changements à l'environnement les répercussions de ceux-ci soit en matière sanitaire et socio-économique, soit sur l'usage courant de terres et de ressources à des fins traditionnelles par les autochtones, soit sur une construction, un emplacement ou une chose d'importance en matière historique, archéologique, paléontologique ou architecturale.

• effets
environnementaux •
"environmental
effect"

« environnement » Ensemble des conditions et des éléments naturels de la Terre, notamment :

• environne-
ment •
"environment"

a) le sol, l'eau et l'air, y compris toutes les couches de l'atmosphère;

b) toutes les matières organiques et inorganiques ainsi que les êtres vivants;

c) les systèmes naturels en interaction qui comprennent les éléments visés aux alinéas a) et b).

« étude approfondie » Évaluation environnementale d'un projet effectuée aux termes de l'article 21 et qui comprend la prise en compte des éléments énumérés aux paragraphes 16(1) et (2).

• étude
approfondie •
"comprehensive
study"

« évaluation environnementale » Évaluation des effets environnementaux d'un projet effectuée conformément à la présente loi et aux règlements.

• évaluation
environnementale •
"environmental
assessment"

« examen par une commission » Évaluation environnementale effectuée par une commission d'évaluation environnementale constituée aux termes de l'article 33 et qui comprend la prise en compte des éléments énumérés aux paragraphes 16(1) et (2).

• examen par
une commis-
sion •
"assessment by
a review panel"

« examen préalable » Évaluation environnementale qui, à la fois :

• examen
préalable •
"screening"

in Council to the Commissioner of the Yukon Territory or the Northwest Territories,

(b) the following lands and areas, namely,

(i) the internal waters of Canada within the meaning of the *Territorial Sea and Fishing Zones Act*, including the seabed and subsoil below and the airspace above those waters,

(ii) the territorial sea of Canada as determined in accordance with the *Territorial Sea and Fishing Zones Act*, including the seabed and subsoil below and the airspace above that sea,

(iii) any fishing zone of Canada prescribed under the *Territorial Sea and Fishing Zones Act*,

(iv) any exclusive economic zone that may be created by the Government of Canada, and

(v) the continental shelf, consisting of the seabed and subsoil of the submarine areas that extend beyond the territorial sea throughout the natural prolongation of the land territory of Canada to the outer edge of the continental margin or to a distance of two hundred nautical miles from the inner limits of the territorial sea, whichever is the greater, or that extend to such other limits as may be prescribed pursuant to an Act of Parliament, and

(c) reserves, surrendered lands and any other lands that are set apart for the use and benefit of a band and are subject to the *Indian Act*, and all waters on and airspace above those reserves or lands;

"follow-up program" means a program for

(a) verifying the accuracy of the environmental assessment of a project, and
(b) determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project;

"interested party" means, in respect of an environmental assessment, any person or body having an interest in the outcome of the environmental assessment for a purpose that is neither frivolous nor vexatious;

a) est effectuée de la façon prévue à l'article 18;

b) prend en compte les éléments énumérés au paragraphe 16(1).

« liste d'étude approfondie » Liste des projets ou catégories de projets désignés par règlement aux termes de l'alinéa 59d).

« liste d'exclusion » Liste des projets ou catégories de projets établie par règlement aux termes de l'alinéa 59c).

« médiation » Évaluation environnementale effectuée sous la direction d'un médiateur nommé aux termes de l'article 30 et qui comprend la prise en compte des éléments énumérés aux paragraphes 16(1) et (2).

« mesures d'atténuation » Maîtrise efficace, réduction importante ou élimination des effets environnementaux négatifs d'un projet, éventuellement assortie d'actions de rétablissement notamment par remplacement ou restauration; y est assimilée l'indemnisation des dommages causés.

« ministre » Le ministre de l'Environnement.

« partie intéressée » Toute personne ou tout organisme pour qui le résultat de l'évaluation environnementale revêt un intérêt qui ne soit ni frivole ni vexatoire.

« programme de suivi » Programme visant à permettre :

a) de vérifier la justesse de l'évaluation environnementale d'un projet;

b) de juger de l'efficacité des mesures d'atténuation des effets environnementaux négatifs.

« projet » Réalisation — y compris l'entretien, la modification, la désaffectation ou la fermeture — d'un ouvrage ou proposition d'exercice d'une activité concrète, non liée à un ouvrage, désignée par règlement ou faisant partie d'une catégorie d'activités concrètes désignée par règlement aux termes de l'alinéa 59b).

« promoteur » Autorité fédérale ou gouvernement, personne physique ou morale ou tout organisme qui propose un projet.

« rapport d'examen préalable » Rapport des résultats d'un examen préalable.

« liste d'étude approfondie »
"comprehensive study list"

« liste d'exclusion »
"exclusion list"

« médiation »
"mediation"

« mesures d'atténuation »
"mitigation"

« ministre »
"Minister"

« partie intéressée »
"interested party"

« programme de suivi »
"follow-up program"

« projet »
"project"

« promoteur »
"proponent"

« rapport d'examen préalable »
"screening report"

"follow-up program"
« programme de suivi »

"interested party"
« partie intéressée »

"mediation" « médiation »	"mediation" means an environmental assessment that is conducted with the assistance of a mediator appointed pursuant to section 30 and that includes a consideration of the factors required to be considered under subsections 16(1) and (2);	« territoire domanial »	« territoire domanial » "federal lands"
"Minister" « ministre »	"Minister" means the Minister of the Environment;	a) Les terres qui appartiennent à Sa Majesté du chef du Canada ou qu'elle a le pouvoir d'aliéner, ainsi que leurs eaux et leur espace aérien, à l'exception des terres sur lesquelles le commissaire du Yukon ou celui des Territoires du Nord-Ouest a pleine autorité par décision du gouverneur en conseil;	
"mitigation" « mesures d'atténuation »	"mitigation" means, in respect of a project, the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means;	b) les terres et zones suivantes :	
"prescribed" Version anglaise seulement	"prescribed" means prescribed by the regulations;	(i) les eaux intérieures du Canada au sens de la <i>Loi sur la mer territoriale et la zone de pêche</i> , ainsi que leur fond, leur sous-sol et leur espace aérien,	
"project" « projet »	"project" means (a) in relation to a physical work, any proposed construction, operation, modification, decommissioning, abandonment or other undertaking in relation to that physical work, or (b) any proposed physical activity not relating to a physical work that is prescribed or is within a class of physical activities that is prescribed pursuant to regulations made under paragraph 59(b);	(ii) la mer territoriale du Canada délimitée conformément à la <i>Loi sur la mer territoriale et la zone de pêche</i> , ainsi que le fond de la mer, son sous-sol et son espace aérien,	
"proponent" « promoteur »	"proponent", in respect of a project, means the person, body, federal authority or government that proposes the project;	(iii) toute zone de pêche délimitée par règlement pris sous le régime de la <i>Loi sur la mer territoriale et la zone de pêche</i> ,	
"record" « document »	"record" includes any correspondence, memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, photograph, film, microform, sound recording, videotape, machine readable record, and any other documentary material, regardless of physical form or characteristics, and any copy thereof;	(iv) toute zone économique exclusive créée par le gouvernement fédéral, (v) le plateau continental, c'est-à-dire le fond de la mer et le sous-sol des zones sous-marines qui s'étendent au-delà de la mer territoriale sur tout le prolongement naturel du territoire terrestre du Canada soit jusqu'au rebord externe de la marge continentale, soit jusqu'à deux cents milles marins des limites intérieures de la mer territoriale là où ce rebord se trouve à une distance inférieure, soit jusqu'aux limites fixées au titre d'une loi fédérale;	
"responsible authority" « autorité responsable »	"responsible authority", in relation to a project, means a federal authority that is required pursuant to subsection 11(1) to ensure that an environmental assessment of the project is conducted;	c) les réserves, terres cédées ou autres terres qui ont été mises de côté à l'usage et au profit d'une bande et assujetties à la <i>Loi sur les Indiens</i> , ainsi que leurs eaux et leur espace aérien.	
"screening" « examen préalable »	"screening" means an environmental assessment that is conducted pursuant to section 18 and that includes a consider-		

ation of the factors set out in subsection 16(1);

"screening report"
• rapport d'examen préalable •

"screening report" means a report that summarizes the results of a screening;

"sustainable development"
• développement durable •

"sustainable development" means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs.

Control

(2) For the purposes of this Act, a corporation is controlled by another corporation if

(a) securities of the corporation to which are attached more than fifty per cent of the votes that may be cast to elect directors of the corporation are held, other than by way of security only, by or for the benefit of that other corporation; and

(b) the votes attached to those securities are sufficient, if exercised, to elect a majority of the directors of the corporation.

(2) Pour l'application de la présente loi, a le contrôle d'une personne morale la personne morale :

Contrôle

a) d'une part, qui détient — ou en est bénéficiaire —, autrement qu'à titre de garantie seulement, des valeurs mobilières conférant plus de cinquante pour cent du maximum possible des voix à l'élection des administrateurs de la personne morale;

b) d'autre part, dont les valeurs mobilières confèrent un droit de vote dont l'exercice permet d'élire la majorité des administrateurs de la personne morale.

HER MAJESTY

SA MAJESTÉ

Binding on Her Majesty

3. This Act is binding on Her Majesty in right of Canada or a province.

3. La présente loi lie Sa Majesté du chef du Canada ou d'une province.

Sa Majesté

PURPOSES

OBJET

Purposes

4. The purposes of this Act are

(a) to ensure that the environmental effects of projects receive careful consideration before responsible authorities take actions in connection with them;

(b) to encourage responsible authorities to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy;

(c) to ensure that projects that are to be carried out in Canada or on federal lands do not cause significant adverse environmental effects outside the jurisdictions in which the projects are carried out; and

(d) to ensure that there be an opportunity for public participation in the environmental assessment process.

4. La présente loi a pour objet :

Objet

a) de permettre aux autorités responsables de décider de tout projet susceptible d'avoir des effets environnementaux en se fondant sur un jugement éclairé quant à ces effets;

b) d'inciter ces autorités à favoriser un développement durable propice à la salubrité de l'environnement et à la santé de l'économie;

c) de faire en sorte que les éventuels effets environnementaux négatifs importants des projets devant être réalisés dans les limites du Canada ou du territoire domanial ne débordent pas ces limites;

d) de veiller à ce que le public ait la possibilité de participer au processus d'évaluation environnementale.

ENVIRONMENTAL ASSESSMENT OF
PROJECTS*Projects to be Assessed*Projects
requiring
environmental
assessment

5. (1) An environmental assessment of a project is required before a federal authority exercises one of the following powers or performs one of the following duties or functions in respect of a project, namely, where a federal authority

(a) is the proponent of the project and does any act or thing that commits the federal authority to carrying out the project in whole or in part;

(b) makes or authorizes payments or provides a guarantee for a loan or any other form of financial assistance to the proponent for the purpose of enabling the project to be carried out in whole or in part, except where the financial assistance is in the form of any reduction, avoidance, deferral, removal, refund, remission or other form of relief from the payment of any tax, duty or impost imposed under any Act of Parliament, unless that financial assistance is provided for the purpose of enabling an individual project specifically named in the Act, regulation or order that provides the relief to be carried out;

(c) has the administration of federal lands and sells, leases or otherwise disposes of those lands or any interests in those lands, or transfers the administration and control of those lands or interests to Her Majesty in right of a province, for the purpose of enabling the project to be carried out in whole or in part; or

(d) under a provision prescribed pursuant to paragraph 59(f), issues a permit or licence, grants an approval or takes any other action for the purpose of enabling the project to be carried out in whole or in part.

(2) Notwithstanding any other provision of this Act,

(a) an environmental assessment of a project is required before the Governor in Council, under a provision prescribed pursuant to regulations made under paragraph 59(g), issues a permit or licence, grants an approval or takes any other

Projects
requiring
approval of
Governor in
CouncilÉVALUATION ENVIRONNEMENTALE DES
PROJETS*Projets visés*

Projets visés

5. (1) L'évaluation environnementale d'un projet est effectuée avant l'exercice d'une des attributions suivantes :

a) une autorité fédérale en est le promoteur et le met en œuvre en tout ou en partie;

b) une autorité fédérale accorde à un promoteur en vue de l'aider à mettre en œuvre le projet en tout ou en partie un financement, une garantie d'emprunt ou toute autre aide financière, sauf si l'aide financière est accordée sous forme d'allègement — notamment réduction, évitement, report, remboursement, annulation ou remise — d'une taxe ou d'un impôt qui est prévu sous le régime d'une loi fédérale, à moins que cette aide soit accordée en vue de permettre la mise en œuvre d'un projet particulier spécifié nommément dans la loi, le règlement ou le décret prévoyant l'allègement;

c) une autorité fédérale administre le territoire domanial et en autorise la cession, notamment par vente ou cession à bail, ou celle de tout droit foncier relatif à celui-ci ou en transfère à Sa Majesté du chef d'une province l'administration et le contrôle, en vue de la mise en œuvre du projet en tout ou en partie;

d) une autorité fédérale, aux termes d'une disposition prévue par règlement pris en vertu de l'alinéa 59f), délivre un permis ou une licence, donne toute autorisation ou prend toute mesure en vue de permettre la mise en œuvre du projet en tout ou en partie.

(2) Par dérogation à toute autre disposition de la présente loi :

a) l'évaluation environnementale d'un projet est obligatoire, avant que le gouverneur en conseil, en vertu d'une disposition désignée par règlement aux termes de l'alinéa 59g), prenne une mesure, notamment

Projets
nécessitant
l'approbation
du gouverneur
en conseil

action for the purpose of enabling the project to be carried out in whole or in part; and

(b) the federal authority that, directly or through a Minister of the Crown in right of Canada, recommends that the Governor in Council take an action referred to in paragraph (a) in relation to that project

(i) shall ensure that an environmental assessment of the project is conducted as early as is practicable in the planning stages of the project and before irrevocable decisions are made,

(ii) is, for the purposes of this Act and the regulations, except subsection 11(2) and sections 20 and 37, the responsible authority in relation to the project,

(iii) shall consider the applicable reports and comments referred to in sections 20 and 37, and

(iv) where applicable, shall perform the duties of the responsible authority in relation to the project under section 38 as if it were the responsible authority in relation to the project for the purposes of paragraphs 20(1)(a) and 37(1)(a).

délivre un permis ou une licence ou accorde une approbation, autorisant la réalisation du projet en tout ou en partie;

b) l'autorité fédérale qui, directement ou par l'intermédiaire d'un ministre fédéral, recommande au gouverneur en conseil la prise d'une mesure visée à l'alinéa a) à l'égard du projet :

(i) est tenue de veiller à ce que l'évaluation environnementale du projet soit effectuée le plus tôt possible au stade de la planification de celui-ci, avant la prise d'une décision irrévocable,

(ii) est l'autorité responsable à l'égard du projet pour l'application de la présente loi — à l'exception du paragraphe 11(2) et des articles 20 et 37 — et de ses règlements,

(iii) est tenue de prendre en compte les rapports et observations pertinents visés aux articles 20 et 37,

(iv) le cas échéant, est tenue d'exercer à l'égard du projet les attributions de l'autorité responsable prévues à l'article 38 comme si celle-ci était l'autorité responsable à l'égard du projet pour l'application des alinéas 20(1)a) et 37(1)a).

6. Notwithstanding any other provision of this Act, no confidence of the Queen's Privy Council for Canada in respect of which subsection 39(1) of the *Canada Evidence Act* applies shall be disclosed or made available to any person.

6. Par dérogation à toute autre disposition de la présente loi, nul renseignement confidentiel du Conseil privé de la Reine pour le Canada visé par le paragraphe 39(1) de la *Loi sur la preuve au Canada* ne peut être divulgué ni fourni à quiconque.

Excluded Projects

Exclusions

7. (1) Notwithstanding section 5, an environmental assessment of a project is not required where

7. Par dérogation à l'article 5, n'ont pas à faire l'objet d'une évaluation environnementale les projets :

(a) the project is described in an exclusion list;

(b) the project is to be carried out in response to a national emergency for which special temporary measures are being taken under the *Emergencies Act*; or

(c) the project is to be carried out in response to an emergency and carrying out the project forthwith is in the interest of preventing damage to property or the envi-

a) qui sont visés dans les listes d'exclusion;

b) qui sont mis en œuvre en réaction à des situations de crise nationale pour lesquelles des mesures d'intervention sont prises aux termes de la *Loi sur les mesures d'urgence*;

c) qui sont mis en œuvre en réaction à une situation d'urgence et qu'il importe, soit pour la protection de biens ou de l'environnement, soit pour la santé ou la sécurité publiques, de mettre en œuvre sans délai.

Confidences of
Queen's Privy
Council for
Canada

Renseignements
confidentiels

Exclusions

Exclusions

ronment or is in the interest of public health or safety.

Idem

(2) For greater certainty, an environmental assessment is not required where a federal authority exercises a power or performs a duty or function referred to in paragraph 5(1)(b) in relation to a project and the essential details of the project are not specified before or at the time the power is exercised or the duty or function is performed.

(2) Il est entendu qu'il n'est pas nécessaire d'effectuer une évaluation environnementale dans les cas où l'autorité fédérale exerce une attribution visée à l'alinéa 5(1)b) à l'égard d'un projet dont les détails essentiels ne sont pas déterminés avant cet exercice ou au moment de celui-ci.

Précision

Assessments by Crown corporations under regulations

8. (1) Before a Crown corporation within the meaning of the *Financial Administration Act* or any corporation controlled by such a corporation exercises a power or performs a duty or function referred to in paragraph 5(1)(a), (b) or (c) in relation to a project, the Crown corporation shall ensure or require the corporation controlled by it to ensure, as the case may be, that an assessment of the environmental effects of the project is conducted in accordance with any regulations made for that purpose under paragraph 59(j) as early as is practicable in the planning stages of the project and before irrevocable decisions are made.

8. (1) Les sociétés d'État, au sens de la *Loi sur la gestion des finances publiques*, ou les personnes morales dont elles ont le contrôle, avant d'exercer une attribution visée aux alinéas 5(1)a), b) ou c) à l'égard d'un projet, veillent à ce que soit effectuée, le plus tôt possible au stade de la planification de celui-ci, avant la prise d'une décision irrévocable, l'évaluation des effets environnementaux du projet conformément aux règlements pris aux termes de l'alinéa 59j).

Sociétés d'État

Idem

(2) Notwithstanding section 5, an environmental assessment of a project is not required by reason only of the authorization or approval by a minister of the Crown in right of Canada granted under any other Act of Parliament or any regulations made thereunder in respect of the exercise of a power or the performance of a duty or function referred to in paragraph 5(1)(a), (b) or (c) in relation to the project by a Crown corporation within the meaning of the *Financial Administration Act*.

(2) Malgré l'article 5, il n'est pas nécessaire d'effectuer l'évaluation environnementale d'un projet parce qu'un ministre fédéral autorise ou approuve, en vertu d'une autre loi fédérale ou de ses règlements, l'exercice par une société d'État, au sens de la *Loi sur la gestion des finances publiques*, d'une attribution visée aux paragraphes 5(1)a), b) ou c) à l'égard du projet.

Exception

Assessments by harbour commissions under regulations

9. Before the Hamilton Harbour Commissioners constituted pursuant to *The Hamilton Harbour Commissioners' Act*, The Toronto Harbour Commissioners constituted pursuant to *The Toronto Harbour Commissioners' Act, 1911* or any harbour commission established pursuant to the *Harbour Commissions Act* exercises a power or performs a duty or function referred to in paragraph 5(1)(a), (b) or (c) in relation to a project, it shall ensure that an assessment of the environmental effects of the project is

9. Les commissaires nommés en vertu de la *Loi des commissaires du havre de Hamilton* et de la *Loi de 1911 concernant les commissaires du havre de Toronto* et les commissions portuaires constituées par la *Loi sur les commissions portuaires*, avant d'exercer une attribution visée aux alinéas 5(1)a), b) ou c) à l'égard d'un projet, veillent à ce que soit effectuée, le plus tôt possible au stade de la planification de celui-ci, avant la prise d'une décision irrévocable, une évaluation des effets environnementaux du projet

Commissions portuaires

conducted in accordance with any regulations made for that purpose under paragraph 59(k) as early as is practicable in the planning stages of the project and before irrevocable decisions are made.

Assessments by band councils under regulations

10. (1) Before a person or body receives financial assistance provided by a federal authority for the purpose of enabling a project to be carried out in whole or in part on a reserve that is set apart for the use and benefit of a band and that is subject to the *Indian Act*, the council of the band for whose use and benefit the reserve has been set apart shall ensure that an assessment of the environmental effects of the project is conducted in accordance with any regulations made for that purpose under paragraph 59(l) as early as is practicable in the planning stages of the project and before irrevocable decisions are made.

conformément aux règlements pris aux termes de l'alinéa 59k).

10. (1) Avant la réception par une personne ou un organisme, de la part d'une autorité fédérale, d'une aide financière permettant la réalisation d'un projet en tout ou en partie sur une réserve mise de côté à l'usage et au profit d'une bande et assujettie à la *Loi sur les Indiens*, le conseil de cette bande veille à ce qu'une évaluation des effets environnementaux du projet soit effectuée le plus tôt possible au stade de la planification de celui-ci, avant la prise d'une décision irrévocable, conformément aux règlements pris aux termes de l'alinéa 59l).

Conseils de bande

Assessment not required

(2) Notwithstanding paragraph 5(1)(b), an environmental assessment of a project is not required by reason only of the provision of financial assistance for the purpose mentioned in subsection (1).

(2) Par dérogation à l'alinéa 5(1)b), l'évaluation n'est pas rendue nécessaire seulement à cause de l'aide financière visée au paragraphe (1).

Évaluation non requise

Responsible Authority

Timing of assessment

11. (1) Where an environmental assessment of a project is required, the federal authority referred to in section 5 in relation to the project shall ensure that the environmental assessment is conducted as early as is practicable in the planning stages of the project and before irrevocable decisions are made, and shall be referred to in this Act as the responsible authority in relation to the project.

Autorité responsable

11. (1) Dans le cas où l'évaluation environnementale d'un projet est obligatoire, l'autorité fédérale visée à l'article 5 veille à ce que l'évaluation environnementale soit effectuée le plus tôt possible au stade de la planification du projet, avant la prise d'une décision irrévocable, et est appelée, dans la présente loi, l'autorité responsable de ce projet.

Moment de l'évaluation

No power, etc., to be exercised until assessment is complete

(2) A responsible authority shall not exercise any power or perform any duty or function referred to in section 5 in relation to a project unless it takes a course of action pursuant to paragraph 20(1)(a) or 37(1)(a).

(2) L'autorité responsable d'un projet ne peut exercer ses attributions à l'égard de celui-ci que si elle prend une décision aux termes des alinéas 20(1)a) ou 37(1)a).

Effet suspensif

More than one responsible authority

12. (1) Where there are two or more responsible authorities in relation to a project, they shall together determine the manner in which to perform their duties and functions under this Act and the regulations.

12. (1) Dans le cas où plusieurs autorités responsables sont chargées d'un même projet, elles décident conjointement de la façon de remplir les obligations qui leur incombent aux termes de la présente loi et des règlements.

Pluralité d'autorités responsables

Disagreement

(2) In the case of a disagreement, the Agency may advise responsible authorities and other federal authorities with respect to their powers, duties and functions under this Act and the manner in which those powers, duties and functions may be determined and allocated among them.

(2) En cas de différend, l'Agence peut conseiller les autorités responsables et les autres autorités fédérales sur leurs obligations communes et sur la façon de les remplir conjointement.

Différend

Participation by federal authorities

(3) Every federal authority that is in possession of specialist or expert information or knowledge with respect to a project shall, on request, make available that information or knowledge to the responsible authority or to a mediator or a review panel.

(3) Il incombe à l'autorité fédérale pourvue des connaissances voulues touchant un projet de fournir, sur demande, les renseignements pertinents à l'autorité responsable ou à un médiateur ou à une commission.

Obligation de l'autorité fédérale

Cooperation with other jurisdictions

(4) Where a screening or comprehensive study of a project is to be conducted and a jurisdiction has a responsibility or an authority to conduct an assessment of the environmental effects of the project or any part thereof, the responsible authority may cooperate with that jurisdiction respecting the environmental assessment of the project.

(4) L'autorité responsable peut, dans le cadre de l'examen préalable ou de l'étude approfondie d'un projet, coopérer avec l'instance qui offre sa collaboration pour l'évaluation environnementale de celui-ci et qui a la responsabilité ou le pouvoir d'effectuer, en tout ou en partie, l'évaluation des effets environnementaux d'un projet.

Collaboration

Definition of "jurisdiction"

(5) In this section, "jurisdiction" means

- (a) the government of a province;
- (b) an agency or a body that is established pursuant to the legislation of a province and that has powers, duties or functions in relation to an assessment of the environmental effects of a project;
- (c) a body that is established pursuant to a land claims agreement referred to in section 35 of the *Constitution Act, 1982* and that has powers, duties or functions in relation to an assessment of the environmental effects of a project; or
- (d) a governing body that is established pursuant to legislation that relates to the self-government of Indians and that has powers, duties or functions in relation to an assessment of the environmental effects of a project.

(5) Dans le présent article, « instance » s'entend :

- a) du gouvernement d'une province;
- b) d'un organisme établi sous le régime d'une loi provinciale ayant des attributions relatives à l'évaluation des effets environnementaux d'un projet;
- c) d'un organisme, constitué aux termes d'un accord sur des revendications territoriales visé à l'article 35 de la *Loi constitutionnelle de 1982*, ayant des attributions relatives à l'évaluation des effets environnementaux d'un projet;
- d) d'un organisme dirigeant, constitué par une loi relative à l'autonomie gouvernementale des Indiens, ayant des attributions relatives à l'évaluation des effets environnementaux d'un projet.

Définition d'« instance »

Action of Federal Authorities Suspended

Action suspended

13. Where a project is described in the comprehensive study list or is referred to a mediator or a review panel, notwithstanding any other Act of Parliament, no power, duty or function conferred by or under that Act or any regulation made thereunder shall be exercised or performed that would permit the

Suspension des prises de décision

13. Dans le cas où un projet appartient à une catégorie visée dans la liste d'étude approfondie, ou si un examen par une commission ou un médiateur doit être effectué, malgré toute autre loi fédérale, l'exercice d'une attribution qui est prévu par cette loi ou ses règlements pour mettre en œuvre le

Suspension de la prise de décision

project to be carried out in whole or in part unless an environmental assessment of the project has been completed and a course of action has been taken in relation to the project in accordance with paragraph 37(1)(a).

projet en tout ou en partie est subordonné à l'achèvement de l'évaluation environnementale de celui-ci et à la prise d'une décision à son égard aux termes de l'alinéa 37(1)a).

ENVIRONMENTAL ASSESSMENT PROCESS

PROCESSUS D'ÉVALUATION ENVIRONNEMENTALE

General

Dispositions générales

Environmental assessment process

14. The environmental assessment process includes, where applicable,

14. Le processus d'évaluation environnementale d'un projet comporte, selon le cas :

Processus d'évaluation environnementale

- (a) a screening or comprehensive study and the preparation of a screening report or a comprehensive study report;
- (b) a mediation or assessment by a review panel as provided in section 29 and the preparation of a report; and
- (c) the design and implementation of a follow-up program.

- a) un examen préalable ou une étude approfondie et l'établissement d'un rapport d'examen préalable ou d'un rapport d'étude approfondie;
- b) une médiation ou un examen par une commission prévu à l'article 29 et l'établissement d'un rapport;
- c) l'élaboration et l'application d'un programme de suivi.

Scope of project

15. (1) The scope of the project in relation to which an environmental assessment is to be conducted shall be determined by

15. (1) L'autorité responsable ou, dans le cas où le projet est renvoyé à la médiation ou à l'examen par une commission, le ministre, après consultation de l'autorité responsable, détermine la portée du projet à l'égard duquel l'évaluation environnementale doit être effectuée.

Détermination de la portée du projet

- (a) the responsible authority; or
- (b) where the project is referred to a mediator or a review panel, the Minister, after consulting with the responsible authority.

(2) Dans le cadre d'une évaluation environnementale de deux ou plusieurs projets, l'autorité responsable ou, si au moins un des projets est renvoyé à la médiation ou à l'examen par une commission, le ministre, après consultation de l'autorité responsable, peut décider que deux projets sont liés assez étroitement pour être considérés comme un seul projet.

Pluralité de projets

Same assessment for related projects

(2) For the purposes of conducting an environmental assessment in respect of two or more projects,

- (a) the responsible authority, or
- (b) where at least one of the projects is referred to a mediator or a review panel, the Minister, after consulting with the responsible authority,

may determine that the projects are so closely related that they can be considered to form a single project.

All proposed undertakings to be considered

(3) Where a project is in relation to a physical work, an environmental assessment shall be conducted in respect of every construction, operation, modification, decommissioning, abandonment or other undertaking in relation to that physical work that is proposed by the proponent or that is, in the opinion of

(3) Est effectuée, dans l'un ou l'autre des cas suivants, l'évaluation environnementale de toute opération — construction, exploitation, modification, désaffectation, fermeture ou autre — constituant un projet lié à un ouvrage :

Projet lié à un ouvrage

- a) l'opération est proposée par le promoteur;

- (a) the responsible authority, or
- (b) where the project is referred to a mediator or a review panel, the Minister, after consulting with the responsible authority,

likely to be carried out in relation to that physical work.

Factors to be considered

16. (1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- (b) the significance of the effects referred to in paragraph (a);
- (c) comments from the public that are received in accordance with this Act and the regulations;
- (d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and
- (e) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project, that the responsible authority or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered.

Additional factors

(2) In addition to the factors set out in subsection (1), every comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the purpose of the project;
- (b) alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;

- b) l'autorité responsable ou, dans le cadre d'une médiation ou de l'examen par une commission et après consultation de cette autorité, le ministre estime l'opération susceptible d'être réalisée en liaison avec l'ouvrage.

16. (1) L'examen préalable, l'étude approfondie, la médiation ou l'examen par une commission d'un projet portent notamment sur les éléments suivants :

- a) les effets environnementaux du projet, y compris ceux causés par les accidents ou défaillances pouvant en résulter, et les effets cumulatifs que sa réalisation, combinée à l'existence d'autres ouvrages ou à la réalisation d'autres projets ou activités, est susceptible de causer à l'environnement;
- b) l'importance des effets visés à l'alinéa a);
- c) les observations du public à cet égard, envoyées conformément à la présente loi et aux règlements;
- d) les mesures d'atténuation réalisables, sur les plans technique et économique, des effets environnementaux importants du projet;
- e) tout autre élément pertinent à l'étude approfondie, à la médiation ou à l'examen par une commission, notamment la nécessité du projet et ses solutions de rechange, — dont l'autorité responsable ou, sauf dans le cas d'un examen préalable, le ministre, après consultation de celle-ci, peut exiger la prise en compte.

Éléments à examiner

(2) L'étude approfondie d'un projet et l'évaluation environnementale qui fait l'objet d'une médiation ou d'un examen par une commission portent également sur les éléments suivants :

- a) les raisons d'être du projet;
- b) les solutions de rechange réalisables sur les plans technique et économique, et leurs effets environnementaux;
- c) la nécessité d'un programme de suivi du projet, ainsi que ses modalités;

Éléments supplémentaires

(c) the need for, and the requirements of, any follow-up program in respect of the project; and

(d) the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

d) la capacité des ressources renouvelables, risquant d'être touchées de façon importante par le projet, de répondre aux besoins du présent et à ceux des générations futures.

Determination of factors

(3) The scope of the factors to be taken into consideration pursuant to paragraphs (1)(a), (b) and (d) and (2)(b), (c) and (d) shall be determined

(a) by the responsible authority; or

(b) where a project is referred to a mediator or a review panel, by the Minister, after consulting the responsible authority, when fixing the terms of reference of the mediation or review panel.

(3) L'évaluation de la portée des éléments visés aux alinéas (1)a, b) et d) et (2)b, c) et d) incombe :

a) à l'autorité responsable;

b) au ministre, après consultation de l'autorité responsable, lors de la détermination du mandat du médiateur ou de la commission d'examen.

Obligations

Factors not included

(4) An environmental assessment of a project is not required to include a consideration of the environmental effects that could result from carrying out the project in response to a national emergency for which special temporary measures are taken under the *Emergencies Act*.

(4) L'évaluation environnementale d'un projet n'a pas à porter sur les effets environnementaux que sa réalisation peut entraîner en réaction à des situations de crise nationale pour lesquelles des mesures d'intervention sont prises aux termes de la *Loi sur les mesures d'urgence*.

Situations de crise nationale

Delegation

17. (1) A responsible authority may delegate to any person, body or jurisdiction within the meaning of subsection 12(5) any part of the screening or comprehensive study of a project or the preparation of the screening report or comprehensive study report, and may delegate any part of the design and implementation of a follow-up program, but shall not delegate the duty to take a course of action pursuant to subsection 20(1) or 37(1).

17. (1) L'autorité responsable d'un projet peut déléguer à un organisme, une personne ou une instance, au sens du paragraphe 12(5), l'exécution de l'examen préalable ou de l'étude approfondie, ainsi que les rapports correspondants, et la conception et la mise en œuvre d'un programme de suivi, à l'exclusion de toute prise de décision aux termes du paragraphe 20(1) ou 37(1).

Délégation

Idem

(2) For greater certainty, a responsible authority shall not take a course of action pursuant to subsection 20(1) or 37(1) unless it is satisfied that any duty or function delegated pursuant to subsection (1) has been carried out in accordance with this Act and the regulations.

(2) Il est entendu que l'autorité responsable qui a délégué l'exécution de l'examen ou de l'étude ainsi que l'établissement des rapports en vertu du paragraphe (1) ne peut prendre une décision aux termes du paragraphe 20(1) ou 37(1) que si elle est convaincue que les attributions déléguées ont été exercées conformément à la présente loi et à ses règlements

Précision

Screening

Screening

18. (1) Where a project is not described in the comprehensive study list or the exclusion list, the responsible authority shall ensure that

Examen préalable

18. (1) Dans le cas où le projet n'est pas visé dans une liste d'étude approfondie ou dans les listes d'exclusion, l'autorité responsable veille :

Examen préalable

- (a) a screening of the project is conducted; and
 (b) a screening report is prepared.

- a) à ce qu'en soit effectué l'examen préalable;
 b) à ce que soit établi un rapport d'examen préalable.

Source of information

(2) Any available information may be used in conducting the screening of a project, but where a responsible authority is of the opinion that the information available is not adequate to enable it to take a course of action pursuant to subsection 20(1), it shall ensure that any studies and information that it considers necessary for that purpose are undertaken or collected.

(2) Dans le cadre de l'examen préalable qu'elle effectue, l'autorité responsable peut utiliser tous les renseignements disponibles; toutefois, si elle est d'avis qu'il n'existe pas suffisamment de renseignements pour lui permettre de prendre une décision en vertu du paragraphe 20(1), elle fait procéder aux études qu'elle estime nécessaires à leur obtention.

Information

Consideration of public comments

(3) Where the responsible authority is of the opinion that public participation in the screening of a project is appropriate in the circumstances, or where required by regulation, the responsible authority shall give the public notice and an opportunity to examine and comment on the screening report and on any record that has been filed in the public registry established in respect of the project pursuant to section 55 before taking a course of action under section 20.

(3) Avant de prendre sa décision aux termes de l'article 20, l'autorité responsable, dans les cas où elle estime que la participation du public à l'examen préalable est indiquée ou dans le cas où les règlements l'exigent, avise celui-ci et lui donne la possibilité d'examiner le rapport d'examen préalable et les documents consignés au registre public établi aux termes de l'article 55 et de faire ses observations à leur égard.

Participation du public

Declaration of class screening report

19. (1) Subject to subsection (2), the Agency may, on the request of the responsible authority and where the Agency determines that a screening report could be used as a model in conducting screenings of other projects within the same class, declare that report to be a class screening report.

19. (1) Sous réserve du paragraphe (2), l'Agence, sur demande de l'autorité responsable, peut, si elle décide qu'un rapport d'examen préalable peut servir de modèle pour d'autres projets appartenant à la même catégorie, faire une déclaration à cet effet.

Déclaration

Public notice and consideration of public comments

(2) The Agency shall, before making a declaration pursuant to subsection (1),

(2) Avant de faire une déclaration, l'Agence :

Idem

(a) publish in the *Canada Gazette* a notice setting out the following information, namely,

a) publie dans la *Gazette du Canada* un avis contenant les éléments suivants :

- (i) the date on which the screening report will be available to the public,
 (ii) the place at which copies of the screening report may be obtained, and
 (iii) the deadline and address for filing comments on the appropriateness of the use of the screening report as a model in conducting screenings of other projects within the same class; and

- (i) la date à laquelle le rapport d'examen préalable sera accessible au public,
 (ii) le lieu d'obtention d'exemplaires du rapport,
 (iii) l'adresse et la date limite pour la réception par elle d'observations sur l'applicabilité du rapport comme modèle pour d'autres projets appartenant à la même catégorie;

(b) take into consideration any comments filed in respect of the screening report.

b) prend en compte les commentaires reçus sur le rapport.

Publication	(3) Any declaration made pursuant to subsection (1) shall be published in the <i>Canada Gazette</i> and the screening report to which it relates shall be made available to the public at the registry maintained by the Agency.	(3) La déclaration est publiée dans la <i>Gazette du Canada</i> et le rapport est accessible au public et consigné au registre tenu par l'Agence.	Publication
Use of class screening report	(4) Where a project or part of a project is within a class in respect of which a class screening report has been declared, the responsible authority may use or permit the use of that report and the screening on which it is based to whatever extent the responsible authority considers appropriate for the purpose of complying with section 18.	(4) Si tout ou partie d'un projet appartient à une catégorie de projets pour laquelle une déclaration a été faite aux termes du paragraphe (1), l'autorité responsable peut permettre l'utilisation de tout ou partie de l'examen préalable et du rapport correspondant dans la mesure qu'elle estime indiquée pour l'application de l'article 18.	Catégorie de projets
Necessary adjustments	(5) Where a responsible authority uses or permits the use of a class screening report, it shall ensure that any adjustments are made to the report that are necessary to take into account local circumstances and any cumulative environmental effects that may result from the project in combination with other projects or activities that have been or will be carried out.	(5) Dans les cas visés au paragraphe (4), l'autorité responsable veille à ce que soient apportées au rapport les adaptations nécessaires à la prise en compte des facteurs locaux et des effets environnementaux cumulatifs qui, selon elle, peuvent résulter de la réalisation du projet combinée à l'existence d'autres ouvrages ou à la réalisation d'autres projets ou activités.	Adaptations
Declaration to remove class screening report	(6) Where the Agency determines that a class screening report can no longer be used as a model in conducting screenings of other projects within the same class, the Agency may declare the report not to be a class screening report.	(6) L'Agence, si elle décide qu'un rapport d'examen préalable ne peut plus servir de modèle pour d'autres projets appartenant à la même catégorie, peut faire une déclaration à cet effet.	Déclaration
Publication	(7) Any declaration made pursuant to subsection (6) shall be published in the <i>Canada Gazette</i> and the screening report in respect of which it relates shall be removed from the public registry maintained by the Agency.	(7) La déclaration faite aux termes du paragraphe (6) est publiée dans la <i>Gazette du Canada</i> et le rapport qu'elle vise est retranché du registre public établi par l'Agence.	Idem
Decision of responsible authority following a screening	20. (1) The responsible authority shall take one of the following courses of action in respect of a project after taking into consideration the screening report and any comments filed pursuant to subsection 18(3): (a) subject to subparagraph (c)(iii), where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is not likely to cause significant adverse environmental effects, the responsible authority may exercise any power or perform any duty or function that would permit the project to be carried out and shall ensure that any mitigation	20. (1) L'autorité responsable prend l'une des mesures suivantes, après avoir pris en compte le rapport d'examen préalable et les observations reçues aux termes du paragraphe 18(3): a) sous réserve du sous-alinéa c)(iii), si la réalisation du projet n'est pas susceptible, compte tenu de l'application des mesures d'atténuation qu'elle estime indiquées, d'entraîner des effets environnementaux négatifs importants, exercer ses attributions afin de permettre la mise en œuvre du projet et veiller à l'application de ces mesures d'atténuation; b) si, compte tenu de l'application des mesures d'atténuation qu'elle estime indi-	Décision de l'autorité responsable

measures that the responsible authority considers appropriate are implemented;

(b) where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the responsible authority shall not exercise any power or perform any duty or function conferred on it by or under any Act of Parliament that would permit the project to be carried out in whole or in part; or

(c) where

(i) it is uncertain whether the project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, is likely to cause significant adverse environmental effects,

(ii) the project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, is likely to cause significant adverse environmental effects and paragraph (b) does not apply, or

(iii) public concerns warrant a reference to a mediator or a review panel,

the responsible authority shall refer the project to the Minister for a referral to a mediator or a review panel in accordance with section 29.

quées, la réalisation du projet est susceptible d'entraîner des effets environnementaux négatifs importants qui ne peuvent être justifiés dans les circonstances, ne pas exercer les attributions qui lui sont conférées sous le régime d'une loi fédérale et qui pourraient lui permettre la mise en œuvre du projet en tout ou en partie;

c) s'adresser au ministre pour une médiation ou un examen par une commission prévu à l'article 29 :

(i) s'il n'est pas clair, compte tenu de l'application des mesures d'atténuation qu'elle estime indiquées, que la réalisation du projet soit susceptible d'entraîner des effets environnementaux négatifs importants,

(ii) si la réalisation du projet, compte tenu de l'application de mesures d'atténuation qu'elle estime indiquées, est susceptible d'entraîner des effets environnementaux négatifs importants et si l'alinéa b) ne s'applique pas,

(iii) si les préoccupations du public le justifient.

Responsible authority to ensure implementation of mitigation measures

(2) Where a responsible authority takes a course of action referred to in paragraph (1)(a), it shall, notwithstanding any other Act of Parliament, in the exercise of its powers or the performance of its duties or functions under that other Act or any regulation made thereunder or in any other manner that the responsible authority considers necessary, ensure that any mitigation measures referred to in that paragraph in respect of the project are implemented.

All federal authorities prohibited from proceeding with project

(3) Where the responsible authority takes a course of action pursuant to paragraph (1)(b) in relation to a project,

(a) the responsible authority shall file a notice of that course of action in the public

(2) L'autorité responsable qui prend la décision visée à l'alinéa (1)a) veille, malgré toute autre disposition d'une loi fédérale, lors de l'exercice des attributions qui lui sont conférées sous le régime de cette loi ou de ses règlements ou selon les autres modalités qu'elle estime indiquées, à l'application des mesures d'atténuation visées à cet alinéa.

Application des mesures d'atténuation

(3) L'autorité responsable qui prend la décision visée à l'alinéa (1)b) à l'égard d'un projet fait consigner un avis de sa décision au registre public tenu aux termes de l'article 55 pour le projet, et, malgré toute autre disposi-

Interdiction de mise en œuvre

registry established in respect of the project pursuant to section 55; and
 (b) notwithstanding any other Act of Parliament, no power, duty or function conferred by or under that Act or any regulation made thereunder shall be exercised or performed that would permit that project to be carried out in whole or in part.

Comprehensive Study

Comprehensive study

21. Where a project is described in the comprehensive study list, the responsible authority shall

- (a) ensure that a comprehensive study is conducted, and a comprehensive study report is prepared and provided to the Minister and the Agency; or
- (b) refer the project to the Minister for a referral to a mediator or a review panel in accordance with section 29.

Public notice

22. (1) After receiving a comprehensive study report in respect of a project, the Agency shall, in any manner it considers appropriate to facilitate public access to the report, publish a notice setting out the following information:

- (a) the date on which the comprehensive study report will be available to the public;
- (b) the place at which copies of the report may be obtained; and
- (c) the deadline and address for filing comments on the conclusions and recommendations of the report.

Public concerns

(2) Prior to the deadline set out in the notice published by the Agency, any person may file comments with the Agency relating to the conclusions and recommendations and any other aspect of the comprehensive study report.

Decision of Minister

23. The Minister shall take one of the following courses of action in respect of a project after taking into consideration the comprehensive study report and any comments filed pursuant to subsection 22(2):

- (a) subject to subparagraph (b)(iii), where, taking into account the implemen-

tion d'une loi fédérale, aucune attribution conférée sous le régime de cette loi ou de ses règlements ne peut être exercée de façon qui pourrait permettre la mise en œuvre du projet en tout ou en partie.

Étude approfondie

Étude approfondie

21. Dans le cas où le projet est visé dans la liste d'étude approfondie, l'autorité responsable a le choix :

- a) de veiller à ce que soit effectuée, en conformité avec les règlements, une étude approfondie et à ce que soit présenté au ministre et à l'Agence un rapport de cette étude;
- b) de s'adresser au ministre afin qu'il fasse effectuer, aux termes de l'article 29, une médiation ou un examen par une commission.

Avis public

22. (1) Quand elle reçoit un rapport d'étude approfondie, l'Agence donne avis, de la façon qu'elle estime indiquée pour favoriser l'accès du public au rapport, des éléments suivants :

- a) la date à laquelle le rapport d'étude approfondie sera accessible au public;
- b) le lieu d'obtention d'exemplaires du rapport;
- c) l'adresse et la date limite pour la réception par celle-ci d'observations sur les conclusions et recommandations du rapport.

Observations du public

(2) Toute personne peut, dans le délai indiqué dans l'avis publié par l'Agence, lui présenter ses observations relativement aux conclusions ou recommandations issues de l'étude approfondie ou à tout autre aspect du rapport qui y fait suite.

Décision du ministre

23. Après avoir pris en compte le rapport d'étude approfondie et les observations qui ont été présentées en vertu du paragraphe 22(2), le ministre :

- a) renvoie le projet à l'autorité responsable pour une décision aux termes de l'article 37, si sous réserve du sous-alinéa b)(iii)

tation of any appropriate mitigation measures,

(i) the project is not likely to cause significant adverse environmental effects, or

(ii) the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the Minister shall refer the project back to the responsible authority for action to be taken under section 37; or

(b) where,

(i) it is uncertain whether the project, taking into account the implementation of any appropriate mitigation measures, is likely to cause significant adverse environmental effects,

(ii) the project, taking into account the implementation of any appropriate mitigation measures, is likely to cause significant adverse environmental effects and subparagraph (a)(ii) does not apply, or

(iii) public concerns warrant a reference to a mediator or a review panel,

the Minister shall refer the project to a mediator or a review panel in accordance with section 29.

Use of
previously
conducted
environmental
assessment

24. (1) Where a proponent proposes to carry out, in whole or in part, a project for which an environmental assessment was previously conducted and

(a) the project did not proceed after the assessment was completed,

(b) in the case of a project that is in relation to a physical work, the proponent proposes an undertaking in relation to that work different from that proposed when the assessment was conducted,

(c) the manner in which the project is to be carried out has subsequently changed, or

(d) the renewal of a licence, permit, approval or other action under a prescribed provision is sought,

the responsible authority may use or permit the use of that assessment and the report thereon to whatever extent it is appropriate

et compte tenu de l'application des mesures d'atténuation indiquées, la réalisation du projet, selon le cas :

(i) n'est pas susceptible d'entraîner des effets environnementaux négatifs importants,

(ii) est susceptible d'entraîner des effets environnementaux négatifs importants qui ne peuvent être justifiés dans les circonstances;

b) fait procéder à une médiation ou à un examen par une commission conformément à l'article 29 dans chacun des cas suivants :

(i) il n'est pas clair, compte tenu de l'application des mesures d'atténuation indiquées, que le projet soit susceptible d'entraîner des effets environnementaux négatifs importants,

(ii) que la réalisation du projet, compte tenu de l'application des mesures d'atténuation indiquées, est susceptible d'entraîner des effets environnementaux négatifs importants et que le sous-alinéa a)(ii) ne s'applique pas,

(iii) les préoccupations du public le justifient.

24. (1) Si un promoteur se propose de mettre en œuvre, en tout ou en partie, un projet ayant déjà fait l'objet d'une évaluation environnementale, l'autorité responsable peut utiliser ou permettre l'utilisation de l'évaluation et du rapport correspondant, dans la mesure appropriée pour l'application des articles 18 ou 21 dans chacun des cas suivants :

a) le projet n'a pas été mis en œuvre après l'achèvement de l'évaluation;

b) le projet est lié à un ouvrage à l'égard duquel le promoteur propose une réalisation différente de celle qui était proposée au moment de l'évaluation;

c) modification des modalités de mise en œuvre du projet qui ont fait l'objet de l'évaluation;

d) demande de prise d'une mesure en vertu d'une disposition prévue par règle-

Utilisation
d'une
évaluation
antérieure

for the purpose of complying with section 18 or 21.

ment, notamment le renouvellement d'un permis, d'une licence ou d'une autorisation.

Necessary adjustments

(2) Where a responsible authority uses or permits the use of an environmental assessment and the report thereon pursuant to subsection (1), the responsible authority shall ensure that any adjustments are made to the report that are necessary to take into account any significant changes in the environment and in the circumstances of the project.

(2) Dans les cas visés au paragraphe (1), l'autorité responsable veille à ce que soient apportées au rapport les adaptations nécessaires à la prise en compte des changements importants de circonstances survenus depuis l'évaluation.

Adaptations nécessaires

Discretionary Powers

Pouvoirs d'appréciation

Referral to Minister

25. Subject to paragraphs 20(1)(b) and (c), where at any time a responsible authority is of the opinion that

25. Sous réserve des alinéas 20(1)(b) et c), à tout moment, si elle estime soit que le projet, compte tenu de l'application des mesures d'atténuation qu'elle estime indiquées, peut entraîner des effets environnementaux négatifs importants, soit que les préoccupations du public justifient une médiation ou un examen par une commission, l'autorité responsable peut demander au ministre d'y faire procéder conformément à l'article 29.

Examen par une commission

(a) a project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, may cause significant adverse environmental effects, or

(b) public concerns warrant a reference to a mediator or a review panel,

the responsible authority may request the Minister to refer the project to a mediator or a review panel in accordance with section 29.

Termination by responsible authority

26. Where at any time a responsible authority decides not to exercise any power or perform any duty or function referred to in section 5 in relation to a project that has not been referred to a mediator or a review panel, it may terminate the environmental assessment of the project.

26. L'autorité responsable peut, à tout moment au cours d'une évaluation environnementale qui n'a pas fait l'objet d'une médiation ou d'un examen par une commission, mettre fin à l'évaluation si elle décide de ne pas exercer les attributions visées à l'article 5 qu'elle possède à l'égard du projet.

Arrêt d'une évaluation environnementale

Termination by Minister

27. Where at any time a responsible authority decides not to exercise any power or perform any duty or function referred to in section 5 in relation to a project that has been referred to a mediator or a review panel, the Minister may terminate the environmental assessment of the project.

27. Le ministre peut, à tout moment au cours d'une évaluation environnementale qui fait l'objet d'une médiation ou d'un examen par une commission, mettre fin à l'évaluation si l'autorité responsable décide de ne pas exercer les attributions visées à l'article 5 qu'elle possède à l'égard du projet.

Pouvoir du ministre

Referral by Minister

28. Where at any time the Minister is of the opinion that

(a) a project for which an environmental assessment may be required under section 5, taking into account the implementation of any appropriate mitigation measures,

28. À tout moment, le ministre, après avoir offert de consulter l'instance, au sens du paragraphe 12(5), responsable du lieu où le projet doit être réalisé et après consultation de l'autorité responsable, ou, à défaut, de toute autorité fédérale compétente, s'il estime soit qu'un projet assujéti à l'évalua-

Idem

may cause significant adverse environmental effects, or

(b) public concerns warrant a reference to a mediator or a review panel,

the Minister may, after offering to consult with the jurisdiction, within the meaning of subsection 12(5), where the project is to be carried out and after consulting with the responsible authority or, where there is no responsible authority in relation to the project, the appropriate federal authority, refer the project to a mediator or a review panel in accordance with section 29.

Mediation and Panel Reviews

Initial referral to mediator or review panel

29. (1) Subject to subsection (2), where a project is to be referred to a mediator or a review panel, the Minister shall

(a) refer the environmental assessment relating to the project to

(i) a mediator, or

(ii) a review panel; or

(b) refer part of the environmental assessment relating to the project to a mediator and part of that assessment to a review panel.

Condition on reference to mediator

(2) An environmental assessment or a part thereof shall not be referred to a mediator unless the interested parties have been identified and are willing to participate in the mediation.

Subsequent reference to a mediator

(3) The Minister may, at any time, refer any issue relating to an assessment by a review panel to a mediator where the Minister is of the opinion, after consulting with the review panel, that mediation is appropriate in respect of that issue.

Subsequent reference to a review panel

(4) Where at any time after an environmental assessment or part of an environmental assessment of a project has been referred to a mediator, the Minister or the mediator determines that the mediation of any issue subject to the mediation is not likely to produce a result that is satisfactory to all the participants to the mediation, the Minister shall terminate the mediation of the issue and refer the issue to a review panel.

tion environnementale aux termes de l'article 5 peut, compte tenu de l'application des mesures d'atténuation indiquées, entraîner des effets environnementaux négatifs importants, soit que les préoccupations du public le justifient, peut faire procéder à une médiation ou à un examen par une commission conformément à l'article 29.

Médiation ou examen par une commission

Décision du ministre

29. (1) Sous réserve du paragraphe (2), dans le cas où un projet doit faire l'objet d'une médiation ou d'un examen par une commission, le ministre :

a) soit renvoie l'évaluation environnementale du projet à un médiateur ou à une commission;

b) soit renvoie une partie de l'évaluation environnementale du projet à un médiateur et une partie de celle-ci à une commission.

Conditions

(2) Le ministre ne renvoie la totalité d'une évaluation environnementale ou une partie de celle-ci à un médiateur que si les parties intéressées ont été identifiées et acceptent de participer à la médiation.

Pouvoir du ministre

(3) À tout moment le ministre peut renvoyer une question relative à une évaluation environnementale soumise à l'examen par une commission à un médiateur si, après avoir consulté la commission d'examen, il estime que la médiation est indiquée relativement à cette question.

Idem

(4) Dans le cas où, à tout moment après le renvoi de l'évaluation environnementale d'un projet ou d'une partie de celle-ci à un médiateur, le ministre ou le médiateur estime que la question soumise à la médiation n'est pas susceptible d'être résolue par la médiation à la satisfaction des parties intéressées, le ministre peut mettre fin à la médiation relativement à cette question et soumettre celle-ci à l'examen par une commission.

Appointment of mediator

30. (1) Where a reference is made under subparagraph 29(1)(a)(i) in relation to a project, the Minister shall, after consulting with the responsible authority and all parties who are to participate in the mediation,

- (a) appoint as mediator any person who
- (i) is unbiased and free from any conflict of interest relative to the project and who has knowledge or experience in acting as a mediator, and
 - (ii) may have been selected from a roster established pursuant to subsection (2); and
- (b) fix the terms of reference of the mediation.

Establishment of roster

(2) The Minister may establish a roster of persons to act as mediators to be appointed pursuant to paragraph (1)(a).

Additional participants

31. The mediator may, at any time, allow an additional interested party to participate in a mediation.

Mediation report

32. (1) A mediator shall, at the conclusion of the mediation, prepare and submit a report to the Minister and to the responsible authority.

Privilege

(2) No evidence of or relating to a statement made by a mediator or a participant to the mediation during the course of and for the purposes of the mediation is admissible without the consent of the mediator or participant, in any proceeding before a review panel, court, tribunal, body or person with jurisdiction to compel the production of evidence.

Appointment of review panel

33. (1) Where a project is referred to a review panel, the Minister shall, in consultation with the responsible authority,

- (a) appoint as members of the panel, including the chairperson thereof, persons who
- (i) are unbiased and free from any conflict of interest relative to the project and who have knowledge or experience relevant to the anticipated environmental effects of the project, and

30. (1) S'il effectue le renvoi au médiateur visé à l'alinéa 29(1)a), le ministre, après consultation de l'autorité responsable et des parties qui doivent participer à la médiation :

- a) nomme médiateur une personne :
- (i) impartiale, non en conflit d'intérêts avec le projet et pourvue des connaissances ou de l'expérience voulues pour agir comme médiateur,
 - (ii) qui peut avoir été choisie sur la liste établie en vertu du paragraphe (2);
- b) fixe son mandat.

Nomination du médiateur

(2) Le ministre peut établir une liste de personnes qui peuvent être nommées médiateurs aux termes de l'alinéa (1)a).

Liste

31. Le médiateur peut, à tout moment, permettre à une partie intéressée supplémentaire de participer à la médiation.

Parties

32. (1) Dès l'achèvement de la médiation, le médiateur présente un rapport au ministre et à l'autorité responsable.

Rapport du médiateur

(2) Sauf consentement du médiateur ou d'un participant à la médiation, les déclarations faites par l'un ou l'autre de ceux-ci dans le cadre de la médiation ne sont pas admissibles en preuve devant un organisme ou une personne habilités à contraindre des personnes à déposer en justice, notamment une commission ou un tribunal.

Inadmissibilité en preuve des déclarations

33. (1) Le ministre, en consultation avec l'autorité responsable, nomme les membres, y compris le président, de la commission d'évaluation environnementale et fixe le mandat de celle-ci. À cette fin, le ministre choisit des personnes :

Commission

- a) impartiales, non en conflit d'intérêts avec le projet et pourvues des connaissances ou de l'expérience voulues touchant les effets environnementaux prévisibles du projet;
- b) qui peuvent avoir été choisies sur la liste établie en vertu du paragraphe (2).

	(ii) may have been selected from a roster established pursuant to subsection (2); and		
	(b) fix the terms of reference of the panel.		
Establishment of roster	(2) The Minister may establish a roster of persons, to act as members of any review panel to be established pursuant to paragraph (1)(a).	(2) Le gouverneur en conseil peut établir une liste de personnes qui peuvent être nommées membres d'une commission aux termes de l'alinéa (1)a).	Liste
Assessment by review panel	34. A review panel shall, in accordance with any regulations made for that purpose and with its term of reference, (a) ensure that the information required for an assessment by a review panel is obtained and made available to the public; (b) hold hearings in a manner that offers the public an opportunity to participate in the assessment; (c) prepare a report setting out (i) the rationale, conclusions and recommendations of the panel relating to the environmental assessment of the project, including any mitigation measures and follow-up program, and (ii) a summary of any comments received from the public; and (d) submit the report to the Minister and the responsible authority.	34. La commission, conformément à son mandat et aux règlements pris à cette fin : a) veille à l'obtention des renseignements nécessaires à l'évaluation environnementale d'un projet et veille à ce que le public y ait accès; b) tient des audiences de façon à donner au public la possibilité de participer à l'évaluation environnementale du projet; c) établit un rapport assorti de sa justification, de ses conclusions et recommandations relativement à l'évaluation environnementale du projet, notamment aux mesures d'atténuation et au programme de suivi, et énonçant, sous la forme d'un résumé, les observations reçues du public; d) présente son rapport au ministre et à l'autorité responsable.	Commission d'évaluation environnementale
Powers of review panel	35. (1) A review panel has the power of summoning any person to appear as a witness before the panel and of ordering the witness to (a) give evidence, orally or in writing; and (b) produce such documents and things as the panel considers necessary for conducting its assessment of the project.	35. (1) La commission a le pouvoir d'assigner devant elle des témoins et de leur ordonner de : a) déposer oralement ou par écrit; b) produire les documents et autres pièces qu'elle juge nécessaires en vue de procéder à l'examen dont elle est chargée.	Pouvoirs de la commission
Enforcement powers	(2) A review panel has the same power to enforce the attendance of witnesses and to compel them to give evidence and produce documents and other things as is vested in a court of record.	(2) La commission a, pour contraindre les témoins à comparaître, à déposer et à produire des pièces, les pouvoirs d'une cour d'archives.	Pouvoirs de contrainte
Hearings to be public	(3) A hearing by a review panel shall be public unless the panel is satisfied after representations made by a witness that specific, direct and substantial harm would be caused to the witness by the disclosure of the evidence, documents or other things that the	(3) Les audiences de la commission sont publiques sauf si elle décide, à la suite d'observations faites par le témoin, que la communication des éléments de preuve, documents ou objets qu'il est tenu de présenter au titre du présent article lui causerait directement un préjudice réel et sérieux.	Audiences publiques

witness is ordered to give or produce pursuant to subsection (1).

Non-disclosure

(4) Where a review panel is satisfied that the disclosure of evidence, documents or other things would cause specific, direct and substantial harm to a witness, the evidence, documents or things are privileged and shall not, without the authorization of the witness, knowingly be or be permitted to be communicated, disclosed or made available by any person who has obtained the evidence, documents or other things pursuant to this Act.

(4) Si la commission conclut que la communication d'éléments de preuve, de documents ou d'objets causerait directement un préjudice réel et sérieux au témoin, ces éléments de preuve, documents ou objets sont protégés; la personne qui les a obtenus en vertu de la présente loi ne peut sciemment les communiquer ou permettre qu'ils le soient sans l'autorisation du témoin.

Non-communication

Enforcement of summonses and orders

(5) Any summons issued or order made by a review panel pursuant to subsection (1) shall, for the purposes of enforcement, be made a summons or order of the Federal Court by following the usual practice and procedure.

(5) Aux fins de leur exécution, les assignations faites et ordonnances rendues aux termes du paragraphe (1) sont, selon la procédure habituelle, assimilées aux assignations ou ordonnances de la Cour fédérale.

Exécution des assignations et ordonnances

Immunity

(6) No action or other proceeding lies or shall be commenced against a member of a review panel for or in respect of anything done or omitted to be done, during the course of and for the purposes of the assessment by the review panel.

(6) Les membres d'une commission d'examen sont soustraits aux poursuites et autres procédures pour les faits — actes ou omissions — censés accomplis dans le cadre d'un examen par la commission.

Immunité

Public notice

36. On receiving a report submitted by a mediator or a review panel, the Minister shall make the report available to the public in any manner the Minister considers appropriate to facilitate public access to the report, and shall advise the public that the report is available.

36. Sur réception du rapport du médiateur ou de la commission d'évaluation environnementale, le ministre en donne avis public et en favorise l'accès par le public de la manière qu'il estime indiquée.

Publication

*Decision of Responsible Authority**Décision de l'autorité responsable*

Decision of responsible authority

37. (1) The responsible authority shall take one of the following courses of action in respect of a project after taking into consideration the report submitted by a mediator or a review panel or, in the case of a project referred back to the responsible authority pursuant to paragraph 23(a), the comprehensive study report:

37. (1) L'autorité responsable, après avoir pris en compte le rapport du médiateur ou de la commission ou si le ministre, à la suite d'une étude approfondie, lui demande de prendre une décision aux termes de l'alinéa 23a), prend l'une des décisions suivantes :

Autorité responsable

(a) where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate,

a) si, compte tenu de l'application des mesures d'atténuation qu'elle estime indiquées, la réalisation du projet n'est pas susceptible d'entraîner des effets environnementaux négatifs importants ou est susceptible d'entraîner des effets environnementaux qui sont justifiables dans les circonstances, exercer ses attributions afin de permettre la mise en œuvre du projet et

(i) the project is not likely to cause significant adverse environmental effects, or

(ii) the project is likely to cause significant adverse environmental effects that can be justified in the circumstances,

the responsible authority may exercise any power or perform any duty or function that would permit the project to be carried out in whole or in part and shall ensure that those mitigation measures are implemented; or

(b) where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the responsible authority shall not exercise any power or perform any duty or function conferred on it by or under any Act of Parliament that would permit the project to be carried out in whole or in part.

Responsible authority to ensure implementation of mitigation measures

(2) Where a responsible authority takes a course of action referred to in paragraph (1)(a), it shall, notwithstanding any other Act of Parliament, in the exercise of its powers or the performance of its duties or functions under that other Act or any regulation made thereunder or in any other manner that the responsible authority considers necessary, ensure that any mitigation measures referred to in that paragraph in respect of the project are implemented.

All federal authorities prohibited from proceeding with project

(3) Where the responsible authority takes a course of action referred to in paragraph (1)(b) in relation to a project,

(a) the responsible authority shall file a notice of that course of action in the public registry established in respect of the project pursuant to section 55; and

(b) notwithstanding any other Act of Parliament, no power, duty or function conferred by or under that Act or any regulation made thereunder shall be exercised or performed that would permit that project to be carried out in whole or in part.

Follow-up Program

Design and implementation

38. (1) Where a responsible authority takes a course of action pursuant to paragraph 20(1)(a) or 37(1)(a), it shall, in accordance with any regulations made for

veiller à l'application de ces mesures d'atténuation;

b) si, compte tenu de l'application des mesures d'atténuation qu'elle estime indiquées, la réalisation du projet est susceptible d'entraîner des effets environnementaux qui ne sont pas justifiables dans les circonstances, ne pas exercer les attributions qui lui sont conférées sous le régime d'une loi fédérale et qui pourraient permettre la mise en œuvre du projet en tout ou en partie.

Précision

(2) L'autorité responsable qui prend la décision visée à l'alinéa (1)a) veille, malgré toute autre disposition d'une loi fédérale, lors de l'exercice des attributions qui lui sont conférées sous le régime de cette loi ou de ses règlements ou selon les autres modalités qu'elle estime indiquées, à l'application des mesures d'atténuation visées à cet alinéa.

Interdiction de mise en œuvre

(3) L'autorité responsable qui prend la décision visée à l'alinéa (1)b) à l'égard d'un projet fait consigner un avis de sa décision au registre public tenu aux termes de l'article 55 pour le projet, et, malgré toute autre disposition d'une loi fédérale, aucune attribution conférée sous le régime de cette loi ou de ses règlements ne peut être exercée de façon qui pourrait permettre la mise en œuvre du projet en tout ou en partie.

Programme de suivi

Suivi

38. (1) L'autorité responsable qui décide de la mise en œuvre conformément aux alinéas 20(1)a) ou 37(1)a) élabore, conformément aux règlements pris à cette fin, tout

that purpose, design any follow-up program that it considers appropriate for the project and arrange for the implementation of that program.

Public notice

(2) A responsible authority referred to in subsection (1) shall, in accordance with any regulations made for that purpose, advise the public of

- (a) its course of action in relation to the project;
- (b) any mitigation measures to be implemented with respect to the adverse environmental effects of the project;
- (c) the extent to which the recommendations set out in any report submitted by a mediator or a review panel have been adopted and the reasons for not having adopted any of those recommendations;
- (d) any follow-up program designed for the project pursuant to subsection (1); and
- (e) any results of any follow-up program.

Certificate

Certificate

39. A certificate that states that an environmental assessment of a project has been completed, and that is signed by a responsible authority that exercises a power or performs a duty or function referred to in paragraph 5(1)(c) in relation to the project, is, in the absence of evidence to the contrary, proof of the matter stated.

Joint Review Panels

Definition of "jurisdiction"

40. (1) For the purposes of this section and sections 41 and 42, "jurisdiction" includes

- (a) a federal authority;
- (b) the government of a province;
- (c) any other agency or body established pursuant to an Act of Parliament or the legislature of a province and having powers, duties or functions in relation to an assessment of the environmental effects of a project;
- (d) any body established pursuant to a land claims agreement referred to in section 35 of the *Constitution Act, 1982* and having powers, duties or functions in rela-

programme de suivi qu'elle estime indiqué et veille à son application.

(2) L'autorité responsable visée au paragraphe (1) porte à la connaissance du public, conformément aux règlements pris à cette fin, les renseignements suivants :

- a) sa décision relativement au projet;
- b) les mesures d'atténuation des effets environnementaux négatifs, s'il y a lieu;
- c) si une médiation ou un examen par une commission a eu lieu, la suite qu'elle entend donner aux recommandations issues des rapports de médiation ou d'examen par une commission et les motifs du rejet d'une recommandation;
- d) le programme de suivi élaboré en application du paragraphe (1);
- e) les résultats du programme de suivi.

Renseignements

Certificat

39. Le certificat signé par l'autorité responsable qui exerce une attribution visée à l'alinéa 5(1)c) et où il est déclaré qu'une évaluation environnementale a été effectuée fait foi, sauf preuve contraire, de son contenu.

Certificat d'évaluation environnementale

Examen conjoint

40. (1) Pour l'application du présent article et des articles 41 et 42, « instance » s'entend notamment :

- a) d'une autorité fédérale;
- b) du gouvernement d'une province;
- c) de tout autre organisme établi sous le régime d'une loi provinciale ou fédérale ayant des attributions relatives à l'évaluation des effets environnementaux d'un projet;
- d) de tout organisme, constitué aux termes d'un accord sur des revendications territoriales visé à l'article 35 de la *Loi constitutionnelle de 1982*, ayant des attributions relatives à l'évaluation des effets environnementaux d'un projet;

Définition d'« instance »

tion to an assessment of the environmental effects of a project;

(e) a government of a foreign state or of a subdivision of a foreign state, or any institution of such a government; and

(f) an international organization of states or any institution of such an organization.

Review panels established jointly with another jurisdiction

(2) Subject to section 41, where the referral of a project to a review panel is required or permitted by this Act and a jurisdiction referred to in paragraph (1)(a), (b), (c) or (d) has a responsibility or an authority to conduct an assessment of the environmental effects of the project or any part of it, the Minister

(a) may enter into an agreement or arrangement with that jurisdiction respecting the joint establishment of a review panel and the manner in which an assessment of the environmental effects of the project is to be conducted by the review panel; and

(b) shall, in the case of a jurisdiction within the meaning of subsection 12(5), offer to consult and cooperate with that other jurisdiction respecting the assessment of the environmental effects of the project.

Idem

(3) Subject to section 41, where the referral of a project to a review panel is required or permitted by this Act and a jurisdiction referred to in paragraph (1)(e) or (f) has a responsibility or an authority to conduct an assessment of the environmental effects of the project or any part of it, the Minister and the Secretary of State for External Affairs may enter into an agreement or arrangement with that jurisdiction respecting the joint establishment of a review panel and the manner in which an assessment of the environmental effects of the project is to be conducted by the review panel.

Publication of agreement for joint panel

(4) Any agreement or arrangement referred to in subsection (2) or (3) shall be published before the commencement of the hearings conducted by the review panel.

Conditions

41. An agreement or arrangement entered into pursuant to subsection 40(2) or (3) shall provide that the assessment of the environ-

e) du gouvernement d'un État étranger, d'une subdivision politique d'un État étranger ou de l'un de leurs organismes;

f) d'une organisation internationale d'États ou de l'un de ses organismes.

Examen conjoint

(2) Sous réserve de l'article 41, dans le cas où il estime qu'un examen par une commission est nécessaire ou possible et où une instance visée à l'un des alinéas (1)a), b), c) ou d) a la responsabilité ou le pouvoir d'entreprendre l'évaluation des effets environnementaux de tout ou partie du projet, le ministre :

a) peut conclure un accord avec l'instance visée pour l'organisation d'un examen conjointement avec celle-ci et pour déterminer les modalités d'examen des effets environnementaux du projet par la commission;

b) est tenu, dans le cas d'une instance, au sens du paragraphe 12(5), d'offrir de consulter et de coopérer avec celle-ci à l'égard de l'évaluation des effets environnementaux du projet.

Idem

(3) Sous réserve de l'article 41, dans le cas où ils estiment qu'un examen par une commission est nécessaire ou possible et où une instance visée à l'alinéa (1)e) ou f) a la responsabilité ou le pouvoir d'entreprendre l'évaluation des effets environnementaux de tout ou partie du projet, le ministre et le secrétaire d'État aux Affaires extérieures peuvent conclure un accord avec l'instance visée pour l'organisation d'un examen conjointement avec celle-ci et pour déterminer les modalités d'examen des effets environnementaux du projet par la commission.

Publicité

(4) Les accords visés au paragraphe (2) ou (3) sont publiés avant le début des audiences de la commission conjointe.

Conditions de l'examen conjoint

41. Tout accord conclu aux termes des paragraphes 40(2) ou (3) contient une disposition à l'effet que l'évaluation des effets

mental effects of the project shall include a consideration of the factors required to be considered under subsections 16(1) and (2) and be conducted in accordance with any additional requirements and procedures set out in the agreement and shall provide that

(a) the Minister shall appoint or approve the appointment of the chairperson or appoint a co-chairperson, and shall appoint at least one other member of the panel;

(b) the members of the panel are to be unbiased and free from any conflict of interest relative to the project and are to have knowledge or experience relevant to the anticipated environmental effects of the project;

(c) the Minister shall fix or approve the terms of reference for the panel;

(d) the review panel is to have the powers provided for in section 35;

(e) the public will be given an opportunity to participate in the assessment conducted by the panel;

(f) on completion of the assessment, the report of the panel will be submitted to the Minister; and

(g) the panel's report will be published.

environnementaux du projet prend en compte les éléments prévus aux paragraphes 16(1) et (2) et est effectuée conformément aux exigences et modalités supplémentaires qui y sont contenues ainsi que les conditions suivantes :

a) le ministre nomme le président, ou approuve sa nomination, ou nomme le coprésident et nomme au moins un autre membre de la commission;

b) les membres de la commission sont impartiaux, non en conflit d'intérêts avec le projet et pourvus des connaissances et de l'expérience voulues touchant les effets environnementaux prévus du projet;

c) le ministre fixe ou approuve le mandat de la commission;

d) les pouvoirs prévus à l'article 35 sont conférés à la commission;

e) le public aura la possibilité de participer à l'examen;

f) dès l'achèvement de l'examen, la commission lui présentera un rapport;

g) le rapport sera publié.

Deemed
substitution

42. Where the Minister establishes a review panel jointly with a jurisdiction referred to in subsection 40(1), the assessment conducted by that panel shall be deemed to satisfy any requirements of this Act and the regulations respecting assessments by a review panel.

Public Hearing by a Federal Authority

Substitute for
review panel

43. (1) Where the referral of a project to a review panel is required or permitted by this Act and the Minister is of the opinion that a process for assessing the environmental effects of projects that is followed by a federal authority under an Act of Parliament other than this Act or by a body referred to in paragraph 40(1)(d) would be an appropriate substitute, the Minister may approve the substitution of that process for an environmental assessment by a review panel under this Act.

42. Dans le cas où le ministre organise un examen conjointement avec une instance visée au paragraphe 40(1), l'examen est réputé satisfaire aux exigences de la présente loi et des règlements en matière d'évaluation environnementale effectuée par une commission.

Examen réputé
conforme

Audience publique par une autorité fédérale

Substitution

43. (1) Dans le cas où la présente loi lui permet de demander un examen par une commission ou l'y oblige, et s'il estime que le processus d'évaluation des effets environnementaux suivi par une autorité fédérale sous le régime d'une autre loi fédérale ou par un organisme visé à l'alinéa 40(1)d) serait indiqué dans les circonstances, le ministre peut autoriser la substitution.

Manner of approval

(2) An approval of the Minister pursuant to subsection (1) shall be in writing and may be given in respect of a project or a class of projects.

(2) L'autorisation du ministre est donnée par écrit et peut viser un projet ou une catégorie de projets.

Modalités

Conditions

44. The Minister shall not approve a substitution pursuant to subsection 43(1) unless the Minister is satisfied that

44. Le ministre ne peut autoriser la substitution que s'il est convaincu que les conditions suivantes sont réunies :

Conditions

(a) the process to be substituted will include a consideration of the factors required to be considered under subsections 16(1) and (2);

a) l'évaluation à effectuer portera entre autres sur les éléments dont la prise en compte est exigée en vertu des paragraphes 16(1) et (2);

(b) the public will be given an opportunity to participate in the assessment;

b) le public aura la possibilité de participer au processus d'évaluation;

(c) at the end of the assessment, a report will be submitted to the Minister;

c) dès l'achèvement de l'évaluation, un rapport lui sera présenté;

(d) the report will be published; and

d) le rapport sera publié;

(e) any criteria established pursuant to paragraph 58(1)(g) are met.

e) il a été satisfait aux critères fixés aux termes de l'alinéa 58(1)g).

Deemed substitution

45. Where the Minister approves a substitution of a process pursuant to subsection 43(1), an assessment that is conducted in accordance with that process shall be deemed to satisfy any requirements of this Act and the regulations in respect of assessments by a review panel.

45. L'évaluation autorisée en application du paragraphe 43(1) est réputée satisfaire aux exigences de la présente loi et des règlements en matière d'évaluation environnementale effectuée par une commission.

Évaluation réputée conforme

TRANSBOUNDARY AND RELATED ENVIRONMENTAL EFFECTS

EFFETS HORS FRONTIÈRES ET EFFETS ENVIRONNEMENTAUX CONNEXES

Transboundary and related environmental effects

46. (1) Where no power, duty or function referred to in section 5 or conferred by or under any other Act of Parliament or regulation is to be exercised or performed by a federal authority in relation to a project that is to be carried out in a province and the Minister is of the opinion that the project may cause significant adverse environmental effects in another province, the Minister may refer the project to a mediator or a review panel in accordance with section 29 for an assessment of the environmental effects of the project in that other province.

46. (1) Le ministre peut, conformément à l'article 29, renvoyer à un médiateur ou à une commission l'examen des effets environnementaux d'un projet à l'égard duquel aucune des attributions visées à l'article 5 ou conférées sous le régime d'une autre loi fédérale ou d'un règlement ne doit être exercée par une autorité fédérale, s'il estime que le projet doit être mis en œuvre dans une province et peut causer des effets environnementaux négatifs importants dans une autre province.

Effets interprovinciaux

Agreement

(2) The Minister shall not refer a project to a mediator or a review panel pursuant to subsection (1) where the Minister and the governments of all interested provinces have agreed on another manner of conducting an assessment of the interprovincial environmental effects of the project that

(2) Le ministre ne peut effectuer le renvoi prévu au paragraphe (1) que si lui-même et les gouvernements des provinces concernées ne peuvent s'entendre sur des modalités de rechange de l'évaluation des effets environnementaux interprovinciaux du projet qui réunissent les conditions suivantes :

Entente interprovinciale

(a) includes a consideration of the factors required to be considered under subsections 16(1) and (2);

(b) includes an opportunity for the public to participate in the assessment;

(c) includes a requirement that the report is to be submitted to the Minister at the end of the assessment;

(d) includes a requirement that the report is to be published; and

(e) meets any criteria established pursuant to paragraph 58(1)(h).

a) l'évaluation porte sur les éléments dont la prise en compte est exigée en vertu des paragraphes 16(1) et (2);

b) le public a la possibilité de participer au processus d'évaluation;

c) dès l'achèvement de l'évaluation, un rapport lui sera présenté;

d) le rapport sera publié;

e) l'évaluation satisfait aux critères établis aux termes de l'alinéa 58(1)h).

Initiative for reference

(3) The Minister shall consider whether to make a reference pursuant to subsection (1)

(a) on the request of the government of any interested province; or

(b) on the receipt of a petition that is

(i) signed by one or more persons each of whom has an interest in lands on which the project may cause significant adverse environmental effects, and

(ii) accompanied by a concise statement of the evidence supporting the contention of the petitioners that the project may cause significant adverse environmental effects in a province other than the one in which it is to be carried out.

(3) Le ministre est tenu d'examiner la possibilité d'effectuer le renvoi prévu au paragraphe (1) :

a) à la demande du gouvernement d'une province concernée;

b) sur réception d'une pétition signée par une ou plusieurs personnes qui ont chacune des droits sur des terres sur lesquelles le projet peut entraîner des effets environnementaux négatifs importants et accompagnée d'un bref exposé alléguant que la mise en œuvre du projet dans une province peut causer de tels effets dans une autre province.

Initiative

Notice

(4) At least ten days before referring a project to a mediator or a review panel pursuant to subsection (1), the Minister shall give notice of the intention to do so to the proponent of the project, to the governments of all interested provinces and to any person who signed a petition considered by the Minister pursuant to subsection (3).

(4) Avant d'effectuer le renvoi prévu au paragraphe (1), le ministre en donne un préavis d'au moins dix jours au promoteur du projet, à tous les gouvernements des provinces concernées et aux signataires de la pétition reçue aux termes du paragraphe (3).

Avis

Meaning of "interested province"

(5) For the purposes of this section and sections 47, 48, 50 and 51, "interested province" means

(a) a province in which the project is to be carried out; or

(b) a province that claims that significant adverse environmental effects may occur in that province as a result of the project.

(5) Pour l'application du présent article et des articles 47, 48, 50 et 51, « province concernée » s'entend de la province où est mis en œuvre le projet et de celle qui prétend que le projet peut entraîner des effets environnementaux négatifs importants sur son territoire.

Définition de « province concernée »

International environmental effects

47. (1) Where no power, duty or function referred to in section 5 or conferred by or under any other Act of Parliament or regulation is to be exercised or performed by a federal authority in relation to a project that

47. (1) Dans le cas où aucune des attributions visées à l'article 5 ou conférées sous le régime d'une autre loi fédérale ou d'un règlement ne doit être exercée par une autorité fédérale à l'égard d'un projet devant être mis

Effets internationaux

is to be carried out in Canada or on federal lands and the Minister is of the opinion that the project may cause significant adverse environmental effects occurring both outside Canada and outside those federal lands, the Minister and the Secretary of State for External Affairs may refer the project to a mediator or a review panel in accordance with section 29 for an assessment of the environmental effects of the project occurring both outside Canada and outside federal lands.

en œuvre au Canada ou sur le territoire domanial et où le ministre est d'avis que le projet peut entraîner des effets environnementaux négatifs importants à la fois à l'étranger et hors du territoire domanial, le ministre et le secrétaire d'État aux Affaires extérieures peuvent, conformément à l'article 29, renvoyer à un médiateur ou à une commission l'évaluation des effets environnementaux internationaux.

Agreement

(2) The Minister and the Secretary of State for External Affairs shall not refer a project to a mediator or a review panel pursuant to subsection (1) where the Minister and the governments of all interested provinces have agreed on another manner of conducting an assessment of the environmental effects of the project occurring both outside Canada and outside federal lands that

- (a) includes a consideration of the factors required to be considered under subsections 16(1) and (2);
- (b) includes an opportunity for the public to participate in the assessment;
- (c) includes a requirement that the report is to be submitted to the Minister at the end of the assessment;
- (d) includes a requirement that the report is to be published; and
- (e) meets any criteria established pursuant to paragraph 58(1)(h).

(2) Le ministre et le secrétaire d'État aux Affaires extérieures ne peuvent effectuer le renvoi prévu au paragraphe (1) que si le ministre et les gouvernements des provinces concernées ne peuvent s'entendre sur des modalités de rechange de l'évaluation des effets environnementaux du projet qui surviennent à la fois à l'étranger et hors du territoire domanial et que si ces modalités de rechange réunissent les conditions suivantes :

- a) elles portent sur les éléments dont la prise en compte est exigée en vertu des paragraphes 16(1) et (2);
- b) le public a la possibilité de participer au processus d'évaluation;
- c) dès son achèvement, un rapport sera présenté au ministre;
- d) le rapport sera publié;
- e) elles satisfont aux critères fixés aux termes de l'alinéa 58(1)h).

Défaut d'entente

Initiative for reference

(3) On a request to the Minister to refer a project to a mediator or a review panel pursuant to subsection (1) made by

- (a) the government of any province in which the project is to be carried out or that is adjacent to federal lands on which the project is to be carried out, or
- (b) the government of a foreign state or a subdivision thereof that claims that significant adverse environmental effects may occur in that foreign state or subdivision thereof as a result of the project,

the Minister and the Secretary of State for External Affairs shall consider whether to make a reference pursuant to subsection (1).

(3) Le ministre et le secrétaire d'État aux Affaires extérieures sont tenus d'examiner la possibilité d'effectuer le renvoi prévu au paragraphe (1) sur réception par le ministre d'une demande présentée soit par le gouvernement d'une province où doit être mis en œuvre le projet ou dont le territoire est contigu au territoire domanial sur lequel le projet doit être mis en œuvre, soit par le gouvernement d'un État étranger ou d'une subdivision politique d'un État étranger qui allègue que le projet peut entraîner des effets environnementaux négatifs importants sur son territoire.

Demande

Notice

(4) At least ten days before making a reference pursuant to subsection (1), the Minister shall give notice of the intention to do so to

- (a) the proponent of the project;
- (b) the government of any province in which the project is to be carried out or that is adjacent to federal lands on which the project is to be carried out; and
- (c) the government of any foreign state or a subdivision thereof in which, in the opinion of the Minister, significant adverse environmental effects may occur as a result of the project.

Environmental effects on lands of federal interest

48. (1) Where no power, duty or function referred to in section 5 or conferred by or under any other Act of Parliament or regulation is to be exercised or performed by a federal authority in relation to a project that is to be carried out in Canada and the Minister is of the opinion that the project may cause significant adverse environmental effects on

- (a) lands in a reserve that is set apart for the use and benefit of a band and that is subject to the *Indian Act*,
- (b) federal lands other than those mentioned in paragraph (a),
- (c) lands that are described in a land claims agreement referred to in section 35 of the *Constitution Act, 1982* and that are prescribed,
- (d) lands that have been set aside for the use and benefit of Indians pursuant to legislation that relates to the self-government of Indians and that are prescribed, or
- (e) lands in respect of which Indians have interests,

the Minister may refer the project to a mediator or a review panel in accordance with section 29 for an assessment of the environmental effects of the project on those lands.

Idem

(2) Where no power, duty or function referred to in section 5 or conferred by or under any other Act of Parliament or regulation is to be exercised or performed by a

(4) Avant d'effectuer le renvoi prévu au paragraphe (1), le ministre en donne un préavis d'au moins dix jours :

- a) au promoteur du projet;
- b) au gouvernement de la province où est mis en œuvre le projet ou dont le territoire est contigu au territoire domanial sur lequel le projet est mis en œuvre;
- c) au gouvernement de l'État étranger à l'égard duquel, ou à la subdivision politique du gouvernement d'un État étranger à l'égard de laquelle, selon le ministre, le projet peut entraîner des effets environnementaux négatifs importants sur son territoire.

Préavis

48. (1) Le ministre peut renvoyer à un médiateur ou à une commission l'examen des effets environnementaux d'un projet à l'égard duquel aucune attribution visée à l'article 5 ou conférée sous le régime d'une autre loi fédérale ou d'un règlement ne doit être exercée par une autorité fédérale, si le projet doit être mis en œuvre au Canada et, à son avis, est susceptible d'entraîner des effets environnementaux négatifs importants sur :

- a) des terres d'une réserve mise de côté à l'usage et au profit d'une bande et assujettie à la *Loi sur les Indiens*;
- b) le territoire domanial, à l'exception des terres visées à l'alinéa a);
- c) des terres visées dans un accord de revendications territoriales visé à l'article 35 de la *Loi constitutionnelle de 1982* et désignées par règlement;
- d) des terres, désignées par règlement, mises de côté à l'usage et au profit des Indiens conformément à une loi relative à l'autonomie gouvernementale des Indiens;
- e) des terres sur lesquelles les Indiens ont des droits.

Territoire domanial et autre

(2) S'il est d'avis qu'un projet, à l'égard duquel aucune attribution visée à l'article 5 ou conférée sous le régime d'une autre loi fédérale ou d'un règlement ne doit être exer-

Effets sur les terres d'une réserve et autres

federal authority in relation to a project that is to be carried out on

(a) lands in a reserve that is set apart for the use and benefit of a band and that is subject to the *Indian Act*,

(b) lands that are described in a land claims agreement referred to in section 35 of the *Constitution Act, 1982* and that are prescribed, or

(c) lands that have been set aside for the use and benefit of Indians pursuant to legislation that relates to the self-government of Indians and that are prescribed,

and the Minister is of the opinion that the project may cause significant adverse environmental effects outside those lands, the Minister may refer the project to a mediator or a review panel in accordance with section 29 for an assessment of the environmental effects of the project outside those lands.

Agreement

(3) The Minister shall not refer a project to a mediator or a review panel pursuant to subsection (1) or (2) where the Minister and the governments of all interested provinces, and

(a) in respect of federal lands referred to in paragraph (1)(b), the federal authority having the administration of those lands,

(b) in respect of lands referred to in paragraph (1)(a) or (2)(a), the council of the band for whose use and benefit the reserve has been set apart,

(c) in respect of lands referred to in paragraph (1)(c) or (e) or (2)(b), the party to the agreement or claim representing the aboriginal people or that party's successor, or

(d) in respect of lands that have been set aside for the use and benefit of Indians pursuant to legislation referred to in paragraph (1)(d) or (2)(c), the governing body established by that legislation,

have agreed on another manner of conducting an assessment of the environmental effects of the project on or outside those lands, as the case may be.

Initiative for reference

(4) The Minister shall consider whether to make a reference pursuant to subsection (1) or (2)

cée par une autorité fédérale, qui doit être mis en œuvre sur les terres énumérées ci-après est susceptible d'entraîner des effets environnementaux négatifs importants à l'extérieur de ces terres, le ministre peut, conformément à l'article 29, renvoyer à un médiateur ou à une commission l'examen de ces effets :

a) terres d'une réserve mise de côté à l'usage et au profit d'une bande et assujettie à la *Loi sur les Indiens*;

b) terres visées dans un accord de revendications territoriales visé à l'article 35 de la *Loi constitutionnelle de 1982* et désignées par règlement;

c) terres, désignées par règlement, qui ont été mises de côté à l'usage et au profit des Indiens conformément à une loi relative à l'autonomie gouvernementale des Indiens.

(3) Le ministre ne peut effectuer le renvoi prévu aux paragraphes (1) ou (2) que si lui-même et les gouvernements des provinces concernées ainsi que les organismes énumérés ci-après ne peuvent s'entendre sur les modalités de rechange de l'évaluation des effets environnementaux négatifs importants du projet sur ces terres ou à l'extérieur de celles-ci :

a) à l'égard du territoire domanial visé à l'alinéa (1)b), l'autorité fédérale qui est chargée de sa gestion;

b) à l'égard des terres visées aux alinéas (1)a) ou (2)a), le conseil de la bande à l'usage et au profit de laquelle la réserve a été mise de côté;

c) à l'égard de terres visées aux alinéas (1)c) ou e) ou (2)b), la partie à l'accord ou à la revendication qui représente le peuple autochtone;

d) à l'égard des terres qui ont été mises de côté à l'usage et au profit des Indiens conformément à une loi visée aux alinéas (1)d) ou (2)c), l'organisme dirigeant constitué par cette loi.

Défaut d'entente

(4) Le ministre est tenu d'examiner la possibilité d'effectuer le renvoi prévu aux paragraphes (1) ou (2) :

Demande

- (a) on the request of the government of any interested province or the federal authority having the administration of federal lands referred to in paragraph (1)(b); or
 (b) on receipt of a petition that is

- (i) signed by one or more persons each of whom has an interest in lands on which the project may cause significant adverse environmental effects, and
 (ii) accompanied by a concise statement of the evidence supporting the contention of the petitioner that the project may cause significant adverse environmental effects in respect of which a reference may be made pursuant to subsection (1) or (2).

Notice

(5) At least ten days before a reference is made pursuant to subsection (1) or (2), the Minister shall give notice of the intention to do so to

- (a) the proponent of the project;
 (b) the governments of all interested provinces;
 (c) any person who signed a petition considered by the Minister pursuant to subsection (4); and
 (d) the federal authority, in the case of a reference to be made pursuant to paragraph (1)(b).

Meaning of "lands in respect of which Indians have interests"

(6) For the purposes of this section, "lands in respect of which Indians have interests" means

- (a) land areas that are subject to a land claim accepted by the Government of Canada for negotiation under its comprehensive land claims policy and that
 (i) in the case of land areas situated in the Yukon Territory or the Northwest Territories, have been withdrawn from disposal under the *Territorial Lands Act* for the purposes of land claim settlement, or
 (ii) in the case of land areas situated in a province, have been agreed on for selection by the Government of Canada and the government of the province; and
 (b) land areas that belong to Her Majesty or in respect of which Her Majesty has the

a) à la demande du gouvernement d'une province concernée ou de l'autorité fédérale chargée de la gestion du territoire domanial visé à l'alinéa (1)b);

b) sur réception d'une pétition :

- (i) signée par une ou plusieurs personnes qui ont chacune des droits sur des terres où le projet peut entraîner des effets environnementaux négatifs importants,
 (ii) accompagnée d'un bref exposé alléguant que la mise en œuvre du projet dans une province peut causer de tels effets, à l'égard desquels un renvoi peut être effectué aux termes des paragraphes (1) ou (2).

(5) Avant d'effectuer le renvoi prévu aux paragraphes (1) ou (2), le ministre en donne un préavis d'au moins dix jours :

- a) au promoteur du projet;
 b) aux gouvernements des provinces concernées;
 c) aux signataires d'une pétition examinée par le ministre aux termes du paragraphe (4);
 d) à l'autorité fédérale, dans le cas du renvoi qui doit être effectué aux termes de l'alinéa (1)b).

Préavis

(6) Pour l'application du présent article, les terres sur lesquelles les Indiens ont des droits s'entendent :

- a) des terres visées par des revendications territoriales que le gouvernement fédéral a accepté de négocier dans le cadre de sa politique en matière de revendications territoriales des Indiens et :
 (i) dans le cas du territoire du Yukon ou des Territoires du Nord-Ouest, celles qui ont été soustraites à l'application de la *Loi sur les terres territoriales* pour les fins d'un règlement en matière de revendications territoriales,
 (ii) dans le cas des provinces, celles qui ont été choisies par le gouvernement fédéral et celui de la province concernée;
 b) des terres qui appartiennent à Sa Majesté ou qu'elle a le droit de céder et

Terres sur lesquelles les Indiens ont des droits

right to dispose and that have been identified and agreed on by Her Majesty and an Indian band for transfer to settle claims based on

- (i) an outstanding lawful obligation of Her Majesty towards an Indian band pursuant to the specific claims policy of the Government of Canada, or
- (ii) treaty land entitlement.

qui ont été choisies par elle et une bande indienne pour cession en vue d'un règlement des revendications territoriales fondées :

- (i) sur une obligation légale de Sa Majesté envers une bande indienne aux termes de la politique du gouvernement fédéral en matière de revendications particulières,
- (ii) sur les droits fonciers découlant d'un traité.

Reference to lands, etc.

(7) For the purposes of this section, a reference to any lands, land areas or reserves includes a reference to all waters on and air above those lands, areas or reserves.

(7) Pour l'application du présent article, toute mention des terres, territoires ou réserves comprend leurs eaux et leur espace aérien.

Règle d'application

Rules governing review panels

49. Sections 29 to 36 and 40 to 42 apply, with such modifications as the circumstances require, in respect of a reference to a mediator or a review panel pursuant to subsection 46(1), 47(1) or 48(1) or (2).

49. Les articles 29 à 36 et 40 à 42 s'appliquent, avec les adaptations nécessaires, aux renvois à une médiation ou à une commission d'examen visés aux paragraphes 46(1), 47(1) ou 48(1) ou (2).

Règles applicables aux commissions

Ministerial orders

50. (1) Where the Minister refers a project to a mediator or a review panel for an assessment of the environmental effects of the project referred to in subsection 46(1), 47(1) or 48(1) or (2), the Minister may, by order, prohibit the proponent of the project from doing any act or thing that would commit the proponent to ensuring that the project is carried out in whole or in part until the assessment is completed and the Minister is satisfied that, taking into account the implementation of any appropriate mitigation measures the project is not likely to cause any significant adverse environmental effects referred to in that subsection or that any such effects are justified in the circumstances.

50. (1) Dans le cas où il effectue le renvoi à un médiateur ou à une commission, aux termes des paragraphes 46(1), 47(1) ou 48(1) ou (2), le ministre peut, par arrêté, interdire au promoteur d'accomplir tout acte permettant la mise en œuvre du projet en tout ou en partie jusqu'à ce que l'examen soit terminé et qu'il soit convaincu que, compte tenu de la mise en œuvre des mesures d'atténuation indiquées, la réalisation du projet n'est pas susceptible d'entraîner les effets environnementaux négatifs importants visés à ces articles ou qu'ils sont justifiables dans les circonstances.

Suspension du projet

Idem

(2) Where a project is referred to a mediator or a review panel for an assessment of the environmental effects of the project referred to in subsection 46(1), 47(1) or 48(1) or (2) and the mediator or review panel submits a report to the Minister indicating that the project is likely to cause significant adverse environmental effects referred to in that subsection the Minister may, by order, prohibit the proponent of the project from doing any act or thing that would commit the proponent to ensuring that the project is carried

(2) Dans le cas où le médiateur ou la commission en vient à la conclusion dans son rapport au ministre que la mise en œuvre du projet visé aux paragraphes 46(1), 47(1) ou 48(1) ou (2) est susceptible d'entraîner des effets environnementaux négatifs importants, le ministre peut, par arrêté, interdire au promoteur d'accomplir tout acte permettant la mise en œuvre du projet en tout ou en partie jusqu'à ce qu'il soit convaincu que, compte tenu de l'application des mesures d'atténuation indiquées, la réalisation du projet n'est

Idem

out in whole or in part until the Minister is satisfied that, taking into account the implementation of any appropriate mitigation measures, the project is not likely to cause any significant adverse environmental effects referred to in that subsection or that any such effects are justified in the circumstances.

Consultation
with interested
jurisdictions

(3) The Minister shall, before exercising discretion to make an order under subsection (1) or (2), advise and offer to consult with the governments of all interested provinces and any federal authority, or the band council, party to the agreement or claim or governing body having an interest in the lands where the project is to be carried out, as the case may be.

Injunction

51. (1) Where, on the application of the Attorney General of Canada, it appears to a court of competent jurisdiction that an order made under section 50 in respect of a project has been, is about to be or is likely to be contravened, the court may issue an injunction ordering any person named in the application to refrain from doing any act or thing that would commit the proponent to ensuring that the project or any part thereof is carried out until

(a) with respect to an order made pursuant to subsection 50(1), the assessment of the environmental effects of the project referred to in subsection 46(1), 47(1) or 48(1) or (2) is completed and the Minister is satisfied that, taking into account the implementation of any appropriate mitigation measures, the project is not likely to cause any significant adverse environmental effects referred to in that subsection or any such effects are justified in the circumstances; and

(b) with respect to an order made pursuant to subsection 50(2), the Minister is satisfied that, taking into account the implementation of any appropriate mitigation measures, the project is not likely to cause any significant adverse environmental effects referred to in that subsection or any such effects are justified in the circumstances.

pas susceptible d'entraîner les effets environnementaux importants visés à ces articles ou qu'ils sont justifiables dans les circonstances.

Consultation

(3) Avant de prendre sa décision aux termes des paragraphes (1) ou (2), le ministre avise et offre de consulter, selon le cas, les gouvernements des provinces concernées, ou le conseil de bande, la partie à l'entente ou à la revendication ou l'organisme dirigeant qui a des droits dans les terres où le projet doit être mis en œuvre.

Injunction

51. (1) Si, sur demande présentée par le procureur général du Canada, il conclut à l'inobservation — réelle ou appréhendée — de l'arrêté pris en application de l'article 50, le tribunal compétent peut, par ordonnance, interdire à toute personne visée par la demande d'accomplir tout acte permettant la mise en œuvre du projet en tout ou en partie jusqu'à ce que :

a) dans le cas d'un arrêté pris en vertu du paragraphe 50(1), l'examen par une commission soit terminé et que le ministre soit convaincu que, compte tenu de l'application des mesures d'atténuation indiquées, la réalisation du projet n'est pas susceptible d'entraîner les effets environnementaux négatifs importants visés aux paragraphes 46(1), 47(1) ou 48(1) ou (2) ou qu'ils sont justifiables dans les circonstances;

b) dans le cas d'un arrêté pris en vertu du paragraphe 50(2), le ministre soit convaincu que, compte tenu de l'application des mesures d'atténuation indiquées, la réalisation du projet n'est pas susceptible d'entraîner les effets environnementaux négatifs importants visés à ces articles ou qu'ils sont justifiables dans les circonstances.

Notice	<p>(2) At least forty-eight hours before an injunction is issued under subsection (1), notice of the application shall be given to</p> <p>(a) persons named in the application, and</p> <p>(b) the governments of all interested provinces and any federal authority, band council, party to the agreement or claim or governing body having an interest in the lands where the project is to be carried out, as the case may be,</p> <p>unless the urgency of the situation is such that the delay involved in giving such notice would not be in the public interest.</p>	<p>(2) Sauf lorsque cela serait contraire à l'intérêt public en raison de l'urgence de la situation, l'injonction est subordonnée à la signification d'un préavis d'au moins quarante-huit heures :</p> <p>a) aux parties nommées dans la demande;</p> <p>b) aux gouvernements des provinces concernées et, selon le cas, à l'autorité fédérale, au conseil de bande, à la partie à l'entente ou à la revendication ou à l'organisme dirigeant qui ont des droits dans les terres où le projet doit être mis en œuvre.</p>	Préavis
Order in force	<p>52. (1) An order under section 50 comes into force at the time it is made.</p>	<p>52. (1) L'arrêté pris en application de l'article 50 prend effet dès sa prise.</p>	Prise d'effet de l'arrêté
Approval of Governor in Council	<p>(2) The order ceases to have effect fourteen days after it is made unless, within that period, it is approved by the Governor in Council.</p>	<p>(2) L'arrêté devient inopérant à défaut d'approbation du gouverneur en conseil dans les quatorze jours suivant sa prise.</p>	Approbation du gouverneur en conseil
Exemption from application of Statutory Instruments Act	<p>(3) The order is exempt from the application of sections 3, 5 and 11 of the <i>Statutory Instruments Act</i> and shall be published in the <i>Canada Gazette</i> within twenty-three days after it is approved by the Governor in Council.</p>	<p>(3) L'arrêté est soustrait à l'application des articles 3, 5 et 11 de la <i>Loi sur les textes réglementaires</i> et publié dans la <i>Gazette du Canada</i> dans les vingt-trois jours suivant son approbation.</p>	Dérogation à la Loi sur les textes réglementaires
Follow-up program	<p>53. (1) Where the Minister has referred a project to a mediator or a review panel pursuant to subsection 46(1), 47(1) or 48(1) or (2), the Minister shall, in accordance with any regulations made for that purpose, design or approve any follow-up program that the Minister considers appropriate for the project and arrange for the implementation of that program.</p>	<p>53. (1) Dans les cas où il a effectué le renvoi à un médiateur ou à une commission prévu aux paragraphes 46(1), 47(1) ou 48(1) ou (2), le ministre élabore ou approuve, conformément aux règlements pris à cette fin, tout programme de suivi qu'il estime indiqué pour le projet et veille à la mise en œuvre du programme.</p>	Programme de suivi
Public notice	<p>(2) Following the receipt of the report of the mediator or review panel in respect of the assessment of the environmental effects of the project referred to in subsection 46(1), 47(1) or 48(1) or (2), the Minister shall, in accordance with any regulations made for that purpose, advise the public of</p> <p>(a) any order or injunction issued under section 50 or 51 in respect of the project;</p> <p>(b) any mitigation measures to be implemented with respect to the adverse environmental effects of the project referred to in those subsections;</p>	<p>(2) Sur réception du rapport du médiateur ou de la commission concernant les évaluations environnementales visées aux paragraphes 46(1), 47(1) ou 48(1) ou (2), le ministre porte à la connaissance du public, conformément aux règlements pris à cette fin :</p> <p>a) tout arrêté pris aux termes de l'article 50 ou toute injonction prononcée aux termes de l'article 51;</p> <p>b) les mesures d'atténuation éventuelles des effets environnementaux négatifs d'un projet visé à ces paragraphes;</p>	Publicité

(c) the extent to which the recommendations set out in the report have been adopted, and the reasons for not having adopted any of those recommendations;

(d) any follow-up program that is designed or approved for the project pursuant to subsection (1); and

(e) any results of any follow-up program.

AGREEMENTS AND ARRANGEMENTS

54. (1) Subject to subsection (3), where a federal authority or the Government of Canada on behalf of a federal authority enters into an agreement or arrangement with the government of a province or any institution of such a government under which a federal authority exercises a power or performs a duty or function referred to in paragraph 5(1)(b) in relation to projects the essential details of which are not specified, the Government of Canada or the federal authority shall ensure that the agreement or arrangement provides for the assessment of the environmental effects of those projects and that the assessment will be carried out as early as practicable in the planning stages of those projects, before irrevocable decisions are made, in accordance with

(a) this Act and the regulations; or

(b) a process for the assessment of the environmental effects of projects that is consistent with the requirements of this Act and is in effect in the province where the projects are to be carried out.

(2) Subject to subsection (3), where a federal authority or the Government of Canada on behalf of a federal authority enters into an agreement or arrangement with any government or any person, organization or institution, whether or not part of or affiliated with a government, under which a federal authority exercises a power or performs a duty or function referred to in paragraph 5(1)(b) in relation to projects the essential details of which are not specified and that are to be carried out both outside Canada and outside federal lands, the Government of Canada or the federal authority shall ensure, in so far as is practicable and

c) la suite donnée aux recommandations issues du rapport et les motifs du rejet éventuel d'une de celles-ci;

d) le programme de suivi élaboré ou approuvé aux termes du paragraphe (1);

e) les résultats du programme de suivi.

ACCORDS SIGNÉS PAR LES AUTORITÉS FÉDÉRALES

54. (1) Sous réserve du paragraphe (3), le gouvernement du Canada ou toute autorité fédérale veille à ce que les accords que l'autorité fédérale conclut — ou que le gouvernement conclut en son nom — avec le gouvernement d'une province ou avec l'un de ses organismes, en vertu desquels une autorité fédérale exerce une attribution visée à l'alinéa 5(1)b) au titre de projets dont les éléments essentiels ne sont pas déterminés, prévoient l'évaluation des effets environnementaux des projets, cette évaluation devant être effectuée le plus tôt possible au stade de leur planification, avant la prise d'une décision irrévocable conformément à la présente loi et aux règlements ou au processus, compatible avec la présente loi, d'évaluation des effets environnementaux de projets applicable dans la province où ceux-ci doivent être mis en œuvre.

(2) Sous réserve du paragraphe (3), le gouvernement du Canada ou toute autorité fédérale veille à ce que les accords que l'autorité fédérale conclut — ou que le gouvernement conclut en son nom — avec soit un gouvernement, soit une personne, un organisme ou une institution, peu importe qu'ils soient ou non affiliés à un gouvernement ou en fassent partie, en vertu desquels une autorité fédérale exerce une attribution visée à l'alinéa 5(1)b) au titre de projets dont les éléments essentiels ne sont pas déterminés qui doivent être mis en œuvre à la fois à l'étranger et hors du territoire domanial, prévoient, dans la mesure du possible, tout en

Provincial
agreement or
arrangement

Accords avec
les provinces

International
agreement or
arrangement

Accords
internationaux

subject to any other such agreement to which the Government of Canada or federal authority is a party, that the agreement or arrangement provides for the assessment of the environmental effects of those projects and that the assessment will be carried out as early as practicable in the planning stages of those projects, before irrevocable decisions are made, in accordance with

- (a) this Act and the regulations; or
- (b) a process for the assessment of the environmental effects of projects that is consistent with the requirements of this Act and is in effect in the foreign state where the projects are to be carried out.

Exception

(3) Subsection (1) or (2) does not apply in respect of an agreement or arrangement referred to in that subsection where the federal authority will be required to exercise a power or perform a duty or function referred to in paragraph 5(1)(b) in relation to the projects in respect of which the agreement or arrangement applies after the essential details of the projects are specified.

étant compatibles avec les accords internationaux dont le Canada est déjà signataire à leur entrée en vigueur, l'évaluation des effets environnementaux des projets, cette évaluation devant être effectuée le plus tôt possible au stade de leur planification, avant la prise d'une décision irrévocable, conformément à la présente loi et aux règlements ou au processus, compatible avec la présente loi, d'évaluation des effets environnementaux de projets applicable dans l'État étranger où ceux-ci doivent être mis en œuvre.

Exception

(3) Les paragraphes (1) ou (2) ne s'appliquent pas à un accord visé à ces paragraphes dans les cas où une autorité fédérale est tenue d'exercer une attribution visée à l'alinéa 5(1)b) relativement aux projets qui font l'objet de l'accord après la détermination des éléments essentiels de ceux-ci.

ACCESS TO INFORMATION

Public registry

55. (1) For the purpose of facilitating public access to records relating to environmental assessments, a public registry shall be established and operated in a manner to ensure convenient public access to the registry and in accordance with this Act and the regulations in respect of every project for which an environmental assessment is conducted.

Public registry established

(2) The public registry in respect of a project shall be maintained

- (a) by the responsible authority from the commencement of the environmental assessment until any follow-up program in respect of the project is completed; and
- (b) where the project is referred to a mediator or a review panel, by the Agency from the appointment of the mediator or the members of the review panel until the report of the mediator or review panel is submitted to the Minister.

Contents of public registry

(3) Subject to subsection (4), a public registry shall contain all records produced,

ACCÈS À L'INFORMATION

Registre public

55. (1) Est tenu, conformément à la présente loi et aux règlements, un registre public pour chacun des projets pour lesquels une évaluation environnementale est effectuée afin de faciliter l'accès aux documents relatifs à cette évaluation.

Établissement du registre

(2) Le registre public est tenu :

- a) par l'autorité responsable dès le début de l'évaluation environnementale et jusqu'à ce que le programme de suivi soit terminé;
- b) par l'Agence, dans les cas où une médiation ou un examen par une commission est effectuée, dès la nomination du médiateur ou des membres de la commission jusqu'au moment de la remise du rapport au ministre.

Contenu du registre

(3) Sous réserve du paragraphe (4), le registre public contient tous les documents

collected, or submitted with respect to the environmental assessment of the project, including

- (a) any report relating to the assessment;
- (b) any comments filed by the public in relation to the assessment;
- (c) any records prepared by the responsible authority for the purposes of section 38;
- (d) any records produced as the result of the implementation of any follow-up program;
- (e) any terms of reference for a mediation or a panel review; and
- (f) any documents requiring mitigation measures to be implemented.

produits, recueillis ou reçus relativement à l'évaluation environnementale d'un projet, notamment :

- a) tout rapport relatif à l'évaluation environnementale du projet;
- b) tout commentaire donné par le public relativement à l'évaluation;
- c) tous les documents que l'autorité responsable a préparés pour l'application de l'article 38;
- d) tous les documents produits par l'application d'un programme de suivi;
- e) le mandat du médiateur ou d'une commission;
- f) tous les documents exigeant l'application de mesures d'atténuation.

Categories of information to be made publicly available

(4) A public registry shall contain a record referred to in subsection (3) if the record falls within one of the following categories:

- (a) records that have otherwise been made available to the public in carrying out the assessment pursuant to this Act and any additional records that have otherwise been made publicly available;
- (b) any record or part of a record that the responsible authority, in the case of a record under its control, or the Minister, in the case of a record under the Agency's control, determines would have been disclosed to the public in accordance with the *Access to Information Act* if a request had been made in respect of that record under that Act at the time the record comes under its control, including any record that would be disclosed in the public interest pursuant to subsection 20(6) of that Act; and
- (c) any record or part of a record, except a record or part containing third party information, if the responsible authority, in the case of a record under the responsible authority's control, or the Minister, in the case of a record under the Agency's control, believes on reasonable grounds that its disclosure would be in the public interest because it is required in order for the public to participate effectively in the assessment.

(4) Le registre public permet l'accès aux documents visés au paragraphe (3) si ceux-ci appartiennent à l'une des catégories suivantes :

- a) documents qui sont mis à la disposition du public dans le registre conformément à la présente loi ainsi que tout autre document qui a déjà été rendu public;
- b) tout ou partie d'un document qui, de l'avis de l'autorité responsable, dans le cas d'un document qu'elle contrôle, ou de l'avis du ministre dans le cas d'un document que l'Agence contrôle, serait communiqué conformément à la *Loi sur l'accès à l'information* si une demande en ce sens était faite aux termes de celle-ci au moment où l'Agence prend le contrôle du document, y compris tout document qui serait communiqué dans l'intérêt public aux termes du paragraphe 20(6) de cette loi;
- c) tout ou partie d'un document, à l'exception d'un document contenant des renseignements relatifs à un tiers, si l'autorité responsable, dans le cas d'un document qu'elle contrôle ou le ministre, dans le cas d'un document que l'Agence contrôle, a des motifs raisonnables de croire qu'il serait d'intérêt public de le communiquer parce qu'il est nécessaire à une participation efficace du public à l'évaluation environnementale.

Genre d'information disponible

Third party
information

(5) Sections 27, 28 and 44 of the *Access to Information Act* apply, with such modifications as the circumstances require, to any determination made under paragraph (4)(b) in respect of third party information, and, for the purpose of section 27 of that Act, any record referred to in paragraph (4)(b) shall be deemed to be a record that the responsible authority or the Minister intends to disclose and, for the purpose of applying that Act, any reference in that Act to the person who requested access shall be disregarded if no person has requested access to the information.

(5) Les articles 27, 28 et 44 de la *Loi sur l'accès à l'information* s'appliquent, avec les adaptations nécessaires, à toute détermination faite aux termes de l'alinéa (4)b) à l'égard de renseignements relatifs à un tiers, et tout document visé à cet alinéa est réputé, pour l'application de l'article 27 de cette loi, constituer un document que le ministre ou l'autorité responsable a l'intention de communiquer; pour l'application de cette loi, il ne doit pas être tenu compte de la mention de la personne qui a demandé la communication des renseignements si nul ne l'a demandée.

Renseignements relatifs à un tiers

Protection from
civil proceeding
or prosecution

(6) Notwithstanding any other Act of Parliament, no civil or criminal proceedings lie against a responsible authority or the Minister, or against any person acting on behalf of or under the direction of a responsible authority or the Minister, and no proceedings lie against the Crown or any responsible authority for the disclosure in good faith of any record or any part of a record pursuant to this Act, for any consequences that flow from that disclosure, or for the failure to give any notice required under section 27 or any other provision of the *Access to Information Act* if reasonable care is taken to give the required notice.

(6) Malgré toute autre loi fédérale, l'autorité responsable ou le ministre et les personnes qui agissent en leur nom ou sous leur autorité bénéficient de l'immunité en matière civile ou pénale, et la Couronne ainsi que les autorités responsables bénéficient de l'immunité devant toute juridiction, pour la communication totale ou partielle d'un document faite de bonne foi dans le cadre de la présente loi ainsi que pour les conséquences qui en découlent; ils bénéficient également de l'immunité dans les cas où, ayant fait preuve de la diligence nécessaire, ils n'ont pu donner les avis prévus à l'article 27 ou à toute autre disposition de la *Loi sur l'accès à l'information*.

Immunité

Meaning of
"third party
information"

(7) For the purposes of this section, "third party information" means

- (a) trade secrets of a third party;
- (b) financial, commercial, scientific or technical information that is confidential information supplied to a government institution by a third party and is treated consistently in a confidential manner by the third party;
- (c) information the disclosure of which could reasonably be expected to result in material financial loss or gain to, or could reasonably be expected to prejudice the competitive position of, a third party; and
- (d) information the disclosure of which could reasonably be expected to interfere with contractual or other negotiations of a third party.

(7) Au présent article, « renseignements relatifs à un tiers » s'entend des renseignements suivants :

- a) secrets industriels de tiers;
- b) renseignements financiers, commerciaux, scientifiques ou techniques fournis à une institution fédérale par un tiers, qui sont de nature confidentielle et qui sont traités comme tels de façon constante par ce tiers;
- c) renseignements dont la divulgation risquerait vraisemblablement de causer des pertes ou profits financiers appréciables à un tiers ou de nuire à sa compétitivité;
- d) renseignements dont la divulgation risquerait vraisemblablement d'entraver des négociations menées par un tiers en vue de contrats ou à d'autres fins.

Définition de
« renseignements relatifs à un tiers »

STATISTICAL SUMMARY

Preparation of statistical summary

56. (1) During each fiscal year a responsible authority shall maintain a statistical summary of all of the environmental assessments undertaken or directed by it and all courses of action taken, and all decisions made, in relation to the environmental effects of the projects after the assessments were completed.

Idem

(2) The responsible authority shall ensure that the summary for a fiscal year is completed within one month after the end of that fiscal year.

JUDICIAL REVIEW

Defect in form or technical irregularity

57. An application for judicial review in connection with any matter under this Act shall be refused where the sole ground for relief established on the application is a defect in form or a technical irregularity.

ADMINISTRATION

Minister's Powers

Powers to facilitate environmental assessments

58. (1) For the purposes of this Act, the Minister may

(a) issue guidelines and codes of practice respecting the application of this Act and the regulations and, without limiting the generality of the foregoing, establish criteria to determine whether a project, taking into account the implementation of any appropriate mitigation measures, is likely to cause significant adverse environmental effects or whether such effects are justified in the circumstances;

(b) establish research and advisory bodies;

(c) enter into agreements or arrangements with any jurisdiction within the meaning of paragraph 40(1)(a), (b), (c) or (d) respecting assessments of environmental effects;

(d) enter into agreements or arrangements with any jurisdiction, within the meaning of subsection 40(1), for the purposes of coordination, consultation, exchange of information and the determination of factors to be considered in relation to the assessment of the environmental effects of projects of common interest;

RÉSUMÉS STATISTIQUES

Résumés statistiques

56. (1) L'autorité responsable prépare pour chaque exercice un résumé statistique de toutes les évaluations environnementales effectuées par elle ou sous son autorité ainsi que de toutes les décisions prises à l'égard des effets environnementaux causés par les projets une fois terminées les évaluations.

Idem

(2) L'autorité responsable veille à ce que le résumé applicable à un exercice soit prêt au plus tard un mois après la fin de l'exercice.

CONTRÔLE JUDICIAIRE

Vice de forme

57. Il n'est admise aucune demande de contrôle judiciaire liée à la présente loi et fondée uniquement sur un vice de forme ou une irrégularité technique.

ADMINISTRATION

Pouvoirs du ministre

58. (1) Pour l'application de la présente loi, le ministre peut :

a) donner des lignes directrices et établir des codes de pratique ou de procédure d'application de la présente loi et des règlements, y compris, établir des critères servant à déterminer si, compte tenu de l'application de mesures d'atténuation indiquées, est susceptible d'entraîner des effets environnementaux négatifs importants ou si ces effets sont justifiables dans les circonstances;

b) constituer des organismes consultatifs et de recherche;

c) conclure des accords avec toute instance au sens des alinéas 40(1)a), b), c) ou d) en matière d'évaluation des effets environnementaux;

d) conclure des accords avec toute instance, au sens du paragraphe 40(1), en matière de coordination, de consultation, d'échange d'information et de détermination des facteurs à considérer relativement à l'évaluation des effets environnementaux de projets d'intérêt commun;

Évaluation environnementale

(e) recommend the appointment of members to bodies established by federal authorities or to bodies referred to in paragraph 40(1)(d), on a temporary basis, for the purpose of facilitating a substitution pursuant to section 43;

(f) establish criteria for the appointment of mediators and members of review panels;

(g) establish criteria for the approval of a substitution pursuant to section 43;

(h) establish criteria for the purposes of an alternative manner of conducting an assessment of the environmental effects of a project referred to in subsection 46(2) or 47(2); and

(i) establish a participant funding program to facilitate the participation of the public in mediations and assessments by review panels.

Power to enter into international agreements

(2) The Minister and the Secretary of State for External Affairs may enter into agreements or arrangements with any jurisdiction within the meaning of paragraph 40(1)(e) or (f) respecting assessments of environmental effects, including, without limiting the generality of the foregoing, for the purposes of implementing the provisions of any international agreement or arrangement to which the Government of Canada is a party respecting the assessment of environmental effects referred to in subsection 47(1).

Opportunity for public to comment

(3) The Minister shall provide reasonable public notice of and a reasonable opportunity for anyone to comment on draft guidelines, codes of practice, agreements, arrangements, criteria or orders under this section.

Availability to public

(4) Any guidelines, codes of practice, agreements, arrangements, criteria or orders shall be made available to the public.

Regulations

Regulations

59. The Governor in Council may make regulations

(a) respecting the procedures and requirements of, and the time periods relating to, the environmental assessment process set

e) recommander la nomination de membres temporaires auprès des organismes constitués par des autorités fédérales ou auprès des organismes visés à l'alinéa 40(1)d) pour les examens substitués aux examens par une commission aux termes de l'article 43;

f) fixer les critères de nomination des médiateurs et des membres des commissions d'évaluation environnementale;

g) fixer les critères applicables aux substitutions effectuées en vertu de l'article 43;

h) fixer les critères des modalités de rechange de l'évaluation environnementale des effets environnementaux visée au paragraphe 46(2) ou 47(2);

i) créer un fonds de participation afin de favoriser la participation du public aux médiations et aux évaluations par une commission d'examen.

Accords internationaux

(2) Le ministre et le secrétaire d'État aux Affaires extérieures peuvent conclure des accords avec toute instance au sens des alinéas 40(1)e) ou f) en matière d'évaluation des effets environnementaux, notamment pour la mise en œuvre de tout accord international, auquel le gouvernement du Canada est partie, concernant l'examen des effets environnementaux visé au paragraphe 47(1).

Préavis

(3) Le ministre donne un préavis public raisonnable des projets de lignes directrices, de codes de pratique, d'accords, de critères ou d'arrêtés établis en application du présent article, ainsi que la possibilité, pour quiconque, de faire des observations à leur sujet.

Accessibilité

(4) Les lignes directrices, codes de pratique, accords, critères et arrêtés sont accessibles au public.

Règlements

Règlements

59. Le gouverneur en conseil peut, par règlement :

a) régir les procédures, les délais applicables et les exigences relatives au processus d'évaluation environnementale prévu par

out in this Act, including the conduct of assessments by review panels established pursuant to section 40;

(b) prescribing, for the purpose of the definition "project" in subsection 2(1), any physical activity or class of physical activities;

(c) prescribing any project or class of projects for which an environmental assessment is not required where the Governor in Council is satisfied that

(i) an environmental assessment of the project would be inappropriate for reasons of national security, or

(ii) in the case of a project in relation to a physical work, the environmental effects of the project are insignificant or the contribution of the responsible authority to the project in exercising powers or performing duties or functions referred to in section 5 in relation to the project is minimal;

(d) prescribing any project or class of projects for which a comprehensive study is required where the Governor in Council is satisfied that the project or any project within that class is likely to have significant adverse environmental effects;

(e) prescribing any body, other than the government of a province, to be a federal authority for the purposes of this Act;

(f) prescribing the provisions of any Act of Parliament or any regulation made pursuant thereto that confer powers, duties or functions on federal authorities the exercise or performance of which requires an environmental assessment under paragraph 5(1)(d);

(g) prescribing the provisions of any Act of Parliament or any regulation made pursuant to any such Act that confer powers, duties or functions on the Governor in Council, the exercise or performance of which require an environmental assessment under subsection 5(2);

(h) respecting the dissemination by responsible authorities of information relating to projects and the environmental assessment of projects and the establishment, maintenance and operation of a

la présente loi, notamment les évaluations effectuées par une commission aux termes de l'article 40;

b) désigner une activité concrète ou une catégorie d'activités concrètes pour l'application de la définition de « projet » au paragraphe 2(1);

c) désigner des projets ou des catégories de projets, liés à une activité concrète ou à une catégorie d'activités concrètes, pour lesquels l'évaluation environnementale n'est pas nécessaire, lorsqu'il est convaincu que :

(i) l'évaluation environnementale de ceux-ci ne serait pas indiquée pour des raisons de sécurité nationale,

(ii) dans le cas de projets liés à un ouvrage, les effets environnementaux de ceux-ci ne sont pas importants ou l'exercice par l'autorité responsable d'attributions visées à l'article 5 à l'égard de ces projets constitue une intervention marginale;

d) désigner des projets ou des catégories de projets susceptibles, selon lui, d'entraîner des effets environnementaux négatifs importants et pour lesquels une étude environnementale approfondie est obligatoire;

e) déterminer quels organismes, autres que le gouvernement d'une province, sont des autorités fédérales pour l'application de la présente loi;

f) déterminer les dispositions législatives ou réglementaires fédérales prévoyant les attributions des autorités fédérales relativement à un projet dont l'exercice rend nécessaire une évaluation environnementale en vertu de l'alinéa 5(1)d);

g) désigner les dispositions législatives ou réglementaires fédérales conférant des attributions au gouverneur en conseil pour l'exercice desquelles le paragraphe 5(2) exige une évaluation environnementale;

h) régir la communication par les autorités responsables de l'information relative aux projets et à l'évaluation environnementale de ceux-ci, et l'établissement et la tenue des registres publics, y compris les installations nécessaires pour permettre au public de consulter ces registres — que

public registry, including facilities to enable the public to examine physical or electronic records contained in the registry, the time and manner in which those records may be examined or copied by the public and the charging of fees therefor, and the transfer and retention of those records after the completion of any follow-up program;

(i) varying or excluding, in the prescribed circumstances, any procedure or requirement of the environmental assessment process set out in this Act or the regulations for the purpose of adapting the process in respect of

(i) projects to be carried out on reserves, surrendered lands or other lands that are vested in Her Majesty and subject to the *Indian Act*,

(ii) projects to be carried out outside Canada and any federal lands,

(iii) projects to be carried out under international agreements or arrangements entered into by the Government of Canada or a federal authority,

(iv) projects to be carried out within Canada or on federal lands in respect of which a federal authority exercises a power or performs a duty or function referred to in paragraph 5(1)(b) or (c),

(v) projects in respect of which the Canada-Nova Scotia Offshore Petroleum Board established pursuant to the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, the Canada-Newfoundland Offshore Petroleum Board established pursuant to the *Canada-Newfoundland Atlantic Accord Implementation Act* or other similar boards exercise a power or perform a duty or function referred to in section 5, or

(vi) projects in relation to which there are matters of national security;

(j) respecting the manner of conducting assessments of the environmental effects of, and follow-up programs for projects for which a Crown corporation within the meaning of the *Financial Administration*

ceux-ci soient constitués de documents physiques ou informatiques — les heures et les modalités de consultation et de reproduction des registres, la fixation du prix à payer pour ces services ainsi que le transfert et la garde des documents une fois terminé le programme de suivi;

i) modifier ou exclure, dans les circonstances prévues par règlement, toute procédure ou exigence du processus d'évaluation environnementale établi en vertu de la présente loi et des règlements afin d'adapter le processus aux :

(i) projets à réaliser dans les réserves, terres cédées ou autres terres dévolues à Sa Majesté et assujetties à la *Loi sur les Indiens*,

(ii) projets à réaliser à l'extérieur du Canada et à l'extérieur du territoire domanial,

(iii) projets à entreprendre en vertu d'accords internationaux conclus par le gouvernement du Canada ou une autorité fédérale,

(iv) projets à réaliser au Canada ou sur le territoire domanial pour lesquels une autorité fédérale exerce une attribution visée aux alinéas 5(1)b) ou c),

(v) projets à l'égard desquels l'Office Canada — Nouvelle-Écosse des hydrocarbures extracôtiers constitué en application de la *Loi de mise en œuvre de l'Accord Canada — Nouvelle-Écosse sur les hydrocarbures extracôtiers*, l'Office Canada — Terre-Neuve des hydrocarbures extracôtiers constitué en application de la *Loi de mise en œuvre de l'Accord atlantique Canada — Terre-Neuve* ou un autre organisme semblable exerce des attributions visées à l'article 5,

(vi) projets qui soulèvent des questions de sécurité nationale;

j) régir les modalités d'évaluation des effets environnementaux et celles du suivi des projets à l'égard desquels les sociétés d'État, au sens de la *Loi sur la gestion des finances publiques*, ou les personnes morales dont elles ont le contrôle exercent une attribution visée aux alinéas 5(1)a), b) ou

Act or any corporation controlled by such a corporation exercises a power or performs a duty or function referred to in paragraph 5(1)(a), (b) or (c), respecting any action to be taken in respect of those projects during the environmental assessment process and, for those purposes, respecting the application of the laws from time to time in force in any province;

(k) respecting the manner of conducting assessments of the environmental effects of, and follow-up programs for projects for which The Hamilton Harbour Commissioners constituted pursuant to *The Hamilton Harbour Commissioner's Act*, The Toronto Harbour Commissioners constituted pursuant to *The Toronto Harbour Commissioners' Act, 1911*, or any harbour commission established pursuant to the *Harbour Commissions Act*, exercises a power or performs a duty or function referred to in paragraph 5(1)(a), (b) or (c), respecting any action to be taken in respect of those projects during the environmental assessment process and, for those purposes, respecting the application of the laws from time to time in force in any province;

(l) respecting the manner of conducting any assessment of the environmental effects of, and follow-up programs for a project for which a person or body receives financial assistance provided by a federal authority for the purpose of enabling the project to be carried out in whole or in part on a reserve that is set apart for the use and benefit of a band and that is subject to the *Indian Act*, and respecting any action to be taken in respect of that project during the environmental assessment process;

(m) prescribing anything that, by this Act, is to be prescribed; and

(n) generally, for carrying out the purposes and provisions of this Act.

c) régir toute mesure qui doit être prise à l'égard de ces projets au cours du processus d'évaluation environnementale et, à ces fins, régir l'application des lois d'une province en vigueur au moment de l'évaluation;

k) régir les modalités d'évaluation des effets environnementaux et celles du suivi des projets à l'égard desquels les commissaires nommés en vertu de la *Loi des commissaires du havre de Hamilton* et de la *Loi de 1911 concernant les commissaires du havre de Toronto* et les commissions portuaires constituées par la *Loi sur les commissions portuaires* exercent une attribution visée aux alinéas 5(1)a), b) ou c), régir toute mesure qui doit être prise à l'égard de ces projets au cours du processus d'évaluation environnementale et, à ces fins, régir l'application des lois d'une province en vigueur au moment de l'évaluation;

l) régir les modalités d'évaluation des effets environnementaux et celles du suivi des projets pour lesquels une personne ou un organisme reçoit d'une autorité fédérale une aide financière permettant la réalisation du projet en tout ou en partie sur une réserve mise de côté à l'usage et au profit d'une bande et assujettie à la *Loi sur les Indiens* et régir toute mesure qui doit être prise à l'égard des projets au cours du processus d'évaluation environnementale;

m) prendre toute mesure d'ordre réglementaire prévue par la présente loi;

n) prendre toute autre mesure d'application de la présente loi.

Variation of
procedures

60. Notwithstanding this or any other Act of Parliament, where the Governor in Council is of the opinion that a federal authority on which duties and functions are imposed under this Act is unable to perform those

60. Malgré les autres dispositions de la présente loi ou toute autre loi fédérale, le gouverneur en conseil peut, s'il estime qu'une autorité fédérale assujettie à la présente loi ne peut remplir ses obligations en raison des

Modification de
la procédure

duties and functions by reason of a time limitation or other procedural requirement that is binding on the federal authority under an Act of Parliament other than this Act or any regulation made under such an Act, the Governor in Council may, on the recommendation of the Minister and the Minister responsible for the administration of that other Act, make regulations varying the time limitation or other procedural requirement in so far as it applies to those duties and functions and to the extent necessary to permit the federal authority to perform them.

délais impartis ou de toute autre formalité prévue sous le régime d'une autre loi fédérale ou de ses règlements, prendre, sur la recommandation du ministre et du ministre responsable de l'application de cette autre loi, des règlements visant à modifier ces délais et formalités dans la mesure où ils s'appliquent à ces obligations et dans la mesure nécessaire pour permettre à l'autorité fédérale de remplir les obligations qui lui incombent sous le régime de la présente loi.

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

AGENCE CANADIENNE D'ÉVALUATION ENVIRONNEMENTALE

Agency established

61. (1) There is hereby established an agency, to be called the Canadian Environmental Assessment Agency, which shall advise and assist the Minister in performing the duties and functions conferred on the Minister by this Act.

61. (1) Est constituée l'Agence canadienne d'évaluation environnementale chargée de conseiller et d'assister le ministre dans l'exercice des attributions qui lui sont conférées par la présente loi.

Constitution

Responsibility of Minister

(2) The Minister is responsible for the Agency.

(2) L'Agence est placée sous la responsabilité du ministre.

Responsabilité du ministre

Objects of Agency

62. The objects of the Agency are

(a) to administer the environmental assessment process and any other requirements and procedures established by this Act and the regulations;

(b) to promote uniformity and harmonization in the assessment of environmental effects across Canada at all levels of government;

(c) to promote or conduct research in matters of environmental assessment and to encourage the development of environmental assessment techniques and practices, including testing programs, alone or in cooperation with other agencies or organizations;

(d) to promote environmental assessment in a manner that is consistent with the purposes of this Act; and

(e) to ensure an opportunity for public participation in the environmental assessment process.

62. L'Agence a pour mission :

a) de gérer le processus d'évaluation environnementale et toute autre procédure ou exigence établis par la présente loi conformément à celle-ci et aux règlements;

b) de promouvoir l'uniformisation et l'harmonisation des processus d'évaluation des effets environnementaux à l'échelle du Canada et à tous les niveaux administratifs;

c) de promouvoir, seule ou en collaboration avec d'autres organismes, la recherche en matière d'évaluation environnementale, de mener des recherches en cette matière et de favoriser l'élaboration de techniques en cette matière, notamment en ce qui a trait aux programmes d'essais;

d) de promouvoir les évaluations environnementales conformément à l'objet de la présente loi;

e) de veiller à ce que le public ait la possibilité de participer au processus d'évaluation environnementale.

Mission

Duties of Agency

63. (1) In carrying out its objects, the Agency shall

63. (1) Dans l'exécution de sa mission, l'Agence :

Attributions de l'Agence

- (a) provide administrative support for mediators and review panels;
- (b) provide, on the request of the Minister, administrative support for any research or advisory body that the Minister may establish in the area of environmental assessment; and
- (c) provide information or training to facilitate the conduct of environmental assessments.

- a) fournit un soutien administratif aux médiateurs et aux commissions d'évaluation environnementale;
- b) à la demande du ministre, fournit un soutien administratif aux organismes de recherche et de consultation en matière d'évaluation environnementale que le ministre peut créer;
- c) fournit toute information ou formation en vue de faciliter l'application du processus établi par la présente loi et les règlements.

Powers of Agency

(2) In carrying out its objects, the Agency may

- (a) undertake studies or activities or conduct research relating to environmental assessment;
- (b) advise persons and organizations on matters relating to the assessment of environmental effects;
- (c) negotiate agreements referred to in paragraph 58(1)(c) or (d) on behalf of the Minister;
- (d) examine and from time to time report to the Minister on the implementation of the environmental assessment process by responsible authorities; and
- (e) issue guidelines regarding the records to be kept by responsible authorities in relation to the environmental assessment process concerning projects.

(2) Dans l'exécution de sa mission, l'Agence peut :

- a) mener des études, entreprendre des travaux ou mener des recherches en matière d'évaluation environnementale;
- b) conseiller toute personne ou tout organisme en matière d'évaluation des effets environnementaux;
- c) négocier au nom du ministre les accords prévus aux alinéas 58(1)c) et d);
- d) examiner l'application du processus d'évaluation environnementale par les autorités responsables et en faire rapport au ministre;
- e) établir des lignes directrices relativement aux documents que celles-ci doivent conserver à l'égard du processus d'évaluation environnementale de projets.

Idem

Government facilities

64. In exercising its powers and performing its duties and functions under this Act, the Agency shall, where appropriate, make use of the services and facilities of departments, boards and agencies of the Government of Canada.

64. Dans l'exercice de ses attributions, l'Agence fait usage, en tant que de besoin, des installations et services des ministères et organismes fédéraux.

Usage des services fédéraux

President

65. (1) The Governor in Council shall appoint an officer to be called the President of the Agency, to hold office during pleasure, who shall be, for the purposes of this Act, a deputy of the Minister.

65. (1) Le gouverneur en conseil nomme à titre amovible le président de l'Agence; celui-ci a, pour l'application de la présente loi, rang d'administrateur général de ministère.

Président

Idem

(2) The President shall be the chief executive officer of the Agency, and may exercise all of the powers of the Minister under this Act as authorized by the Minister.

(2) Le président est le premier dirigeant de l'Agence et peut exercer les pouvoirs que la présente loi confère au ministre et que celui-ci l'autorise à exercer.

Idem

Acting President

(3) Subject to subsection (5), in the event of the absence or incapacity of the President

(3) Sous réserve du paragraphe (5), en cas d'absence ou d'empêchement du président ou

Absence ou empêchement

	or a vacancy in that office, the Executive Vice-President shall act as, and exercise the powers of, the President for the time being.	de vacance de son poste, l'intérim est assuré par le premier vice-président.	
Idem	(4) Subject to subsection (5), the Minister may appoint a person other than the Executive Vice-President to act as the President for the time being.	(4) Sous réserve du paragraphe (5), le ministre peut nommer une autre personne que le premier vice-président pour assurer l'intérim.	Idem
Approval required	(5) The Executive Vice-President, or a person appointed pursuant to subsection (4), shall not act as the President for a period exceeding ninety days without the approval of the Governor in Council.	(5) Le premier vice-président ou une personne nommée aux termes du paragraphe (4) ne peut assurer l'intérim que pour une période de quatre-vingt-dix jours, sauf approbation du gouverneur en conseil.	Approbation du gouverneur en conseil
Executive Vice-President	66. (1) The Governor in Council may appoint an officer, to be called the Executive Vice-President of the Agency, to hold office during pleasure.	66. (1) Le gouverneur en conseil peut nommer à titre amovible le premier vice-président de l'Agence.	Premier vice-président
Powers, duties and functions	(2) The Executive Vice-President shall exercise such powers and perform such duties and functions as the President may assign.	(2) Le premier vice-président exerce les pouvoirs et fonctions que lui attribue le président.	Pouvoirs et fonctions
Remuneration	67. The President and the Executive Vice-President shall be paid such remuneration as the Governor in Council may fix.	67. Les président et premier vice-président reçoivent la rémunération fixée par le gouverneur en conseil.	Rémunération
Appointment under the Public Service Employment Act	68. The officers and employees necessary to carry out the work of the Agency shall be appointed in accordance with the <i>Public Service Employment Act</i> .	68. Le personnel nécessaire à l'exécution des travaux de l'Agence est nommé conformément à la <i>Loi sur l'emploi dans la fonction publique</i> .	Nominations : <i>Loi sur l'emploi dans la fonction publique</i>
Head office	69. The head office of the Agency shall be in the National Capital Region described in the schedule to the <i>National Capital Act</i> .	69. Le siège de l'Agence est fixé dans la région de la capitale nationale définie à l'annexe de la <i>Loi sur la capitale nationale</i> .	Siège
Contracts, etc., binding on Her Majesty	70. (1) Every contract, memorandum of understanding and arrangement entered into by the Agency in its own name is binding on Her Majesty in right of Canada to the same extent as it is binding on the Agency.	70. (1) Les contrats ou ententes conclus par l'Agence sous son propre nom lient Sa Majesté du chef du Canada au même titre qu'elle-même.	Contrats
Legal proceedings	(2) Actions, suits or other legal proceedings in respect of any right or obligation acquired or incurred by the Agency, whether in its own name or in the name of Her Majesty in right of Canada, may be brought or taken by or against the Agency in the name of the Agency in any court that would have jurisdiction if the Agency were a corporation that is not an agent of Her Majesty.	(2) À l'égard des droits et obligations qu'elle assume sous le nom de Sa Majesté du chef du Canada ou le sien, l'Agence peut ester en justice sous son propre nom devant tout tribunal qui serait compétent si elle était dotée de la personnalité morale et n'avait pas la qualité de mandataire de Sa Majesté.	Actions en justice

ANNUAL REPORT

Annual report
to Parliament

71. (1) The Minister shall report annually to Parliament, within four months after the end of the fiscal year being reported, on the activities of the Agency and the administration and implementation of this Act and regulations during that year.

Statistical
summary to be
included

(2) The annual report to Parliament referred to in subsection (1) shall include a statistical summary of all environmental assessments conducted or completed, under the authority of this Act during the fiscal year being reported.

REVIEW

Review

72. (1) Five years after the coming into force of this section, a comprehensive review of the provisions and operation of this Act shall be undertaken by the Minister.

Report to
Parliament

(2) The Minister shall, within one year after a review is undertaken pursuant to subsection (1) or within such further time as the House of Commons may authorize, submit a report on the review to Parliament including a statement of any changes the Minister recommends.

TRANSITIONAL

Employment
continued

73. (1) Each person employed in the Federal Environmental Assessment Review Office, or seconded to that Office from any portion of the public service of Canada, on the day preceding the day on which section 61 comes into force is deemed to have been appointed pursuant to section 68 or seconded, as the case may be, to a position in the Agency of the same occupational nature and at the same level as the position occupied by the person on that preceding day.

Probation

(2) Notwithstanding section 28 of the *Public Service Employment Act*, no person who is deemed under subsection (1) to have been appointed to a position in the Agency is subject to probation unless the person was subject to probation on the day preceding the day of the deemed appointment, and any

RAPPORT ANNUEL

Rapport annuel
du ministre

71. (1) Dans les quatre mois suivant la fin de chaque exercice, le ministre établit un rapport sur l'application de la présente loi et de ses règlements et les activités de l'Agence au cours de l'exercice précédent et le fait déposer devant le Parlement.

Contenu du
rapport

(2) Le rapport contient le résumé statistique des évaluations environnementales effectuées ou terminées en application de la présente loi au cours de l'exercice visé.

EXAMEN

Examen

72. (1) Dans les cinq années qui suivent l'entrée en vigueur du présent article, un examen complet des dispositions et de l'application de la présente loi doit être fait par le comité, soit de la Chambre des communes, soit mixte, que le Parlement désigne ou constitue à cette fin.

Rapport au
Parlement

(2) Dans l'année qui suit le début de l'étude visée au paragraphe (1) ou dans le délai supérieur que le Parlement lui accorde, le ministre remet son rapport, accompagné des modifications à la présente loi ou aux modalités d'application de celle-ci qu'il recommande, au Parlement.

DISPOSITIONS TRANSITOIRES

Maintien en
poste

73. (1) Les membres du personnel du Bureau fédéral d'examen des évaluations environnementales et les personnes détachées d'autres secteurs de l'administration publique fédérale auprès de lui et en fonctions à l'entrée en vigueur de l'article 61 deviennent membres de celui de l'Agence et sont réputés avoir été nommés à des fonctions identiques en vertu de l'article 68, ou être détachés auprès du Bureau, selon le cas, lors de cette entrée en vigueur.

Stage

(2) Par dérogation à l'article 28 de la *Loi sur l'emploi dans la fonction publique*, les personnes qui, la veille du jour de la présomption de nomination, étaient stagiaires continuent de l'être jusqu'à la fin de la période initialement prévue.

person who was so subject to probation continues subject thereto only for as long as would have been the case but for this section.

Guidelines
Order
continued

74. (1) The *Environmental Assessment and Review Process Guidelines Order*, approved by Order in Council P.C. 1984-2132 of June 21, 1984 and registered as SOR/84-467, shall continue to apply in respect of any proposal that prior to the coming into force of this section was referred to the Minister for public review and for which an Environmental Assessment Panel was established by the Minister pursuant to that Order.

Maintien de
l'application du
décret

74. (1) Le Décret sur les lignes directrices visant le processus d'évaluation et d'examen en matière d'environnement approuvé par le décret C.P. 1984-2132 du 21 juin 1984 et enregistré sous le numéro DORS/84-467 continue de s'appliquer aux examens publics qui y sont visés et pour lesquels les membres de la commission d'évaluation environnementale ont été nommés sous son régime avant l'entrée en vigueur du présent article.

Idem

(2) The Order referred to in subsection (1) shall continue to apply in respect of any proposal for which an environmental screening or initial assessment under that Order was commenced before the coming into force of this section, but where any such proposal is referred to the Minister for public review pursuant to section 20 of that Order, this Act shall thereupon apply and the Minister may refer the project to a mediator or a review panel in accordance with section 29.

(2) Le décret visé au paragraphe (1) continue de s'appliquer aux examens préalables ou aux évaluations initiales commencés sous son régime avant l'entrée en vigueur du présent article, jusqu'au moment où, le cas échéant, une proposition est soumise au ministre pour examen public aux termes de l'article 20 du décret, auquel cas la présente loi commence de s'appliquer et le ministre peut prendre une décision aux termes de l'article 29.

Examens
préalables en
cours et
évaluations
initiales

Idem

(3) Where a proponent proposes to carry out, in whole or in part, a project for which an environmental screening or an initial assessment was conducted in accordance with the Order referred to in subsection (1), and

(3) Dans le cas où un promoteur propose la réalisation de tout ou partie d'un projet à l'égard duquel l'examen préalable ou l'évaluation initiale a été effectuée sous le régime du décret visé au paragraphe (1), l'autorité responsable peut utiliser le rapport de l'examen ou de l'évaluation, ou en permettre l'utilisation, dans la mesure appropriée pour l'observation des articles 18 ou 21 dans chacun des cas suivants :

Utilisation
d'une
évaluation
antérieure

- (a) the project did not proceed after the assessment was completed,
- (b) in the case of a project that is in relation to a physical work, the proponent proposes an undertaking in relation to that work different from that proposed when the assessment was conducted,
- (c) the manner in which the project is to be carried out has subsequently changed, or
- (d) the renewal of a licence, permit, approval or other action under a prescribed provision is sought,

- a) le projet n'a pas été réalisé après l'achèvement de l'évaluation;
- b) le promoteur d'un projet lié à un ouvrage en propose une réalisation différente de celle qui était proposée au moment de l'évaluation;
- c) les modalités de réalisation du projet sont nouvelles;
- d) la présentation d'une demande de renouvellement d'un permis, d'une licence, d'une autorisation ou d'une autre mesure en vertu d'une disposition désignée par règlement.

the responsible authority may use or permit the use of the environmental screening or initial assessment and the report thereon to whatever extent it is appropriate to do so for the purpose of complying with section 18 or 21.

Idem

(4) Where the construction or operation of a physical work or the carrying out of a physical activity was initiated before June 22, 1984, this Act shall not apply in respect of the issuance or renewal of a licence, permit, approval or other action under a prescribed provision in respect of the project unless the issuance or renewal entails a modification, decommissioning, abandonment or other alteration to the project, in whole or in part.

(4) Dans les cas où la construction ou l'exploitation d'un ouvrage ou la réalisation d'une activité concrète a été entamée avant le 22 juin 1984, la présente loi ne s'applique à la délivrance ou au renouvellement d'une licence, d'un permis, d'une autorisation ou à la prise d'une autre mesure en vertu d'une disposition désignée par règlement à l'égard du projet que si telle mesure entraîne la modification, la désaffectation ou la fermeture d'un ouvrage en tout ou en partie.

Commencement des activités antérieur au 22 juin 1984

CONSEQUENTIAL AMENDMENTS

R.S., c. A-1

Access to Information Act

75. Schedule I to the *Access to Information Act* is amended by adding thereto, in alphabetical order under the heading "*Other Government Institutions*", the following:

Canadian Environmental Assessment Agency

Agence canadienne d'évaluation environnementale

76. Schedule II to the said Act is amended by adding thereto, in alphabetical order, a reference to

Canadian Environmental Assessment Act
Loi canadienne sur l'évaluation environnementale

and a corresponding reference in respect of that Act to "subsection 35(4)".

R.S., c. 16 (4th Suppl.)

Canadian Environmental Protection Act

77. The definition "federal lands" in section 52 of the *Canadian Environmental Protection Act* is repealed and the following substituted therefor:

"federal lands"
« territoire... »

"federal lands" means

(a) lands that belong to Her Majesty in right of Canada, or that Her Majesty in

MODIFICATIONS CORRÉLATIVES

Loi sur l'accès à l'information

75. L'annexe I de la *Loi sur l'accès à l'information* est modifiée par insertion, suivant l'ordre alphabétique, sous l'intertitre « *Autres institutions fédérales* », de ce qui suit :

Agence canadienne d'évaluation environnementale

Canadian Environmental Assessment Agency

76. L'annexe II de la même loi est modifiée par insertion, suivant l'ordre alphabétique, de ce qui suit :

Loi canadienne sur l'évaluation environnementale

Canadian Environmental Assessment Act ainsi que de la mention « paragraphe 35(4) » placée en regard de ce titre de loi.

L.R., ch. A-1

Loi canadienne sur la protection de l'environnement

77. La définition de « territoire domanial », à l'article 52 de la *Loi canadienne sur la protection de l'environnement*, est abrogée et remplacée par ce qui suit :

« territoire domanial »

a) Les terres qui appartiennent à Sa Majesté du chef du Canada ou qu'elle a

L.R., ch. 16 (4^e suppl.)

« territoire domanial »
"federal lands"

right of Canada has the right to dispose of, and all waters on and airspace above those lands,

(b) the following lands and areas, namely,

(i) the internal waters of Canada within the meaning of the *Territorial Sea and Fishing Zones Act*, including the seabed and subsoil below and the airspace above those waters,

(ii) the territorial sea of Canada as determined in accordance with the *Territorial Sea and Fishing Zones Act*, including the seabed and subsoil below and the airspace above that sea,

(iii) any fishing zone of Canada prescribed under the *Territorial Sea and Fishing Zones Act*,

(iv) any exclusive economic zone that may be created by Canada, and

(v) the continental shelf, consisting of the seabed and subsoil of the submarine areas that extend beyond the territorial sea throughout the natural prolongation of the land territory of Canada to the outer edge of the continental margin or to a distance of two hundred nautical miles from the inner limits of the territorial sea, whichever is the greater, or that extend to such other limits as may be prescribed pursuant to an Act of Parliament, and

(c) reserves, surrendered lands and any other lands that are set apart for the use and benefit of a band and are subject to the *Indian Act*, and all waters on and airspace above those reserves or lands;

le pouvoir d'aliéner, ainsi que leurs eaux et leur espace aérien;

b) les terres et zones suivantes :

(i) les eaux intérieures du Canada au sens de la *Loi sur la mer territoriale et la zone de pêche*, ainsi que leur fond, leur sous-sol et leur espace aérien,

(ii) la mer territoriale du Canada délimitée conformément à la *Loi sur la mer territoriale et la zone de pêche*, ainsi que le fond de la mer, son sous-sol et son espace aérien,

(iii) toute zone de pêche délimitée par règlement pris sous le régime de la *Loi sur la mer territoriale et la zone de pêche*,

(iv) toute zone économique exclusive créée par le gouvernement fédéral,

(v) le plateau continental, c'est-à-dire le fond de la mer et le sous-sol des zones sous-marines qui s'étendent au-delà de la mer territoriale sur tout le prolongement naturel du territoire terrestre du Canada soit jusqu'au rebord externe de la marge continentale, soit jusqu'à deux cents milles marins des limites intérieures de la mer territoriale là où ce rebord se trouve à une distance inférieure, soit jusqu'aux limites fixées au titre d'une loi fédérale;

c) les réserves, terres cédées ou autres terres qui ont été mises de côté à l'usage et au profit d'une bande et assujetties à la *Loi sur les Indiens*, ainsi que leurs eaux et leur espace aérien.

R.S., c. P-21

Privacy Act

78. The schedule to the *Privacy Act* is amended by adding thereto, in alphabetical order under the heading "*Other Government Institutions*", the following:

Canadian Environmental Assessment Agency

Agence canadienne d'évaluation environnementale

Loi sur la protection des renseignements personnels

L.R., ch. P-21

78. L'annexe de la *Loi sur la protection des renseignements personnels* est modifiée par insertion, suivant l'ordre alphabétique, sous l'intertitre « *Autres institutions fédérales* », de ce qui suit :

Agence canadienne d'évaluation environnementale

Canadian Environmental Assessment Agency

R.S., c. P-35

Public Service Staff Relations Act

79. Part I of Schedule I to the *Public Service Staff Relations Act* is amended by adding thereto, in alphabetical order, the following:

Canadian Environmental Assessment Agency
Agence canadienne d'évaluation environnementale

Loi sur les relations de travail dans la fonction publique

79. La partie I de l'annexe I de la *Loi sur les relations de travail dans la fonction publique* est modifiée par insertion, suivant l'ordre alphabétique, de ce qui suit :

Agence canadienne d'évaluation environnementale
Canadian Environmental Assessment Agency

L.R., ch. P-35

R.S., c. P-36

Public Service Superannuation Act

80. Part I of Schedule I to the *Public Service Superannuation Act* is amended by adding thereto, in alphabetical order, the following:

Canadian Environmental Assessment Agency
Agence canadienne d'évaluation environnementale

Loi sur la pension de la fonction publique

80. La partie I de l'annexe I de la *Loi sur la pension de la fonction publique* est modifiée par insertion, suivant l'ordre alphabétique, de ce qui suit :

Agence canadienne d'évaluation environnementale
Canadian Environmental Assessment Agency

L.R., ch. P-36

R.S., c. T-19

Transportation of Dangerous Goods Act

81. Section 28 of the *Transportation of Dangerous Goods Act* is repealed and the following substituted therefor:

28. Where the Minister or a person designated by the Minister considers it necessary for the protection of public safety, property or the environment, the Minister may, subject to any regulation made pursuant to paragraph 21(r), direct any person engaged in handling, offering for transport or transporting dangerous goods forthwith to cease any such activity or to carry it on in the manner directed.

Loi sur le transport des marchandises dangereuses

81. L'article 28 de la *Loi sur le transport des marchandises dangereuses* est abrogé et remplacé par ce qui suit :

28. Dans les cas où il l'estime nécessaire pour la protection de la sécurité publique, des biens ou de l'environnement, le ministre ou la personne qu'il désigne peut, sous réserve des règlements pris en vertu de l'alinéa 21r), ordonner à des personnes déterminées qui se livrent à des opérations de manutention ou de transport de marchandises dangereuses soit de cesser ces opérations, soit de les mener selon des modalités bien précises, sans délai.

L.R., ch. T-19

Protection du public

COMING INTO FORCE

Coming into force

82. This Act, or any provision of this Act, shall come into force on a day or days to be fixed by order of the Governor in Council.

ENTRÉE EN VIGUEUR

Entrée en vigueur

82. La présente loi ou telle de ses dispositions entre en vigueur à la date ou aux dates fixées par décret du gouverneur en conseil.



Appendix B:

Environmental Assessment Guidelines for the Provision of Specialist Information— Atmospheric Environment Program

ENVIRONMENTAL ASSESSMENT GUIDELINES FOR THE PROVISION OF SPECIALIST INFORMATION

ATMOSPHERIC ENVIRONMENT PROGRAM

Version Francaise

TABLE OF CONTENTS

I OVERVIEW (one document)

A. INTRODUCTION

B. CEAA and the AEP

1. EARP- 1973 To 1993
2. CEAA And The EA Process
3. The Role of The AEP as Specialists in EA
4. The Need for Common Guidelines
5. Minimal but Flexible

C. RESPONSIBILITIES and SERVICES AVAILABLE

1. National EA Coordinator
- < 2. Regions
3. Air Quality Research Branch
4. Ice Services Branch
5. Climate Research Branch

D. ISSUES ADDRESSED in the GUIDELINES

1. Issues Overview
2. Issues Table

3. Authorities Summary

II. PROJECT-SPECIFIC EA GUIDELINES (separate appendices)

A. Pulp and Paper Mills

B. Thermal Powered Electricity Generation Plants

C. Incinerators

D. Oil and Gas Exploration, Development, Production and (Offshore) Transportation

E. Petro-Chemical Processing

F. Mines

G. Nuclear Projects

H. Airports

I. Smelters

J. Dams and Hydroelectric Generation Projects

K. Marinas, Ports, Dredging, Offshore Structures and Undersea Facilities (Non-Oil and Gas)

L. Highways and Ground Transportation

I OVERVIEW

A. INTRODUCTION

Environmental Assessment (EA) assists in the making of sound environmental decisions. It is a federal process highly visible to all levels of government, industry and the public. Within Environment Canada, the atmospheric components of EA responsibilities are handled within the Atmospheric Environment Program (AEP). The AEP comprises those activities and services delivered by the Atmospheric Environment Service (AES) and components of the DOE regions.

EA has existed as a formal federal activity since 1973. With the proclamation of the new Canadian Environmental Assessment Act (CEAA, or the Act), and in order to maintain the level of expertise needed to carry out EA responsibilities, a national set of guidelines for the provision of specialist information has been developed.

The purpose of these guidelines is to facilitate more consistent environmental assessment reviews and potentially protect staff against court challenges.

As well, the existence of a ready reference on provision of technical information will maximize the limited resources available to carry out the AEP's EA responsibilities.

This Overview is divided into three major sections:

CEAA and the AEP: primarily a policy discussion placing the EA specialist responsibilities of the AEP within the context of the new Act.

: a description of what each of the components of the AEP involved in the delivery of EA must do, and how they are able to do it. Each section has been prepared by an expert from that particular component of the AEP.

Issues Addressed in the Guidelines: a brief statement of the key issues to be considered in the assessments, along with a table showing which issues apply to each project type, and finally a summary of the authorities involved (where applicable).

The main component of this document is the **project-specific guidelines**, intended to provide suggested technical guidance when providing specialist information for a particular type of proponent activity, such as a pulp and paper mill, airport, smelter, and so on. These guidelines have been developed by regional EA specialists.

This is intended as a dynamic document in that the sections will be reviewed and updated on at least an annual basis, as new "tools" for providing EA specialist information are developed, or old ones improved.

B. CEAA and the AEP

1. EARP- 1973 to 1994

The Environmental Assessment and Review Process (EARP) was established by Cabinet decision in December 1973 and subsequently amended by Cabinet in February 1977. The process embodies Canada's policy on environmental impact assessment as it relates to the activities of the federal government, and provides a means of determining the potential environmental impact of all federal projects, programs and activities. In June 1984 a federal Order-in-Council (OIC) was approved as annexed Guidelines to implementation of the federal policy on environmental assessment and review. This OIC is commonly known as the EARP Guidelines Order.

Within the AEP, much of the EA effort has been expended as a specialist department. The AEP provides data, information, advice and comment on proposals in accordance with Section 19 of the EARP Guidelines Order. In addition, Section 19 requires departments with specialist knowledge and responsibilities to also advocate its interests. Similarly Section 36 of the Guidelines Order requires specialist departments to provide data, information and advice in support of formal Panel reviews.

2. CEAA and the EA Process

The Canadian Environmental Assessment Act (CEAA) received Royal Assent in June 1992 and, following development of a set of key Regulations, was recently proclaimed. Accountabilities under the new legislation are largely as they were under the Guidelines Order, although several new features are added. These are discussed below in the context of the AEP's role in providing specialist information.

The environmental assessment process under the Act may be envisioned to operate as depicted in the "EA PROCESS" flow chart shown at the end of this section. Basically, the Act requires that an assessment be conducted before the federal government makes a decision that enables a project, as defined in the Act, to be carried out. Section 5 of the Act specifies four categories of decision-making that could "trigger" an environmental assessment; departments involved in any of these triggers are termed a "responsible authority".

An environmental assessment of a project is required where the federal government:

- i) is the proponent of the project,
- ii) makes federal funds available for a project,

iii) makes federal lands available for a project, or

iv) under a prescribed statutory or regulatory provision, issues a permit or licence, grants an approval or takes any other action which allows a project to proceed.

The majority of AEP EA activity involves providing information as a specialist department for a project originating with an external proponent. The AEP issues no permits and has no licence-granting authority. The AEP may also be involved as the proponent of a project (ie a capital project), by issuing a financial grant or, on rare occasion, providing use of land for a project. For the purposes of this document, only the AEP's role as a specialist will be considered. 3.

The Role of the AEP as Specialists in CEAA

To place what the AEP should do as a specialist in the proper context, it is useful to examine the Act in some detail, in the context of its precise wording.

Purposes of the Act (Section 4)

"(a) to ensure that the environmental effects of projects receive careful consideration before responsible authorities take actions in connection with them;

(b) to encourage responsible authorities to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy;..."

Reference to Specialist (Section 12 (3))

"Every federal authority that is in possession of specialist or expert information or knowledge with respect to a project shall, on request, make available that information or knowledge to the responsible authority or to a mediator or a review panel"

Section 12 therefore defines the participation of the AEP as a specialist. It is worth noting that the specialist information or knowledge shall be provided *on request*, that is, the AEP will participate in a reactive role to a request from a responsible authority. This request would normally be received via the applicable DOE Regional EA Coordinating Committee (EACC). The responsible authority may be DOE or another federal authority as defined by the Act. Further the AEP may participate in response to similar requests from provincial or other jurisdictions as defined by the Act.

Definition of Project (Section 2)

"'Project' means

(a) in relation to a physical work, any proposed construction, operation, modification, decommissioning, abandonment or undertaking in relation to that physical work, or

(b) any proposed physical activity not relating to a physical work that is prescribed or is within a class of physical activities that are pursuant to (the Inclusion List Regulation)"

Definition of Environmental Assessment (Section 2)

"'Environmental Assessment' means, in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with (the) Act and the regulations."

Definition of Environmental Effect (Section 2)

"'Environmental Effect' means, in respect of a project,

(a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and

(b) any change to the project that may be caused by the environment, whether such change occurs within or outside Canada."

Factors to be considered (Section 16 (1))

"Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

(b) the significance of the effects referred to in paragraph (a) above;

....

(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project"

From these definitions it is evident that an environmental assessment is to consider both the environmental effect of the project on the environment *and vice versa*, throughout the *entire lifetime* of the project. Cumulative effects and mitigative measures are also to be examined. These aspects pertain to all components of an assessment including the provision of specialist information or knowledge.

Persons providing specialist information or knowledge can also be involved in the panel review stage of environmental assessment of a project. The Minister of the Environment can establish a roster of persons from which the review panel can be composed (Section 33 (2)). Also, the review panel has significant powers:

Review panel (Section 35):

"(1) A review panel has the power of summoning any person to appear as a witness before the panel and of ordering the witness to:

(a) give evidence, orally or in writing; and

(b) produce such documents and things as the panel considers necessary for conducting its assessment of the project.

(2) A review panel has the same power to enforce the attendance of witnesses and to compel them to give evidence and produce documents and other things as is vested in a court of record"

There will also be convenient public access to records relating to environmental assessments, through the creation and maintenance of a public registry. The registry (55(3)) "shall contain all records produced, collected, or submitted with respect to the environmental assessment of the project, including (a) any report relating to the assessment..."

4. The Need for Common Guidelines

The AEP clearly has a role as a federal authority in possession of specialist knowledge and information. The AEP can be called upon by the responsible authority to provide this expertise for any project

undergoing environmental assessment. The information can also be called for at a review panel and any records produced that pertain to the assessment must be available to the public through the registry. It is evident then that, in order to fulfil the role as specialist, the AEP should provide its knowledge and information in a consistent manner such that our EA experts are not open to liability.

The question then becomes one of policy: what information and knowledge will the AEP supply as a specialist? Based on the above discussion, there are several areas where AEP specialist expertise could apply:

a. Air quality.

The Law List regulation accompanying CEAA includes Section 63 (1) of the Canadian Environmental Protection Act, which deals with transboundary air pollution. In order to assess the applicability of this part of CEPA, we will be expected to participate in the assessment of a project. Similarly, provisions in the Canada-US Air Quality accord may necessitate AEP involvement. Also, Section 46 deals with (interprovincial) transboundary and related effects, and the Minister may need specialist information on (mainly) air issues in order to determine whether to refer the project to a mediator or a review panel. Some issues may be more discretionary in nature than others.

b. Climate and ice.

The environmental assessment is to include the effect of the project on the environment and vice versa, throughout the entire lifetime of the project, including decommissioning and abandonment. Thus a full range of climate factors will be need to be assessed to varying degrees depending on the nature of the project. The question of climate change and greenhouse gas emissions may also need to be addressed, depending on the expected lifetime of the project and also the need to assess cumulative effects. These issues are generally discretionary in nature.

c. General.

The EARP Guidelines Order specified that departments were to advocate the protection of the interests for which they are responsible. While the "advocacy" aspect is not explicitly mentioned in CEAA, Section 4 states that responsible authorities will take actions that "promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy", thus leaving considerable latitude to "advocate" DOE and AEP interests in the conduct of an environmental assessment. The Government Organization Act as it pertains to Environment Canada applies here, in terms of protection of interests for which DOE is responsible.

d. Topics not addressed by the AEP

AEP specialists on occasion are asked to provide information on subject areas for which they have no expertise, such as noise and odours. In these cases they will not provide comment in assessments. For example, in the case of noise, AEP experts are aware of the meteorological factors that affect sound propagation, but have no expertise in noise levels.

5. Minimal but Flexible

Given that environmental assessments must be done on a consistent and efficient basis for a wide variety of projects and with limited specialist resources, the AEP proposes to adopt an approach which:

- (a) ensures legislative or regulatory aspects are covered;
- (b) uses discretion on other issues which are more advocative in nature, based on available specialist resources and the nature of the project.

Section II of this document, outlining technical guidelines for a wide variety of projects for which the AEP expertise may be (or has been) required, is broadly based on the concept of the CEAA

Comprehensive Study List. Each project document is divided into two parts: a Preamble which outlines in a general way the minimum EA requirements for all projects and which initiating authority has requested the information, and a second part which provides specific requirements of proponents for the various types of projects.

C. RESPONSIBILITIES AND SERVICES AVAILABLE

1. National EA Coordinator

The AEP EA Coordinator provides Service-wide program management advice and information, and recommends on national and departmental coordination, resources and policy.

The Coordinator represents the AEP on the DOE Headquarters Environmental Assessment Coordinating Committee (EACC-HQ), which is chaired by the Environmental Protection Service (Environmental Assessment Branch).

As part of the National AEP EA program coordination, the National Coordinator also chairs national meetings of the AEP EA specialists. This group, reconstituted in June 1992, provides technical and policy coordination for AEP EA activities. Members include EA specialists from each Region, as well as specialists or program focal points from Climate Research, Air Quality Research, Ice Services, and Modernization Projects branches. The AEP EACC meets on a regular basis (at least annually), with one of its main activities being the review and updating of these guidelines.

2. DOE Regions

In the Regions, atmospheric related EA responsibilities under the Act are delivered by the Atmospheric Environment or Environmental Services Branches. These activities are generally coordinated by the Regional DOE EACC. The range and degree of activities vary from Region to Region and within a Region over time. All Regions deliver to some extent the following services:

- supply specialist information or knowledge as required by the Act.
- participate in full public panel reviews
- participate in most project reviews
- participate in various federal and provincial processes
- assist with departmental referrals
- comment on legislation, initiatives, and AES/DOE EA documents
- keep current with evolving EA requirements
- represent the Region on the AEP EACC, and represent the AEP on the DOE Regional EACC
- provide advice to managers(Responsible Authorities) on the environmental assessment process

3. AES

All components of AES will provide, on request, specialist information or knowledge in their possession as required by the Act. In addition, the following AES Branches will, to the extent that resources permit, provide the following services:

- a. Air Quality Research Branch** - support to the AEP regional EA specialists through the following

consultative services:

(i) Air Quality Modelling

- evaluation of model output results
- evaluation of appropriateness of model for application

(ii) Air Quality Monitoring

- advice on network requirements for present and proposed monitoring programs
- advice on the appropriateness of measurement techniques and instrumentation

b. Ice Services Branch - consultation, advice and review services to AEP EA specialists on ice climate and climate change issues related to EA. Examples of these services include: (i) Ice climate information

- evaluate the appropriateness of baseline ice climate information for an area prior to project implementation
- review any observation program that may be required for short or long term monitoring of ice variables for the duration of the project

(ii) Ice climate extremes and design values -evaluate the appropriateness of design values for offshore and near-shore structures related to ice extent, ice thickness and ice loads (combined with winds and/or waves)

- review the appropriateness of the data sets and models used for determining the ice climate extremes and design values

(iii) Ice climate change and variability

- evaluate the appropriateness in expected trends in the ice climate means and variability applied to the lifetime of the project
- review the data sets, ice climate models and climate change scenarios used to determine the expected trends in climate means and variability

(iv) Ice climate sensitivity and impacts

- evaluate analyses of the sensitivity of various sectors (eg marine transportation) to ice climate change and variability
- evaluate analyses of the impacts on various sectors from ice climate change and variability
- review the appropriateness of the methods and techniques used to determine ice climate sensitivity and impacts

c. Climate Research Branch - consultation, advice and review services to *supplement* AEP EA specialists' knowledge on general climate and climate change issues related to EA. Examples of these services are listed below:

(i) Baseline climate

- review the representativeness of available climate data
- evaluate the accuracy and appropriateness of baseline climate for an area prior to project

implementation

-review any observation program that may be required for short or long term monitoring of climate variables for the duration of the project

(ii) Climate extremes and design values

-evaluate the appropriateness of design values for land and marine structures related to snow loads, wind, waves, temperature, rates for rainfall, snowmelt and evaporation, probable maximum precipitation, and storm surges

-review the appropriateness of the data sets, statistical and dynamic models used for determining the climate extremes and design values

(iii) Climate change and variability

-evaluate the appropriateness of the expected trends in the climate means and variability applied to the lifetime of the project

-review the data sets, climate models, climate change scenarios, and climate transposition methods used to determine the expected trends in climate means and variability

(iv) Climate sensitivity and impacts

-evaluate analyses of the sensitivity of various sectors to climate change and variability

-evaluate analyses of the impacts on various sectors from climate change and variability

-review the appropriateness of the methods and techniques used to determine climate sensitivity and impacts

(v) Sources and sinks of greenhouse gases

-evaluate and review the appropriateness of measured and projected sources and sinks of greenhouse gases relevant to a project

<

D. ISSUES ADDRESSED IN THE GUIDELINES

1. Issues Overview

These documents cover a number of air quality, climate and ice related issues. The nine issues are briefly summarized here, while the Issues Table in the next section shows which Issues apply to which project type. For more details the individual project guidelines should be consulted.

ISSUE 1

Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

ISSUE 2

Transboundary impacts on visibility.

ISSUE 3

Impacts from water vapour emissions.

ISSUE 4

Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no provincial/ territorial jurisdiction (e.g. Indian Lands).

ISSUE 5

Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

ISSUE 6

Estimates of greenhouse gas emissions.

ISSUE 7

Impact of the environment on the project.

ISSUE 8

Impact of climate change on the project.

ISSUE 9

Impact of the project on the local climate.

2. Issues Table

APPENDIX. / ISSUE	1	2	3	4	5	6	7	8	9
A . Pulp Mills	x	x	x	x	x	x	x	x	
B . Power Plants	x	x	x	x	x	x	x	x	
C. Incineration	x	x	x	x	x	x	x	x	
D. Oil and Gas	x	x	x	x	x	x	x	x	
E . Petro- Chemical	x	x	x	x	x	x	x	x	
F. Mines	x	x	x	x	x	x	x	x	
G. Nuclear Facilities	x		x	x	x	x	x	x	x
H. Airports	x	x	x	x	x	x	x	x	x
I. Smelters	x	x	x	x	x	x	x	x	
J. Dams and Hydro	x	x	x	x	x	x	x	x	x
K. Marinas	x			x	x	x	x	x	x
L. Highways	x	x		x	x	x	x	x	x

3. Authorities Summary

This summary contains the possible authorities, quoted in the AEP EA Specialist Guidelines, under which proponents will be asked to supply information necessary to satisfy environmental assessment requirements.

The authorities are grouped in three categories: legislative, regulatory and advocative/ discretionary.

a. Legislative

i) Canadian Environmental Protection Act, 1988, Part V, International Air Pollution, Section 61 (1).

Subject to subsection (2), where the Ministers have reason to believe that an air contaminant emitted into the air, either alone or in combination with any other air contaminant, by a source or by sources of a particular class or classes in Canada

(a) creates or may reasonably be anticipated to create air pollution in a country other than Canada, or

(b) results in or is likely to result in the violation of an international agreement entered into by the Government of Canada in relation to the control or abatement of pollution,

the Minister shall recommend to the Governor in council regulations with respect to the source or sources for the purpose of controlling or preventing the air pollution or correcting or preventing the violation.

ii) Canada/US Air Quality Accord, 1991, Annex 1, Section 3.A.2:

Compliance Monitoring, Utility Units, for Canada, Canada has agreed to a requirement that, by January 01, 1995, Canada estimate sulphur dioxide and nitrogen oxides emissions from each new electric utility unit and each existing electric utility unit greater than 26 MW using a method of comparable effectiveness to continuous emission monitoring, as well as investigate the feasibility of using and implementing, where appropriate, continuous emission monitoring systems.

iii) Canada/US Air Quality Accord, 1991, Annex 1, Section 4:

In this section, Canada recognizes the importance of protecting visibility, particularly for international parks, national, state, and provincial parks, and designated wilderness areas. Canada has agreed to a requirement to, by January 01, 1995, develop and implement means of affording levels of prevention of significant air quality deterioration and protection of visibility comparable to those in (the United States), with respect to sources that could cause significant transboundary air pollution. In the U.S., Part C of the Clean Air Act governs the prevention of significant deterioration (PSD) of visibility. Under this act, any stationary fossil fuel steam electric plant of more than 73.2 MW heat input and more than 100 t/a emissions must be considered a major source and be subjected to a PSD review.

iv) Canadian Environmental Assessment Act (CEAA), Section 46, Transboundary and Related Environmental Effects.

46. (1) Where no power, duty or function referred to in section 5 or conferred by or under any other Act of Parliament or regulation is to be exercised or performed by a federal authority in relation to a project that is to be carried out in a province and the Minister is of the opinion that the project may cause significant adverse environmental effects in another province, the Minister may refer the project to a mediator or a review panel in accordance with section 29 for an assessment of the environmental effects of the project in that other province.

b. Regulatory

i) The Canadian Environmental Assessment Act, Section 12 (3):

Every federal authority that is in possession of specialist or expert information or

knowledge with respect to a project shall, on request, make available that information or knowledge to the responsible authority or to a mediator or a review panel.

c. Advocative/ Discretionary

i) The Government Organization Act, 1979, Part III, Department of the Environment, Section 6. (1):

Duties related to the preservation and enhancement of environmental quality.

Based on this Act, the department must conduct itself in a manner which clearly reflects its mandate to protect the environment and which provides a credible model for other departments or agencies to follow.

Bob Saunders (saundersb@aestor.am.doe.ca)

> AES ENVIRONMENTAL ASSESSMENT GUIDELINES --- SPECIALIST INFORMATION

Atmospheric program
- how to reference

APPENDIX A. PULP AND PAPER MILLS

PREAMBLE

This framework document pertains to both new mills and expansion of existing ones. It pertains to all aspects of the project, with emphasis on the construction and operations phases.

Responsible Authority (unless otherwise noted): Usually DOE or DFO - sent to the departmental referral system by DFO or the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

1.1 Transboundary effects on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of low-level ozone that may form.

1.2 Authority: CEPA Part V, Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

- a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?
- b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?
- c. Were the conclusions presented compatible with the results obtained?
- d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?
- e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

- a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/ Territory, and explore with them whether the monitoring requirements proposed will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

- a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord.

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

- a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.
- b. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

- 3.1 Impacts from water vapour emissions. For example, water vapour plumes can pose a safety problem near airports; water vapour can also condense and freeze on nearby roads, creating a hazard.

3.2 Authority: Advocative/ discretionary.

- 3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

- 4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

- 4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

- a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.
- b. Compliance monitoring- must comply with Provincial requirements for similar projects.
- c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the Province

c. place these emissions in context with total emissions within the industry nationally.

ISSUE 7.

7.1 Impact of the environment on the project.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and/or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

a. an estimate of its importance to the project, including extreme events

b. an estimate of how sensitive the project is to variations of this element

c. an estimate of the utility of the climate element, including a discussion on data quality, data record

length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived

d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyse data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

Bob.Saunders saundersb@aestor.am.doe.ca

**AES ENVIRONMENTAL ASSESSMENT GUIDELINES
– SPECIALIST INFORMATION**

APPENDIX B. THERMAL POWERED ELECTRICITY GENERATION PLANTS

PREAMBLE

This framework document covers the various components, particularly the construction and operation, of fossil-fuel-fired electricity generating stations. It can pertain to new facilities as well as expansion of existing ones.

Responsible Authority (unless otherwise noted):

Usually DOE - sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

- 1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide.
- 1.2 Authority: CEPA Part V; Canada/US Air Quality Accord
- 1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).
 - 1.3.1. Methodology used to determine impacts:
 - a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?
 - b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?
 - c. Were the conclusions presented compatible with the results obtained?
 - d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?
 - e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?
 - 1.3.2. Compliance Monitoring a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/ Territory, and explore with them whether the monitoring requirements proposed will meet Canada's commitment under the Accord.
 - 1.3.3. Prevention of significant air quality deterioration
 - a. No information required of the proponent at this time. When Canada specifies its

requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

- 2.1 Transboundary impacts on visibility.
- 2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord
- 2.3 Information Requested:
 - 2.3.1. Prevention of significant deterioration of visibility.
 - a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.
 - b. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

- 3.1 Impacts from water vapour emissions. For example, water vapour plumes can pose a safety problem near airports; water vapour can also condense and freeze on nearby roads, creating a hazard.
- 3.2 Authority: Advocative/ discretionary.
- 3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

- 4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).
- 4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.
- 4.3 Information Requested:
 - a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.
 - b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEEA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the Province

c. place these emissions in context with total emissions within the industry nationally

d. place these emissions in context with total emissions from an equivalent coal-fired plant.

ISSUE 7.

7.1 Impact of the environment on the project.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be

reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events
- b. an estimate of how sensitive the project is to variations of this element
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION**APPENDIX C. INCINERATORS****PREAMBLE**

Many small scale and/or one time incineration events would likely never be subjected to environmental assessment unless toxic materials were involved. On the other hand large permanent structures in the past have been assessed and will likely require assessment under CEAA, an example being the Alberta Special Waste Treatment Centre (ASWTC).

Responsible Authority (unless otherwise noted): Usually DOE - sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and heavy metals and particulates and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow). As air chemistry affects the volatility and emission of heavy metals, the information on the chemical form of the metals released should be included.

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic or heavy metal loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements they propose will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility. For example, the release of large quantities of water vapour during cold conditions may contribute to the formation of fog or icefog. This can present a hazard to nearby highways, and would have a transboundary impact if located near a political boundary.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

a. No information is required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

3.1 Impacts from water vapour emissions and/or dust (the latter of which could occur where support infrastructure involves ground transportation over non-paved roads).

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the Province

c. place these emissions in context with total emissions within the industry nationally.

ISSUE 7.

7.1 Impact of the environment on the project. This discussion should emphasize those aspects of the climate which may affect emissions or otherwise allow the accidental discharge of toxins into the environment.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. In particular, emphasis should be placed on those aspects of the climate which may affect emissions or otherwise allow the accidental release of toxins into the environment. For each climate and/or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate

EACC.

- a. an estimate of its importance to the project, including extreme events**
- b. an estimate of how sensitive the project is to variations of this element**
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived**
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted**

ISSUE 8.

8.1 Impact of climate change on the project.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

Bob Saunders saundersb@aestor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION**APPENDIX D. OIL AND GAS EXPLORATION, DEVELOPMENT, PRODUCTION AND (OFFSHORE) TRANSPORTATION****PREAMBLE**

Exploration for hydrocarbon reserves has occurred across much of mainland Canada, in the near-shore areas of the three oceans bordering Canada, in Hudson Bay and in the central and western Arctic archipelago. To date, commercial development has been limited to onshore fields; however it is only a matter of time until offshore fields are developed and full-scale production commences.

This document applies to wells drilled offshore. Most onshore wells are being drilled within areas under provincial/ territorial jurisdiction and AES input is therefore quite limited or not required. Offshore wells fall under the umbrella of one of the Canada- Provincial Offshore Petroleum Boards or, for Frontier Lands, the National Energy Board. In these cases AES involvement may be significant.

For projects which fall within Native Land Claims (the area bounded by the coastline and offshore edge of landfast ice) the appropriate Native screening committee may initiate an in depth review and possible Panel hearing. In such cases Environment Canada will contribute specialist advice, and involvement may be significant.

Responsible Authority (unless otherwise noted): Usually NRCan - sent to the departmental referral system by the National Energy Board, Canada-Provincial Offshore Petroleum Board or the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1.(NOTE: Issue numbering system is common to all documents).

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and should explore with them whether the monitoring requirements they propose will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponents should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

3.1 Impacts from water vapour emissions.

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the Province

c. place these emissions in context with total emissions within the industry nationally.

ISSUE 7.

7.1 Impact of the environment on the project. A variety of marine impacts for offshore structures will be particularly important.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the

necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and/or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events
- b. an estimate of how sensitive the project is to variations of this element
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. For example, for offshore structures, changes to the ice regime and to climate variability may be important. For onshore structures, a rise in mean temperature may affect the permafrost regime in certain northern areas. Changes to climate variability may involve changed frequency of storms and resultant changes to design values for winds, waves, precipitation, and so on.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

Bob Saunders saundersb@aestor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION**APPENDIX E. PETRO-CHEMICAL PROCESSING****PREAMBLE**

This framework document deals with projects for processing petroleum and petro-chemical products. Common examples are oil refineries, gas plants, heavy oil upgraders, tar sands plants and to some extent enhanced oil recovery projects (e.g. heavy oil extraction). Offshore oil and gas development are covered under separate documents.

Atmospheric emissions associated with petro-chemical processing are significant, both to local air quality and long-range transport of air pollutants (acid rain). Depending on the location, some elements of Issues 1, 2, 4 and 5 will need to be addressed in an environmental assessment. Water vapour emissions are substantial so potential impacts should be considered. These projects are all major emitters of greenhouse gases (particularly carbon dioxide). In addition, most of their products will be burned in some combustion process and contribute further to greenhouse gas emissions. Impacts of the environment on the project are minimal so that climate change is only an issue in projects where local surface water supplies are involved.

Responsible Authority(unless otherwise noted): Referred to DOE by the National Energy Board, the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1.*(NOTE: Issue numbering system is common to all documents).*

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide. Also of interest are emissions of particulates. Fugitive emissions of hydrocarbons (VOCs) may be of concern in their own right but also contribute to ground level ozone. Hydrocarbons may be released in the actual processing but storage and transferring the product to tank trucks or rail cars are also contributors.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow). 1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord

(Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements they propose will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponents should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

3.1 Impacts from water vapour emissions. This could be an issue if the project is located adjacent to a major highway or airport where visibility restrictions or moisture deposition (liquid or ice) could constitute a safety hazard to vehicles or aircraft.

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

- b. Compliance monitoring- must comply with Provincial requirements for similar projects.**
- c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.**

ISSUE 5. 5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions). 5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

- a. Methodology re transport of pollutants: as per 1.3.1 above.**
- b. Compliance monitoring: must comply with requirements for similar projects.**

ISSUE 6.

6.1 Estimates of greenhouse gas emissions.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

- a. provide emissions estimates**
- b. place these estimates in context with total emissions in the Province**
- c. place these emissions in context with total emissions within the industry nationally.**

ISSUE 7.

7.1 Impact of the environment on the project. The main element of concern is extreme precipitation for site water management and treatment. Also, the design of berms around storage tanks will need to accommodate significant rainfall events (e.g. 100 year, 24 hour rainfall) in addition to the contents of the storage tank. Sensitivity to temperature is minimal for most projects but extreme winds should be considered for some of the more susceptible structures.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements

will be reviewed. For each climate and/or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events
- b. an estimate of how sensitive the project is to variations of this element
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. In general most refineries and other petrochemical processing plants are relatively insensitive to climate change but there may be some exceptions, such as projects that are dependent upon local surface water supplies for process water.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

Bob Saunders saundersb@aestor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION

APPENDIX F. MINES

PREAMBLE

This framework document covers mines of all types within Canada. Although each mine has its own characteristics, all mines can be classified as either open pit or underground. Many mines include a mill for initial separation, processing and concentration of the substance of interest. Mills and some stand alone mines require the construction and operation of a tailings pond to manage liquid and some solid wastes. Construction, operation and decommissioning of the mine and its associated facilities are important to consider in the environmental assessment process. Smelters associated with (for example) copper, nickel and aluminum mines are dealt with in a separate framework document.

Impact of the environment on the project is common to all mines and is usually one of the most significant issues. Rate of rainfall and the volume and rate of snowfall are significant to the on-site water and tailings management. The impact of climate change on the project is significant to the decommissioning of tailings ponds. The estimate of greenhouse gas emissions is significant where electricity must be diesel-generated but can also include emissions from construction and operational mining equipment. Issues 1, 2 or 5 can be significant for mines located within 10 km of the respective USA or provincial/ territorial boundaries; tall stacks (greater than 50 metres) could cause concern beyond this distance. Issue 4 will need to be addressed for mines located on or adjacent to native or federal lands when provincial jurisdiction does not apply. Impact of water vapour emissions is rarely a significant issue but dust as a public safety issue should be addressed as separate from its health impact (ambient concentration).

Responsible Authority (unless otherwise noted): Usually DOE/EP (Metal Mining Liquid Effluent Regulations and Guidelines under the Fisheries Act) or sent to the departmental referral system by AECB (uranium mines), DFO or the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. *(NOTE: Issue numbering system is common to all documents).*

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of heavy metals and oxides of nitrogen and sulphur and their subsequent deposition, and impacts of total suspended particulates /dust. Air quality concerns generally centre on suspended particulates, NO_x emissions from diesel generators and, for uranium mines, SO₂ emissions from acid plants.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow). As air chemistry affects the volatility and emission of heavy metals, the information on the chemical form of the metals released should be included.

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements they propose will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponents should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

3.1 Impacts from water vapour emissions and/or dust. Dust can affect visibility and represent a public safety issue. Dust is associated with construction as well as mining activity (open pit operations, waste stockpile, blasting) or where support infrastructure involves ground transportation over non-paved roads.

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the

special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested: a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions. The key here gas is carbon dioxide.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the Province

c. place these emissions in context with total emissions within the industry nationally.

ISSUE 7.

7.1 Impact of the environment on the project. For proper design and operation of the facility the

key elements include precipitation, evaporation, evapotranspiration, wind and temperature regimes. Also, sunshine and solar radiation may be of interest for natural degradation of some compounds such as cyanides. Some tailings ponds such as those containing radioactive wastes may require an estimate of the Probable Maximum Precipitation (PMP) to ensure that the pond will not fail during the mining operation, or after it has been decommissioned. For abandonment of a tailings pond, a long-term water balance should be presented if the pond is not environmentally isolated in some other way (e.g. impervious cover).

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and/or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events.
- b. an estimate of how sensitive the project is to variations of this element.
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. The key elements here are precipitation and evaporation in connection with a long term water balance for a decommissioned tailings pond. Temperature will be a concern in areas of permafrost where potential degradation of the permafrost layer would affect the structural integrity of a decommissioned tailings pond.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

Bob Saunders saundersb@aestor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION

APPENDIX G. NUCLEAR PROJECTS

PREAMBLE

This document addresses the assessment components for AES specialists related to nuclear projects. The cycle of nuclear power generation begins with the mining and milling of radioactive nuclear material, primarily uranium. These processes should be assessed using the mining document.

The refining and conversion of nuclear fuels, nuclear power generation, nuclear research and subsequent waste management are addressed in this document.

For the refining and conversion of nuclear fuels, nuclear power generation and nuclear research, the key issues relate to the effects of an extreme environmental event on the facility and the containment and monitoring of a release of nuclear material. The possible effects of climate change may need to be assessed based on the projected lifetime of the facility.

When assessing the management of nuclear wastes, the key components to evaluate are the (a) siting of the disposal facility, (b) operation of the facility and (c) the transportation of radioactive waste to the site. These components are assessed for the impact of extreme meteorological events and the potential effects of climate change.

Assessments may also need to address the construction or decommissioning phase of these projects. These activities can generate significant quantities of air pollutants including particulates and nitrous oxides. Waste management is an important issue for facility decommissioning especially the containment of radioactive components. During these two phases, nuclear facilities also need to address the consequences of the release of nuclear material and the effects of extreme environmental events on facilities.

Detailed monitoring programs will be necessary to support many of the issues raised in this document. To avoid repetition, a summary of monitoring requirements is included at the end of this document.

Responsible Authority (unless otherwise noted): Usually DOE or sent to the departmental referral system by AECB or the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. *(NOTE: Issue numbering system is common to all documents).*

Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Nuclear projects usually do not generate significant amounts of air pollutants. However, all project components must be assessed for the accidental release of radionuclides. AES specialists should ensure that on-site meteorological monitoring would be adequate in these cases.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

- b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?**
- c. Were the conclusions presented compatible with the results obtained?**
- d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?**
- e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?**

1.3.2. Compliance Monitoring

- a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements proposed will meet Canada's commitment under the Accord.**

1.3.3. Prevention of significant air quality deterioration.

- a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.**

ISSUE 3.

3.1 Impacts from water vapour emissions are not estimated to be significant in most nuclear projects with the possible exception of refining processes. Water vapour plumes can pose a safety problem near airports; water vapour can also condense and freeze on nearby roads, creating a hazard.

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands). At this time no nuclear projects are located on Indian land.

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 The interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition should be assessed. As indicated in 1.1, nuclear projects usually do not generate significant amounts of air pollutants. However, all project components must be assessed for the accidental release of radionuclides. AES specialists should ensure that on-site meteorological monitoring would be adequate in these cases.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions. This is generally not a significant issue in nuclear projects with the possible exception of refining processes.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the province

c. place these emissions in context with total emissions within the industry nationally

d. place these emissions in context with total emissions from an equivalent coal-fired plant

ISSUE 7.

7.1 Impact of the environment on the project. This issue needs to be addressed for all nuclear projects. Project sites must be designed to adequately withstand severe weather and extreme precipitation events. Assessments should model extreme event scenarios and provide quantitative estimates of associated impacts. Projects that involve the transportation of nuclear waste are particularly susceptible to meteorological phenomena.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events
- b. an estimate of how sensitive the project is to variations of the element
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. Refining, conversion, power generation and research facilities are anticipated to operate for several decades and therefore may be impacted by near term climate change. Nuclear waste disposal projects may also be affected by long term climate change. The possible changes to water balances and extreme event frequency are of particular interest.

8.2 Authority: Advocative/ discretionary. 8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

ISSUE 9

9.1 Impact of the project on the local climate. Several of the nuclear projects could have an effect on the surrounding climate and environment. While the effects of the projects will not be significant on a large scale, alteration to some elements of the local climate may occur.

9.2 Authority: Advocative/discretionary

9.3 Information Requested: There is no regulatory basis for requesting this type of information from the proponent. However, if there is public interest and a potential for public concern, then the proponent should provide information from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it. Key elements to consider in the project area include: precipitation and hydrology; temperature regime; ice conditions on a seasonal basis for the area's rivers and water bodies.

The basic questions to be addressed would include:

a. what small-scale or local changes in climate are anticipated as a result of the construction and operation of the project?

b. what would be the likely impacts on local activities such as agriculture, forestry and transportation (aviation and marine)?

NOTE ON MONITORING

The proponent should present information on the monitoring networks and programs required to support its assessment, outlining the following:

a. capability to monitor temperature, wind, sky condition, atmospheric pressure, precipitation, ice conditions and

evaporation

b. capability and methods used to assess atmospheric stability

c. capability to monitor air and other pollutants being released

as a result of the project

d. availability of monitoring equipment and capability for emergency response

Ideally, the monitoring network for the project area should be in place before the construction begins.

Bob Saunders saundersb@aeastor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION

APPENDIX H. AIRPORTS

PREAMBLE

This framework document addresses the assessment components for AES specialists related to airport projects. It applies to the construction of new airports and the expansion of existing facilities.

It is important to consider the full range of activities associated with the project including: aircraft operations, ground operations, airport facilities, airport interface with municipal infrastructure and aviation weather services.

The predominant air issue in most airport projects will be air quality. The proponent must explore the effects of the project on air quality and demonstrate that it will not compromise federal, provincial or municipal air quality objectives and standards. The collection of comprehensive baseline data will be critical to the assessment.

The environment can have significant effects on airport operations and, as such, significant climate monitoring and modelling for the site and vicinity must be undertaken. Changes to the natural environment flowing from project construction may substantially alter the local climatology.

Noise may be a significant factor in assessing airport projects. AES specialists are not experts on noise levels and therefore cannot provide specialist information on noise. They are however familiar with the meteorological factors that affect the propagation of sound, and may on occasion comment on this particular aspect of the noise issue. Meteorological factors include wind direction, stability, cloud cover and relative humidity.

Assessments may also need to address the construction (or possibly decommissioning) phase of these projects. These activities can generate significant quantities of air pollutants including particulates and nitrous oxides.

Responsible Authority (unless otherwise noted): Usually DOT or sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide, ozone, total suspended particulates (TSP) and inhaleable particulates.

Emissions information will be required from both the aircraft and all ground operations. Future changes in aircraft volumes, queuing times and fleet composition all affect aircraft emissions. Cumulative emissions from airport operations and those from surrounding roadways should be considered. Roadway contributions may rise significantly if traffic volume and congestion increase.

Adequate assessments will require thorough baseline data for air pollutants associated with airport operations. This monitoring should be conducted on site and in communities adjacent to the airport as determined by climatological wind patterns.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines, as well as relevant provincial and local standards? Impacts on concentrations of VOCs, inhaleable particulates and hazardous pollutants should also be examined.

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements proposed will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility. This issue will generally arise only when an airport (or expansion) will be located near a border.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponents should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

3.1 Impacts from water vapour emissions.

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

- a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.**
- b. Compliance monitoring- must comply with Provincial requirements for similar projects.**
- c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.**

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

- a. Methodology re transport of pollutants: as per 1.3.1 above.**
- b. Compliance monitoring: must comply with requirements for similar projects.**

ISSUE 6.

6.1 Estimates of greenhouse gas emissions. Airport projects should be assessed for impacts on local greenhouse gas emissions through direct (aircraft and ground operations) and indirect (increased highway traffic and congestion in the airport vicinity) contributions.

6.2 Authority: Advocative/ discretionary. 6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information,

and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

- a. provide emissions estimates
- b. place these estimates in context with total emissions in the Province
- c. place these emissions in context with total emissions within the industry nationally.

ISSUE 7.

7.1 Impact of the environment on the project. Meteorological factors can have a significant impact on airport projects. Climatologies for wind, visibility, cloud ceilings and hazardous weather are important siting factors. Terrain, climatological winds and atmospheric stability affect air pollutant and noise levels. These climatologies can be significantly altered by project construction (see issue 9).

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be done through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events
- b. an estimate of how sensitive the project is to variations of this element.
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. For example, higher temperatures may require longer runways; changes in the windfield may affect runway usage; changes in the amount of freezing/frozen precipitation may affect airport operations; increase in frequency of severe summer weather may lead to need for windshear monitoring equipment.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an

effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

ISSUE 9.

9.1 Impact of the project on the local climate. For example, clearing of land for a new airport may affect the local wind field and result in blowing snow problems at the airport and the local area. The local fog regime may also be affected by the clearing of land.

9.2 Authority: Advocative/ discretionary.

9.3 Information requested: There is no regulatory basis for requesting this type of information. However, if there is public interest and a potential for public concern, then the proponent should provide the information from the perspective that the proponent's case will be more persuasive if they provide it. The basic questions to be addressed would include:

a. what small-scale or local changes in climate are anticipated as a result of the construction and operation of the project? b. what would be the likely impacts on local activities such as agriculture, forestry, and transportation (aviation and marine)?

In addition, the proponent should indicate a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data and make adjustments to the initial design values where warranted. The proponent will make the monitoring data available to AES.

Bob Saunders saundersb@aestor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION

APPENDIX I. SMELTERS

PREAMBLE

This document lists the issues to be considered in assessment of smelter projects. It can be applied to major or minor projects; in the case of the latter not all issues may need to be addressed, or at least in not as much depth. Atmospheric pollutants issues are important for this classification of project.

Responsible Authority (unless otherwise noted): Usually DOE or DFO or sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide. Information on emissions should also include those not directly associated with the smelting process (i.e., stack emissions). Similarly, effluents and various holding sites related to smelting operations may contain large amounts of numerous wet/dry elements such as metals and toxic substances. Subsequent processes, such as wind erosion, may contribute to atmospheric concentrations of these elements, which should also be considered here.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow). As air chemistry affects the volatility and emission of heavy metals, the information on the chemical form of the metals should be included.

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately? c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the appropriate provincial authority, and explore with them whether the monitoring requirements they propose will also meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility.

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.

3.1 Impacts from water vapour emissions and /or dust.

3.2 Authority: Advocative/ discretionary.

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA Section 46 (Transboundary provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

a. provide emissions estimates

b. place these estimates in context with total emissions in the Province

c. place these emissions in context with total emissions within the industry nationally.

ISSUE 7.

7.1 Impact of the environment on the project.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be done through the appropriate EACC.

a. an estimate of its importance to the project, including extreme events

b. an estimate of how sensitive the project is to variations of this element.

c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived

d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

Bob Saunders saundersb@astor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION**APPENDIX J. DAMS AND HYDROELECTRIC GENERATION PROJECTS****PREAMBLE**

This framework document lists the issues to be considered in assessments related to dams and hydroelectric projects. They can be used for a major project as well as a minor one. In the latter case some issues may not need to be considered at all or in as much depth. The Impact of the environment on the project, particularly the precipitation regime, is one of the important issues. The Impact of Climate Change on the project will also be a key issue to address.

Responsible Authority (unless otherwise noted): Usually DOE or DFO or sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements proposed will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.**2.1 Transboundary impacts on visibility.****2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord****2.3 Information Requested:****2.3.1. Prevention of significant deterioration of visibility.**

a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 3.**3.1 Impacts from water vapour emissions.****3.2 Authority: Advocative/ discretionary.**

3.3 Information requested: No information required of the proponent at this instant. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions.)

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

- a. Methodology re transport of pollutants: as per 1.3.1 above.**
- b. Compliance monitoring: must comply with requirements for similar projects.**

ISSUE 6. 6.1 Estimates of greenhouse gas emissions.**6.2 Authority: Advocative/ discretionary.**

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

- a. provide emissions estimates**
- b. place these estimates in context with total emissions in the Province**
- c. place these emissions in context with total emissions within the industry nationally**
- d. place these emissions in context with total emissions from an equivalent coal-fired plant**

ISSUE 7.

7.1 Impact of the environment on the project. Critical elements include precipitation, ice conditions, snow melt and, in some cases, permafrost.

7.2 Authority: Advocative/ discretionary.**7.3 Information requested:**

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events**
- b. an estimate of how sensitive the project is to variations of this element.**
- c. an estimate of the utility of the climate element, including a discussion on data quality, data**

record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived

d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. For example, an important consideration for some projects, depending on their location, will be changes to the permafrost regime.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

ISSUE 9.

9.1 Impact of the project on the local climate. For example, the reservoir will create a larger water surface and result in a significant change to the regional (or valley) topography.

9.2 Authority: Advocative/ discretionary.

9.3 Information requested. There is no regulatory basis for requesting this type of information. However, if there is public interest and a potential for public concern, then the proponent should provide information from the perspective that the proponent's case will be more persuasive if they provide it. The basic questions to be addressed would include:

a. what small-scale or local changes in climate are anticipated as a result of the construction and operation of the project?

b. what would be the likely impacts on local activities such as agriculture, forestry and transportation (aviation and marine)?

In addition, the proponent should make a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted. The proponent will make the monitoring data available to AES.

Bob Saunders saundersb@aestor.am.doe.ca

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION**APPENDIX K. MARINAS, PORTS; DREDGING, OFFSHORE STRUCTURES, UNDERSEA FACILITIES (NON- OIL AND GAS)****PREAMBLE**

This framework document covers a variety of projects including bridges and causeways. Offshore structures pertaining to oil and gas developments are dealt with under the "Oil and Gas" framework.

Impact of the environment on the Project, and Impact of the project on the local climate tend to be the most significant issues for this classification of project. The remaining issues generally deal directly or indirectly with pollutants or their transport. Since this project type does not generally result in permanent emitters of gases and particulate matter, these concerns normally arise from the use of heavy machinery during the construction phase. Proponents should be encouraged to indicate total emissions during the construction phase, and to compare emissions to similar projects. Climate change may be a consideration for a few of the long term projects.

Responsible Authority (unless otherwise noted): Usually DOT or sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. (NOTE: Issue numbering system is common to all documents).

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide and low level ozone. (Note: this issue expected to apply mainly to the construction phase of larger projects).

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/

Territory, and explore with them whether the monitoring requirements proposed will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands). (Note: this issue expected to apply mainly to the construction phase of larger projects).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition. (Note: this issue is expected to apply mainly to the construction phase of larger projects, because of the extensive use of heavy machinery.)

5.2 Authority: CEAA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

a. Methodology re transport of pollutants: as per 1.3.1 above.

b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions. (Note: this issue expected to apply mainly to the construction phase of larger projects).

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the

perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

- a. provide emissions estimates**
- b. place these estimates in context with total emissions in the Province**
- c. place these emissions in context with total emissions within the industry nationally (this will depend on the type of project).**

ISSUE 7.

7.1 Impact of the environment on the project.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events**
- b. an estimate of how sensitive the project is to variations of this element.**
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived**
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.**

ISSUE 8.

8.1 Impact of climate change on the project. A few of these projects result in long term structures - they become part of the landscape. During the life of the project, climate warming could lead to sea level rise; while there is little scientific consensus on the specifics, sea rises of up to one metre have been postulated. Consequently, the proponent should be encouraged to consider these effects in their overall design specifications. It could be more cost effective to address these concerns from the start as opposed to retrofitting in the future.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an

effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

ISSUE 9

9.1 Impact of the project on the local climate. For example, during the planning stages of the New Brunswick to PEI "fixed link" bridge, considerable public concern arose over the question of whether the structure would result in a delayed "ice-out" in Northumberland Strait. A great deal of effort was expended in attempting to address this issue.

9.2 Authority: Advocative/ discretionary.

9.3 Information requested: There is no regulatory basis for requesting this type of information. However, if there is public interest and a potential for public concern, then the proponent should provide the information from the perspective that the proponent's case will be more persuasive if they provide it. The basic questions to be addressed would include:

a. what small-scale or local changes in climate are anticipated as a result of the construction and operation of the project?

b. what would be the likely impacts on local activities such as agriculture, forestry and transportation (aviation and marine)?

In addition, the proponent should indicate a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data and make adjustments to the initial design values where warranted. The proponent will make the monitoring data available to AES.

AES ENVIRONMENTAL ASSESSMENT GUIDELINES- SPECIALIST INFORMATION

APPENDIX L. HIGHWAYS AND GROUND TRANSPORTATION

PREAMBLE

This framework covers projects dealing with highways and other ground transportation projects such as railways. Both the construction and operation phases are important to consider in the assessment process. Projects such as causeways and bridges are covered under a separate framework document.

Impact of the environment on the project, and impact of the project on the local climate will frequently be the most significant issues for this classification of project. The remaining issues deal directly or indirectly with pollutants and their transport. This type of project does not result in *permanent* emitters of gases and particulates, and the remaining concerns tend to arise from the use of heavy machinery during the construction phase. However, new highways will result in re-routing of vehicular traffic which, in turn, result in altered patterns of vehicle related emissions. It would not generally be expected that more vehicles would be involved, at least initially. Proponents should be encouraged to indicate total emissions during the construction phase, and from vehicular traffic on the new route, and to place this in the context of provincial and national traffic totals. Climate change concerns might occasionally arise.

Responsible Authority (unless otherwise noted): Usually DOT or sent to the departmental referral system by the appropriate provincial ministry or other jurisdiction as defined in the Act.

ISSUE 1. *(NOTE: Issue numbering system is common to all documents).*

1.1 Transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition, if any. Of particular interest: impacts on ambient air concentrations of oxides of nitrogen and sulphur and their subsequent deposition, and the impacts on ambient air concentrations of carbon monoxide or low level ozone. This issue may arise during the construction phase, because of the extensive use of heavy machinery. Also, new highways could result in re-routing of traffic to near border areas and the consequent increase of transboundary transport of vehicle related pollutants.

1.2 Authority: CEPA Part V; Canada/US Air Quality Accord

1.3 Information Requested: The process of deposition includes both the dry removal of gases and aerosols by impaction and gravitational settling as well as the washout and scavenging of pollutants by precipitation (rain and snow).

1.3.1. Methodology used to determine impacts:

a. Were all reasonable possible impacts identified and considered? Were plausible arguments given for those impacts judged to be insignificant at the outset?

b. Were the computer models used to predict the impacts credible and appropriate? Were the models applied appropriately?

c. Were the conclusions presented compatible with the results obtained?

d. Do the impacts on ambient air concentrations exceed the National Ambient Air Quality Guidelines?

e. Do the impacts on acidic loading exceed any critical loadings established for the region? In the absence of the establishment of critical loadings, how do the expected loadings compare with background levels?

1.3.2. Compliance Monitoring

a. Does the proposed monitoring meet the requirements of the Canada/US Air Quality Accord (Annex 1, Section 3.A.2)? DOE should bring this requirement to the attention of the Province/Territory, and explore with them whether the monitoring requirements they propose will meet Canada's commitment under the Accord.

1.3.3. Prevention of significant air quality deterioration

a. No information required of the proponent at this time. When Canada specifies its requirements under the Accord (Annex 1, Section 4), there will be information needs here.

ISSUE 2.

2.1 Transboundary impacts on visibility. This issue would tend to come into play only if visibility restrictions were to occur at high profile, near-border, locations. It would be expected that the primary visibility restrictions would be due to dust during the construction phase, and vehicle induced smog.

2.2 Authority: CEPA, Part V; Canada/US Air Quality Accord

2.3 Information Requested:

2.3.1. Prevention of significant deterioration of visibility. a. No information required of the proponent at this time. When Canada specifies its requirements (Annex 1, Section 4), there will be information needs here.

b. In some instances, if there is public concern, and a public review is likely, then the proponents should be requested to provide information that can be assessed as per the Methodology to obtain Impacts under 1.3.1 above. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it.

ISSUE 4.

4.1 Impacts on ambient air concentrations of pollutants and their subsequent deposition for the special case that the project is on Federal Lands having no Provincial/ Territorial jurisdiction (eg Indian Lands). (Note: this issue expected to apply mainly to the construction phase of larger projects).

4.2 Authority: Advocative/ discretionary. Currently there are no standards covering emissions from federal lands. DOE should request that the responsible authority include, as a condition in any license or agreement, that all applicable provincial regulations be met.

4.3 Information Requested:

a. Methodology to obtain impacts - as per 1.3.1 above. The methodology must comply with Provincial practice.

b. Compliance monitoring- must comply with Provincial requirements for similar projects.

c. Emissions- Must comply with Provincial requirements. Federal advice should be sought from appropriate office in DOE.

ISSUE 5.

5.1 Interprovincial transboundary impacts on ambient air concentrations of pollutants and their subsequent deposition.

This issue expected to apply mainly to the construction phase of larger projects. Also, new highways could result in re-routing of traffic to near border areas and the consequent increase of transboundary transport of vehicle related pollutants.

5.2 Authority: CEAA, Section 46 (Transboundary Provisions).

5.3 Information requested: On occasion this issue may need to be addressed at the federal level in mediation, where two or more provinces cannot resolve a transboundary air pollution issue, and the Minister of the Environment refers the project to a mediator or review panel. In each of the items discussed below, the province with the stricter standards will be the basis for the assessment.

- a. Methodology re transport of pollutants: as per 1.3.1 above.
- b. Compliance monitoring: must comply with requirements for similar projects.

ISSUE 6.

6.1 Estimates of greenhouse gas emissions. While vehicular traffic may not change significantly, the construction phase of the project may be significant for this issue. Cutting down of trees to prepare a right of way may also be significant, as trees are a sink of CO₂.

6.2 Authority: Advocative/ discretionary.

6.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant; however, these emissions are gaining higher public and political profiles. In some instances, if there is public concern, and a public review is likely, then the proponent should be requested to provide information. The basis for the request should be from the perspective that the public are interested in this information, and the proponent's case will therefore be more persuasive if they provide it. The basis for making the information request may become more solid as requirements are specified under the National Action Strategy on Global Warming.

The proponent should be asked to:

- a. provide emissions estimates
- b. place these estimates in context with total emissions in the Province
- c. place these emissions in context with total emissions within the industry nationally

ISSUE 7.

7.1 Impact of the environment on the project.

7.2 Authority: Advocative/ discretionary.

7.3 Information requested:

No direct information is requested on climate. It is expected that the proponent will provide the necessary climate and/or ice information to validate their environmental impact statements. If a section on climate is provided, only those portions thereof that pertain to the impact statements will be reviewed. For each climate and /or ice element, the proponent will give or discuss, as applicable, the following items. Should the proponent fail to provide an adequate assessment of the impact of the environment on the project, AES has a responsibility to make its concerns

known to the appropriate licensing agency. This would normally be accomplished through the appropriate EACC.

- a. an estimate of its importance to the project, including extreme events
- b. an estimate of how sensitive the project is to variations of this element.
- c. an estimate of the utility of the climate element, including a discussion on data quality, data record length, data record extension, data extrapolation, and how these factors affect the accuracy of the information derived
- d. in cases where the climate data is uncertain, a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted.

ISSUE 8.

8.1 Impact of climate change on the project. These project types can result in long-term structures - they become part of the landscape. Climate change could affect some design considerations. Example: During the lifetime of the project, climate warming could potentially lead to an increase in the water holding capacity of the atmosphere. Although there is little scientific consensus on the specifics, more frequent and more severe storms are a possible result. Consequently, from an advocative viewpoint, the proponent could be encouraged to consider culvert design specifications in light of possible larger Probable Maximum Precipitation (PMP) and snowmelt. It could be more cost effective to consider these aspects in the design of the project from the start as opposed to retrofitting in the future.

8.2 Authority: Advocative/ discretionary.

8.3 Information requested: There is no regulatory requirement to request information from the proponent at this instant. For projects where the operation, decommissioning or abandonment will occur during the timeframe when projected impacts of climate change are likely to have an effect, an assessment of these impacts should be included, as well as measures that will be taken to alleviate risks. Also, in instances where there is public concern, and a public review is likely, then the proponent should be requested to provide the information. The basis for the request should be from the perspective that the public are interested in this information and the proponent's case will be more persuasive if they provide it.

ISSUE 9

9.1 Impacts of the project on the local climate. Example: construction of elevated road and rail beds and other related structures can modify cold air drainage patterns on sloped terrain. This can lead to "cold air pooling" and more frequent frost on the uphill side of these structures. Frost sensitive crop damage could result in agricultural areas and the proponent should be made aware of this possibility.

9.2 Authority: Advocative/ advisory.

9.3 Information requested: There is no regulatory basis for requesting this type of information. However, if there is public interest and a potential for public concern, then the proponent should provide the information from the perspective that the proponent's case will be more persuasive if they provide it. The basic questions to be addressed would include:

- a. what small-scale or local changes in climate are anticipated as a result of the construction and operation of the project?
- b. what would be the likely impacts on local activities such as agriculture, forestry, and

transportation (aviation and marine)?

In addition, the proponent should make a commitment to acquire climate data on an ongoing basis and, periodically, to review and analyze the data to make adjustments to the initial design values where warranted. The proponent will make the monitoring data available to AES.



Appendix C:

Draft Guidelines for Conducting Environmental Assessments—Atlantic Region



DRAFT GUIDELINES FOR CONDUCTING ENVIRONMENTAL ASSESSMENTS

[Home](#)[Guidelines TOC](#)

PROJECTS INVOLVING FENCES

- INTRODUCTION
- REQUIREMENT FOR ENVIRONMENTAL ASSESSMENT
- PURPOSE OF FENCING
- PROJECT DESCRIPTION
- ASSESSING ENVIRONMENTAL EFFECTS
- ALTERNATIVES TO FENCING
- ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT
- ENVIRONMENTAL ASSESSMENT DECISION
- FOLLOW-UP PROGRAMS
- INFORMATION SOURCES
- CHECKLIST OF ENVIRONMENTAL ASSESSMENT REQUIREMENTS FOR PROJECTS INVOLVING FENCING

1 INTRODUCTION

These environmental assessment guidelines apply to the installation, extension, modification, and removal of fences. The guidelines are designed to assist Environment Canada staff conduct an environmental assessment when the department is a Responsible Authority (RA) under the *Canadian Environmental Assessment Act (CEAA)*.



2 REQUIREMENT FOR ENVIRONMENTAL ASSESSMENT

2.1 Establishing if an Environmental Assessment is Necessary

In accordance with *CEAA* (Section 5), Environment Canada must conduct an environmental assessment **before** it:

- undertakes a project as a proponent;
- makes or authorizes payments or provides a guarantee for a loan or other financial assistance in enabling a project to be carried out;
- has the administration of federal lands and sells, leases, or otherwise transfers the interest in those lands enabling the project to be carried out; or
- issues a permit or license, grants an approval or takes any other action in enabling the project to be carried out.

The *CEAA* (Section 2) provides the following definition of a project:

- (a) *in relation to a physical work**, any proposed construction, operation, modification, decommissioning, abandonment or other undertaking in relation to that physical work; or
- (b) any proposed physical activity not relating to a physical work that is prescribed pursuant to regulations made under paragraph 59(b).

* a physical work has been interpreted to be a physical thing at a fixed location, that is constructed with human labour

Schedule I, entry 10 of the Exclusion List Regulations states that no environmental assessment is required for the proposed expansion or modification of a fence that would **not**:

- (a) increase the length or height of the fence by more than 10 percent;
- (b) be carried out in or on or within 30m of a waterbody; and
- (c) involve the likely release of a polluting substance into a waterbody.

In addition, Schedule I, item 1 of the *Exclusion List Regulations* states that no environmental assessment is required for the "proposed maintenance or repair of an existing physical work".

2.2 Establishing What Type of Environmental Assessment is Necessary

Section 14 of the *CEAA* describes the form the environmental assessment may take. If a project is not described in the *Comprehensive Study Regulations*, the RA must ensure a screening of the project is conducted (Section 18). **In themselves, fence projects will only require a screening.**

Some project types are carried out with some regularity and both the environmental effects and the appropriate mitigative measures are well known. In these cases, an RA can prepare screening reports which can then be submitted to the Canadian Environmental Assessment Agency for approval as class screening reports (Section 19). **There are no approved class screening reports for fence projects at present.**



3 PURPOSE OF FENCING

Although optional for a screening, Section 16(2)(a) of the *CEAA* states that the RA consider the purpose of the project. Proposed fence projects that may be supported by Environment Canada (i.e., as a proponent, funder, land administrator, or regulator) are generally intended to provide a protective barrier for a particular part of an ecosystem or habitat that may be vulnerable to human or animal encroachment or to other physical forces. One of the more common reasons to install fences is to prevent unrestricted access to aquatic systems and coastal environments (e.g. rivers, wetlands, intertidal zones, beaches) supporting fish and wildlife. Fences-like structures or "snow" fences may also be used to help stabilize dune systems.



Unrestricted access to fragile areas including streambanks, wetlands, estuaries, ponds, lakeshores, beaches and other riparian zones can be harmful to fish and wildlife species that live in these habitats. The results can be impaired water quality, destruction of habitat and disturbance of fish and wildlife.

Figure 1

The need for the fence and the intended results should be described so as to help focus the assessment. Assuming a focus on preventing unrestricted access, questions to consider include:

- What specific aquatic systems or other habitats need to be protected?
- What specific fish or wildlife species need to be protected?
- What activities need to be controlled?
- Are the control measures required for temporary, seasonal or long-term protection?
- Is controlled access to be provided for livestock or particular wildlife species (e.g. for drinking water)?
- Are controlled crossings to be provided for wildlife, livestock, vehicles or pedestrians?

- Are there other activities (e.g. fertilizer and pesticide applications, animal waste, inadequate drainage, all-terrain vehicles) which require attention?
-



4 PROJECT DESCRIPTION

4.1 Scope of Project

Under Section 15 of the Act, the RA must determine the scope of the project subject to assessment. At a minimum, all undertakings (e.g. installation, maintenance, modification, decommissioning) in relation to a fence that are proposed or are likely to be carried out must be considered in the assessment. In addition, the scope of the project subject to assessment can be expanded to include other physical works and activities related to the proposed fence project. In establishing the appropriate scope of project, the following questions should be considered:

- what undertakings must be or will be carried out in relation to the proposed fence project? (e.g. installation, expansion, modification, decommissioning)
- what other physical works or activities must be undertaken before a fence project can proceed? (e.g. construction of a road)
- what other physical works or activities, and related undertakings, are made inevitable by a proposed fence? (e.g. construction of watercourse crossings)

Information on the project as defined and the environmental setting (e.g., location maps, site plans) is necessary to complete a proper screening. Information requirements related to a proposed fence project are discussed in the following subsections and a checklist is provided in Appendix I.

4.2 Installation and Extension

The following information related to fence installation should be identified:

- Length and height of fence.
- Fence construction materials.
- Location of fence and resources at risk.
- Machinery and equipment to be used.
- Work schedule.

In general, materials for a standard fence configuration could include steel posts barbed wire, wood, chain-link, stone, or any such combination. Fence posts will be spaced according to the fencing material and the desired strength and integrity. For most fencing projects assessed by Environment Canada, fence posts are usually placed directly in the ground without the need for concrete or other sub-grade reinforcement.

4.3 Maintenance and Decommissioning

The following information related to maintenance and decommissioning of fences should be identified.

- Plans for inspections to determine the effectiveness of the fence structure and any other mitigative or enhancement measures.
 - Provisions for removal and disposal of the fencing material with attention to reuse and recycling opportunities.
-



5 ASSESSING ENVIRONMENTAL EFFECTS

One of the purposes of conducting an environmental assessment under *CEAA* is to identify the

environmental effects of a project early in the planning stages so that appropriate actions can be taken. Environment and environmental effects are defined in Section 2 of the Act.

5.1 Factors to Consider in Environmental Assessments

As an RA, Environment Canada will determine the scope of the environmental assessment. However, Section 16(1) of the Act prescribes the following factors which must be addressed in a screening.

Every screening, ...shall include a consideration of the following factors:

(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

(b) the significance of the effects referred to in paragraph (a);

(c) comments from the public that are received in accordance with this Act and the Regulations;

(d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and

(e) any other matter relevant to the screening...such as the need for the project and alternatives to the project, that the responsible authority...may require to be considered.

Adverse environmental effects should be mitigated with a clear priority placed on avoidance through adoption of alternative siting, scheduling and design options. Only after all possible avoidance measures have been applied should those steps required to minimize adverse effects be considered. Compensation should only be considered as a last resort when unavoidable adverse environmental effects can be justified.

5.2 Changes in the Environment Caused by the Project

Table 1 identifies valued environmental components that are most likely to be affected by fence projects. This list is not exhaustive and other components may be relevant on a project specific basis. In carrying out the assessment, the cumulative nature, transboundary implications, and significance of each environmental effect must be determined along with possible mitigative measures.

Table 1. Potential Changes in the Environment Caused by the Project

Valued Environmental Component	Potential Adverse Effects	Cumulative Effects	Outside of Canada	Possible Mitigation Options	Contacts
---------------------------------------	----------------------------------	---------------------------	--------------------------	------------------------------------	-----------------

Water Quality	Siltation/ Sedimentation Increase in contaminant concentrations	Project Specific	Project Specific	Establish and maintain vegetated buffer strip (see note below) Avoid instream work. Schedule project during dry weather. Implement erosion prevention and control measures. Use alternative, less toxic materials for preservation of fencing material.	DFO Provincial DOE EC
Fish and Fish Habitat	Disruption of spawning and migration.	Project Specific	Project Specific	Schedule project to avoid sensitive periods for fish. As for water quality.	DFO
Wetlands	Siltation	Project Specific	Project Specific	Establish and maintain vegetated buffer strip (see note below). As for water quality.	EC Provincial Natural Resources
Wildlife and Wildlife Habitat	Disruption of migration patterns. Loss of access to watercourse	Project Specific	Project Specific	Schedule project to avoid sensitive periods for wildlife. Provide controlled access and crossing points (see note below).	EC Provincial Natural Resources

Buffer Strips



Figure 2. Buffer Strip

While fencing provides protection from the direct impact of animals, people, vehicles, etc., a vegetated buffer zone can also filter and diffuse the many sources of non-point contaminants within run-off and drainage. Buffer strips may already exist and will only require plans for maintenance or they may have to be re-established using a variety of plantings.

The appropriate width of a buffer strip depends on the type of watercourse and possibly specific provincial regulations. *The Atlantic Environmental Farm Plan Workbook (1996)* produced by the Atlantic Farmers Council have evaluated the protection offered by existing buffer strips (Table 2). It is recommended that buffer strips provide maximum protection when being reestablished or created during

fence installation and expansion projects.

Table 2. Summary of Protective Value of Buffer Strips

Watercourse	Maximum Protection	Medium Protection	Minimum Protection
Drainage and road ditches	Greater than 5 m of natural vegetation	Between 3 - 5 m of natural vegetation	Less than 3 m
Streams, brooks, rivers	Greater than 15 m of natural vegetation including grass, trees & bushes.	Between 5-15 m of natural vegetation including grass cover	Less than 5 m of undisturbed vegetation
Wetlands	Maintain ≥ 10 m buffer from where aquatic vegetation begins. Natural or planted vegetation. Buffer strip never used for agricultural purpose. Buffer strip around entire perimeter of wetland.	Maintain 3-10 m buffer from where aquatic vegetation begins. Natural or planted vegetation. Buffer strip never used for agricultural purpose. Buffer strip around entire perimeter of wetland.	Less than 3m buffer from where aquatic vegetation begins. Natural or planted vegetation. Buffer strip cut or grazed annually. Buffer strip not around entire perimeter of wetland.

- The buffer strip may require seeding or revegetation. Efforts should be made to match natural conditions as much as possible using native species.
- The feasibility of planting trees and taller growing shrubs to provide the added benefit of habitat and shelter should be determined. Plant native species as much as possible.
- The constructed fencing may only be required until the plantings become suitably established.

Stream Crossings

If stream crossings are proposed the following information should be provided:

- Purpose of the stream crossings (are they intended for only animals or also vehicles?).
- Location and type of stream crossings (low level, mid-level) and whether they are temporary or permanent (Fencing should extend along low-level crossings).
- Type and source of material to be placed on stream bed for low-level crossings.
- Culvert size for mid-level crossings.

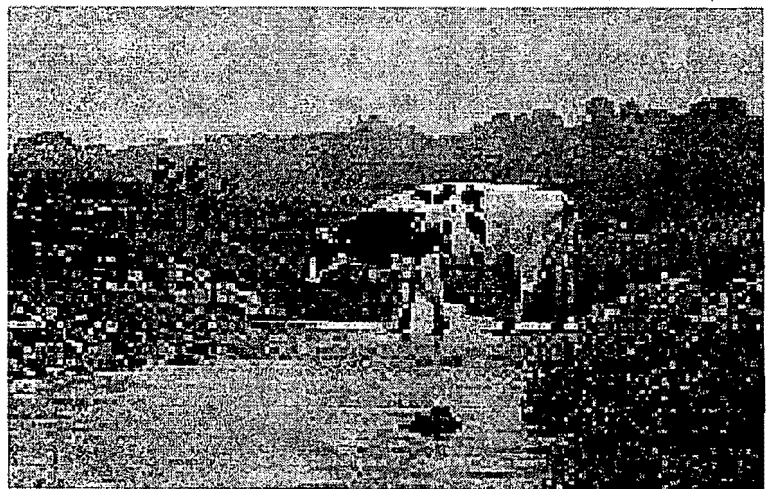


Figure 3. Low-level stream crossing

- Requirements for and status of provincial approvals (e.g. watercourse alteration, fish habitat alteration).

- Erosion control and habitat protection during construction.

Requirements and plans for permanent bank stabilization at crossing site (e.g riprap, revegetation).

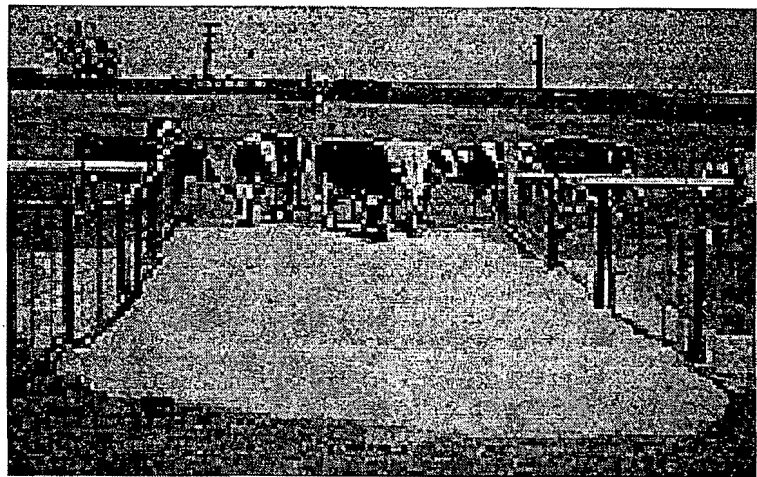


Figure 4. Mid-level stream crossing

5.3 Effects Related to Changes in the Environment

The effects of the project on the biophysical environment can also influence other valued resources and conditions. The assessment must consider the effects of the changes on the environment on socio-economic and health conditions, physical and cultural heritage and current use of resources for traditional purposes by Aboriginal peoples. Table 3 discusses each of these concerns.

Table 3. Potential Effects Related to Changes Caused by the Project

Identified Resource/Condition	Potential Adverse Effects	Cumulative Effects	Outside of Canada	Possible Mitigation Options	Contacts
Socio-economic Conditions	Reduced access for fishing and other recreational uses.	Project Specific	Project Specific	Provide controlled access and crossing points.	EC
Health Conditions	Exposure to hazardous materials	Project Specific	Project Specific	Use alternative, less toxic materials.	Health Canada EC
Physical and Cultural Heritage, Paleontological Archaeological and Architectural Resources	Disruption of significant resources or local points of interest.	Project Specific	Project Specific	Site fence to avoid heritage resources.	Heritage Canada Provincial Museums and Culture Dept.
Current uses of lands and resources for traditional purposes.	Project Specific	Project Specific	Project Specific	Project Specific.	Aboriginal Communities EC DIAND

5.4 Effects Related to Accidents/Upsets

Spills or releases from machinery or equipment (e.g. tractors, chain saws) represent the most common consideration for fencing projects. Other issues, such as the uncontrolled release of preservatives, may

be relevant on a project specific basis. The focus should be on the development and implementation of prevention and response measures.

5.5 Effects of the Project on the Environment

Under the *CEAA*, an assessment must also consider the potential effects of the environment on the project. For most fencing projects these effects are common and can be identified (Table 4) although other effects may be relevant on a project specific basis.

Table 4. Potential Effects of the Project on the Environment

Potential Effect	Possible Mitigation
Heavy snow and/or wind can weaken the fence and possible cause it to collapse.	Configure fence to reduce direct impact of prevailing winds and snow. Use material for fencing and fence posts that is designed to withstand wind and snow forces.
Flooding	Site fence so it is above high water mark.

5.6 Aboriginal Issues

The *CEAA* provides for consideration of the effects of any changes caused by the project on the current use of lands and resources for traditional purposes by Aboriginal persons. When an RA applies the *CEAA*, it also has a process that can serve as a vehicle to assist in meeting fiduciary responsibilities with respect to aboriginal peoples.

5.7 Public Consultation

Section 18(3) of *CEAA* provides the RA the opportunity to consider public participation if is appropriate for a specific project. Sufficient notice is required to allow interested parties to provide input and offer comment on a screening report.

5.8 Environmental Effects and Regulatory Regime

Environment Canada along with other federal and provincial departments administers acts, regulations, policies and programs that are relevant to fence projects (Table 4). A *Guidance Manual for Environment Canada Atlantic Region as a Responsible Authority* provides a comprehensive discussion of the legislation and priority issues related to the federal and provincial mandates and includes a listing of appropriate contacts within federal and provincial departments.

The acts and regulations listed for each of the provinces is not necessarily exhaustive and subject to change. The appropriate department should be consulted by the proponent to ensure current standards are being applied.

Table 5. Federal and Provincial Legislation and Policies Relevant to Fence Projects

Jurisdiction/Department	Legislation/Policy	Mandate
Federal		

Environment Canada	<i>Fisheries Act (Section 36)</i> <i>Migratory Birds Convention Act (Migratory Birds Regulations, Migratory Bird Sanctuary Regulations), and Canada Wildlife Act</i> <i>Federal Policy on Wetland Conservation</i> <i>CCME Water Quality Guidelines (1987)</i>	Prohibits deposition of deleterious substance in waters frequented by fish. Enables conservation and protection of migratory birds, eggs and nests, Migratory Bird Sanctuaries, and National Wildlife Areas Advocates no net loss of wetland area and function. Water quality guidelines for protection of aquatic life and a variety of uses.
Fisheries and Oceans	<i>Fisheries Act (Section 35)</i>	Prohibits the harmful alteration, disruption, or destruction of fish habitat
Canadian Heritage	<i>National Parks Act</i> <i>Canadian Heritage Rivers Systems Policy</i>	Controls activities in national parks, reserves, national historic sites and heritage canals. Allows for designation and management of heritage rivers.
Provincial		
Newfoundland Dept. of Environment and Labour	<i>The Department of Environment and Lands Act (1989)</i>	Requires permits for fording water, installing culverts, bridges or any alteration to a body of water
New Brunswick Dept. of Environment	<i>Clean Water Act (Watercourse Alteration Regulation)</i>	Requires permits for instream work or any excavation or infilling within 30 m of watercourse.
Nova Scotia Dept. of Environment	<i>Environment Act, Water Act</i> <i>(Watercourse Alteration Specifications)</i>	Authorizes, restricts, or prohibits the alteration of any watercourse. Approves watershed protection strategies.
Prince Edward Island Dept. of Environmental Resources	<i>Environmental Protection Act</i>	Requires permits for any watercourse alteration (including wetlands), the placement or removal of any structures, and operating any machinery on a watercourse.



6 ALTERNATIVES TO FENCING

An RA could consider feasible alternatives to a proposed project that may be equally or more effective at less cost and with less environmental impact. In the case of fences, other physical structures and

management practices that could be implemented include:

- Planting "living fences" using trees and shrubs.
- Providing and locating shade, food and alternative water sources away from sensitive habitat.
- Developing and maintaining controlled stream crossing points.
- Implementing rotational grazing practices which help reduce chronic stresses on soils and pasturelands, thus reducing erosion.
- Establishing and maintaining vegetated buffer strips.
- Using discarded christmas trees and other natural materials for stabilizing sand dunes.

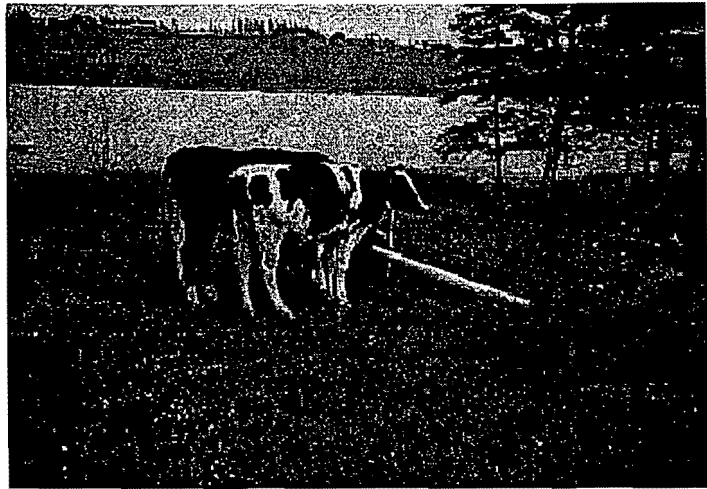


Figure 5. Alternative Watering Source

Table 6. Comparison of traditional fencing with some alternatives

	Constructed Fencing	Living Fences	Stream Crossings	Alternative Watering Facilities
Description	<p>Page wire, barbed wire, high-tensile with or without electricity, rail fences, etc.</p> <p>Allows selective passage of some wildlife species to the watercourse.</p>	<p>Plant selected species of trees and shrubs close together to form a barrier to livestock.</p> <p>May be combined with constructed fencing until plantings are established.</p>	<p>Low-level or bed crossings are constructed with concrete or gravel.</p> <p>Mid-level crossings allow low flows to pass through culverts under surface of structure and allow high flows to pass over.</p>	<p>Mechanically driven pumps</p> <p>Electrically driven pumps.</p> <p>Gravity pumps</p> <p>Solar powered pumps</p> <p>Artificial ponds</p>
Benefits	<p>Can be combined with trees, shrubs and stone pilings to provide habitat</p> <p>Provides instant protection</p>	<p>Provide cover and nesting sites.</p>	<p>Provide habitat protection while allowing fish passage.</p>	<p>Can be permanent or temporary.</p> <p>Can be combined with trees, shrubs and stone pilings to provide habitat</p>

Potential Adverse Environmental Effects (Changes in the Environment)	Described in Table 1.	Siltation of watercourse during digging and planting.	Siltation of watercourse during construction. Disruption of fish migration, spawning and breeding. Disturbance of fish habitat	Siltation of watercourse during construction. Lowering of water levels in watercourses from withdrawal.
Potential Effects of the Environment on the Project	Snow buildup, strong winds can knock fencing down. Flooding can knock down or wash away.	Strong winds can knock vegetation down. Wildlife may feed on young vegetation.	Alteration of hydrological regime Flooding, heavy runoff can cause washouts of structures and material.	None likely but should be examined on project specific basis.



7 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

Although optional for a screening, Section 16(2)(b) of the Act states that the RA consider alternative means of carrying out the project that are technically and economically feasible, and the environmental effects of the alternative means.

Consideration of various fence siting and design options (e.g. buffer strips, stream crossings, fence materials) would constitute an assessment of alternative means of carrying out the project. The integration of fencing with many of the alternatives described in the previous section can optimize environmental protection while producing many additional environmental benefits (e.g. enhance or maintain biodiversity). Fences can incorporate a combination of materials (wood, barbed wire, chain-link, stone) and plantings to provide habitat and food for many wildlife species and can also help to form windrows and shelterbelts.



8 ENVIRONMENTAL ASSESSMENT DECISION

Under Section 20 of the *CEAA*, the RA must determine the course of action to be taken after consideration of the screening report and any comments received from the public. If it is judged that adverse environmental effects are not likely, the project can be supported if the identified mitigation measures are implemented.



9 FOLLOW-UP PROGRAMS

Although optional for a screening, Section 16(2)(d) of *CEAA* allows the RA the opportunity to consider the need for a follow-up program to verify the impact predictions and determine the effectiveness of

mitigative measures. This decision should be made on a case by case basis. To appropriately evaluate the results of follow-up programs it is important that adequate baseline data be collected.



10 INFORMATION SOURCES

The following sources were consulted for these guidelines and provide further discussion of the issues included:

Agriculture and Agri-food Canada and Ontario Ministry of Agriculture, Food and Rural Affairs. 1996. *Best Management Practices: Fish and Fish Habitat*.

Agriculture and Agri-food Canada and Ontario Ministry of Agriculture, Food and Rural Affairs. 1994. *Best Management Practices: Water Management*.

Agriculture and Agri-food Canada and Ontario Ministry of Agriculture, Food and Rural Affairs. 1994. *Best Management Practices: Soil Management*.

Atlantic Canada Farmers Council. 1996. *Atlantic Environmental Farm Plan*.

Chehalis River Council. *Agricultural Practices Control Strategies*. (<http://www.wln.com:80/~crc/apag.html>).

Environment Canada Atlantic Region. 1996. *Guidance Manual for Environment Canada Atlantic Region as a Responsible Authority*(Draft)

Environmental Protection Agency, Office of Federal Activities. *Pollution Prevention/Environmental Impact Reduction Checklist for Grazing* (<http://es.inel.gov:80/oeca/ofa/pollprev/graze.html#N>)



11 Checklist of Environmental Assessment Requirements for Projects Involving Fencing

Required	Received	
_____	_____	Map and site plan indicating area of concern.
_____	_____	Inventory of fish and wildlife species. Note species at risk.
_____	_____	Purpose of and need for project.
_____	_____	Description of activities to be controlled by fencing.

_____ Identification of other potential sources of point and non-point pollution.

_____ Description and evaluation of alternatives to project.

_____ Description of proposed fence configuration. (material, length, height, buffer zone).

_____ Project work schedule.

_____ Plans for prevention and control of erosion and sedimentation.

_____ Provision for temporary stream crossings during installation.

_____ Provision for permanent stream crossings (both animals and vehicles if appropriate).

_____ Provision for restricted access watering sites or alternative watering sources.

_____ Plans for additional habitat enhancement (instream and shoreline).

_____ Native trees, shrubs, and other vegetation to be planted.

_____ Water quality information and monitoring plans.

_____ Status of federal and provincial approvals.



_____ Description of machinery and equipment to be used during installation.

_____ Inventory of hazardous products.

_____ Contingency plan for response to spills or releases of hazardous products and any other environmental emergencies.

Plans for storage and disposal of construction waste including reuse and recycling opportunities.

Provision for maintenance and removal of fencing including reuse and recycling opportunities.

 Home	 Table of Contents	 Top of Page
---	--	--

EROSION/SILTATION PREVENTION AND CONTROL

[Home](#)[Guidelines TOC](#)

- [Site Planning](#)
 - [Site Evaluation](#)
 - [Plan to Prevent or Reduce Erosion](#)
 - [Site Management](#)
 - [Effects Monitoring](#)
 - [Appendix A: Notes on Erosion Control Materials](#)
 - [New Developments - Spray-On Products](#)
-

Erosion/siltation prevention and control involves the following steps:

1. Site Planning

a) *Fit the Development to the Site*

- locate structures along natural contours to reduce the grading required and to minimize the area to be disturbed, thereby preserving vegetation
- limit the length and grade of slopes to reduce erosion, as long/steep slopes increase the volume and velocity of runoff over unstabilized surfaces

b) *Preserve Existing Vegetation* (especially on steep slopes, very erodible soils and buffer areas)

- maintain vegetation to reduce erosion by: decreasing the impact of rainfall; slowing the velocity of runoff; increasing the infiltration potential of the soil; anchoring the soil by the rootmass; and by filtering sediment laden runoff

c) *Minimize Impervious Areas*

- minimize the area of impervious surfaces e.g. driveways, parking lots and streets, to increase the infiltration rate, thereby reducing the volume and velocity of runoff

d) *Retain Existing Drainage Patterns and Watercourses*

- maintain natural drainage patterns to reduce the potential for erosion
 - avoid increases in the volume and/or velocity of water above predevelopment levels in existing channels, as long-term erosion problems can result (install a stormwater collection system if necessary)
-



2. Site Evaluation

a) *Obtain Required Information and Analyse Erosion Potential*

- assemble existing relevant data (e.g. topographic maps, soil surveys, geotechnical information, precipitation data, existing municipal services)
- identify all upstream, downstream and on-site streams, and delineate drainage patterns (e.g.

- determine where runoff enters, crosses and exits site; identify destination of runoff; and determine runoff velocities and volumes, including potential effects of upstream activities)
- determine the rainfall design event (e.g. a 2-year event is usually acceptable for temporary control measures)
 - determine extent and variety of existing vegetation, and identify existing vegetation to be preserved
 - identify sensitive areas (e.g. steep slopes, erodible soils, wetlands, rare plant species, fish habitat) that could be adversely affected by erosion
 - identify existing erosion problems and their causes
 - carry out soil tests to determine infiltration and erodibility potential of different areas on the site (e.g. particle size analysis, moisture content, Atterberg limits and moisture/density analysis) (see Appendix A)
 - conduct site visit to confirm information and gain an appreciation for the site
-



3. Plan to Prevent or Reduce Erosion

a) *Minimize the Exposed Soil Area*

- most effective method of erosion prevention and control, particularly in fine-grained soils; can be accomplished in three ways:
 - i) limit the area on which soils are exposed by clearing, grubbing and excavation
 - ii) limit the area that is exposed at any one time
 - iii) limit the amount of time that any area is exposed (stabilize the area immediately after it has been brought to final grade e.g. by hydroseeding, sodding, or seeding, with mulch or erosion control blankets as required, or by adding rock fill on travel areas, parking lots and drainage areas)

b) *Divert Clean Water Around the Site*

- prevent runoff from undisturbed areas, whether on- or off-site, from entering exposed areas of the construction site through the use of lined berms, channels or French drains

c) *Protect Exposed Soil*

- line sides and bottoms of channels, ditches and berms to prevent erosion
- limit erosion by reducing the velocity of flow (e.g. check dams-must be spaced so that the toe of an upstream dam is not higher than the sill of the dam immediately downstream)
- temporarily stabilize soils, if areas of exposed soil cannot be permanently stabilized within 3 days of being brought to grade, or if the area has remained inactive for more than 7 days prior to being brought to final grade (e.g. wood chips produced on-site from grubbed material, straw mulch, or fast-growing grasses where prolonged periods of inactivity are anticipated)

d) *Keep Sediment On-Site* (last line of defence)

- sediment control, especially in fine-grained soils, is not always entirely effective
- retain sediment on-site by:
 - i) filtration (e.g. through straw, fabrics or buffer strips of natural vegetation)
 - ii) sedimentation (e.g. check dams, settling ponds, buffer strips of natural vegetation)

- treat runoff from the smallest practical catchment area to reduce the volume of water and overland flow (maximum catchment area draining to a sediment control structure should not exceed 0.4 hectare)
 - retain a wide buffer of existing vegetation around the construction area as a contingency measure to filter sediment (a minimum of 8m is recommended)
 - prevent tracking of sediment off-site by stabilizing exit points with gravel and/or geotextile
-



4. Site Management

- install all perimeter control structures (e.g. silt fencing, sediment traps, settling ponds) prior to any land disturbance
- coordinate clearing, grubbing, excavation, grading and construction activities to reflect seasonal constraints. For example:

i) clearing should be carried out during winter when the ground is frozen and the soil is less susceptible to disturbance;

ii) other activities should be undertaken during the summer when precipitation amounts are minimal;

- iii) the work site should be shut down and stabilized in accordance with pre-established criteria in advance of the winter season (before revegetation is no longer possible and before freeze-up);
 - stockpiles should be: sloped and compacted to prevent ingress of moisture; protected from erosion with mulch, plastic or geotextile; surrounded by straw, earthen berms or silt fences; and, located away from watercourses
 - seed salvaged topsoil that is being stored for long periods
 - maintain sediment control structures (e.g. repair structural problems during and after storm events, remove accumulated sediment at regular intervals or at designated capacities and dispose of at an approved site, as it is not appropriate as structural fill material)
 - sample and analyze water retained by sediment control structures to determine if further treatment is required prior to discharge. Suspended solids concentrations **within effluent** released from sedimentation control structures should not exceed 25 mg/L (monthly average) or 50 mg/L (grab sample). (These concentrations reflect permissible limits of suspended solids in effluents subject to industry-specific regulations under Section 36 of the *Fisheries Act*)
 - educate all personnel working at the site on proper methods of erosion prevention and control
-



5. Effects Monitoring

- monitor receiving waters to ensure maintenance of the CCME Canadian Water Quality Guidelines (1987) for the protection of aquatic life (and other uses as appropriate) when considered in conjunction with existing ambient water quality and site-specific factors. The Canadian Water Quality Guidelines (1987) for the protection of aquatic life recommends that the concentration of suspended solids **within the receiving water** should: a) not increase by more than 10 mg/l if the background suspended solids concentration is equal to or less than 100 mg/l, or b) not increase more than 10% above the background concentration if the background concentration exceeds 100 mg/l);
- take further mitigative actions as necessary based on monitoring results.



6. Appendix A: Notes on Erosion Control Materials

Straw

- slow to decompose
- may prevent seeds from penetrating to the soil

Sod

- provides instant cover
- Class I Sod is expensive, Class II Sod is not always available
- needs watering

Mulch

- paper or hay, inexpensive
- good on flat slopes
- not always placed uniformly or thickly enough
- may be displaced by heavy rain or wind

Wood Fibre

- retains moisture
- slows velocity of water and traps eroding material
- used in ditches and medians
- biodegrades

Natural Jute

- retains moisture and conforms to land (acts as hundreds of flow checks)
- can seed before or after installation
- used in ditches and medians
- biodegrades

Synthetic Jute

- requires good slope preparation
- tends to "tent" (vegetation grows up underneath) if not prepared adequately
- photodegrades



7. New Developments - Spray-On Products

- conform to land exactly
- generally applied with hydroseeding
- reduced soil loss compared to blankets

Airtrol

- mixture of gypsum, water and mulch
- forms crust which dissolves in one month
- not for use in ditches




Soil Guard

- mixture of wood fibres, binding agents, organic and mineral activators
- minimal slope preparation
- decomposes microbially (dependent on the season e.g. rapid decomposition in summer as opposed to little or no decomposition in the winter)
- good on steep slopes

Lindstrand

- geosynthetic fibre
- requires more than one application
- decomposes

Note: when re-vegetating a denuded zone, vegetation native to the area should be used whenever possible

 Home	 Table of Contents	 Top of Page
---	--	--

Guidelines for Environmental Assessment

ALTERNATIVES TO PRESSURE-TREATED WOOD

[Home](#)[Guidelines TOC](#)

- [Recycled plastic lumber](#)
- [Untreated Wood](#)
- [Concrete](#)

March, 1996

1. Recycled plastic lumber

Technology for producing lumber from recycled plastic has existed for the last 20 years, but most North American manufacturers have only been operating for the last few years. A mixture of various types of plastic (mainly polyethylene) are ground down into chips or flakes, heated and extruded into molds to make recycled plastic lumber of various sizes. Pigments and reinforcing agents including fiberglass, sawdust, steel and aluminum may be added. Although some pigments are known to be toxic, very little leaching, if any, occurs with plastic lumber. The mixture averages 2-3% impurities (e.g. dust, paper, glue, aluminum particles and other residues). Recipes vary, and the composition of the finished product is not identical from producer to producer or even from batch to batch (depends on uniformity of plastic used for each batch). Parks Canada has recently funded projects to determine the suitability of plastic lumber. The following is a summary of information gathered from three projects entitled: *Recycled Plastic Lumber - A Study of Its Use By Parks Canada (June 1995)*; *Plastic Lumber Pilot Project - Point Pelee National Park (December 1993)*; and, *Recycled Plastic Lumber - A Survey of North American Manufacturers and Applications (February, 1993)*.

Some of the advantages of recycled plastic lumber include:

- less leaching of contaminants (e.g. creosote, chromium, copper, arsenic) compared with pressure-treated lumber
- recycled plastic lumber is **recyclable**
- helps reduce plastics from entering landfills
- less likely to splinter or split
- resistant to bacterial, algal and fungal decay, wet rot and marine borers, termites, insects and barnacle growth
- skid-resistant, abrasion-resistant
- projected life-expectancy of approximately 50 years (compared to 15-20 years for pressure treated wood)
- extremely durable and requires practically no maintenance, therefore reducing labour costs
- doesn't need painting and comes in different colours (colourfast, graffiti-resistant)
- retains its new appearance of natural wood (provided it contains an additive to protect against UV light), unlike pressure-treated wood, which loses its colour over time
- easy to wash and provides a nonslip surface
- repairable using plastic sawdust, heated with a iron

Some of the disadvantages of recycled plastic lumber include:

- its greatest weakness, when compared to natural wood, is its elasticity (lack of rigidity).
- it is at least twice (and can be up to more than ten times) as expensive as pressure-treated wood, depending on the manufacturer (at present, with increased recycling efforts, prices may decline)
- it is more sensitive to heat (it contracts more in the cold and expands more in the heat) than natural wood (for this reason, screws and bolts are recommended instead of nails for fastening).
- when plastic wood surfaces are frozen, they will be as slippery as wood, if not more slippery, and

- plastic may become more brittle and less resistant to impact
- manufacturers do not guarantee the structural strength of their product. More testing is required to establish industry standards where failure could result in personal injuries. Currently, thicker wood, shorter spans and reinforcement are needed to compensate for its lower structural strength.
 - depending on percentage of wood fibre (if any), water absorption may be significant in diminishing its strength.
 - standard woodworking tools are sufficient for working with recycled lumber but carbide-tipped saw blades are preferred to make cuts (due to the various contaminants present in plastic lumber), and cuts should be made rapidly to avoid overheating wood. For smoother cuts, a saw with a high number of teeth per cm is recommended
 - workers require training (its heavier than wood)
 - it is preferable to pre-drill screw holes

Parks Canada has been using plastic lumber for several years for various applications including picnic tables, walkways, posts and pickets, outdoor amphitheatre benches, guardrails, sill plates, playground structures, washroom partitions and marine pilings, and has found that recycled plastic lumber is a viable alternative to using pressure-treated wood. Some problems were encountered, however. For example, driving pickets into the ground sometimes resulted in the tops being crushed. It was also found that when signs (exceeding 76 cm X 76 cm in dimension) were affixed to plastic lumber posts, it caused the posts to bend. Because recycled plastic lumber is still in the trial stage, caution should be exercised until its use is more established.



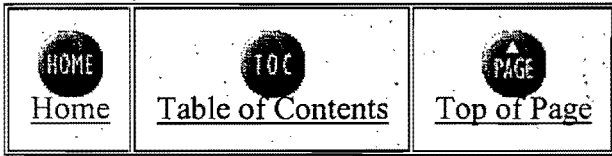
2. Untreated Wood

Several types of untreated wood, which are less harmful to the environment than pressure-treated wood, offer other alternatives. **Western Red Cedar** from British Columbia, for example, has anti-fungal properties and is high in natural resins. Its lifespan is somewhere between that of spruce and pressure-treated wood. However it has several drawbacks. For example, it is not as strong as pressure-treated wood (e.g. larger than normal pieces of lumber are required to meet the structural strength of pressure-treated wood), and it is expensive (approximately three times the price of pressure-treated wood). Other natural woods that can be used are **hemlock** and **white cedar**. Hemlock is readily available in this province and its use, upon specific request, would be an environmentally wise choice. Hemlock, has excellent structural properties and was used in the past, until the 1960's, in bridge beams. With protective tarpaper or aluminum on the upper side and decking with an alternate species, any structure would be expected to be serviceable for approximately 20 years, at half the cost of pressure treated lumber. White cedar, which also has natural preservative qualities, has been used in shingles in this region and with a minimum of protective coatings, has proven very durable in coastal communities.



3. Concrete

Information found in a recent newspaper article in the Halifax Chronicle-Herald suggests the use of **concrete** as another alternative to pressure-treated wood. According to the *Bronzeport Construction Company*, it is half as expensive to build a concrete wharf relative to a pressure-treated one, and it takes two days to erect, rather than two weeks for a wharf made of natural wood. Concrete blocks, which fit together in a manner similar to that of lego, possess the same saltwater, anti-corrosion properties as materials used in the fixed-link to PEI, and are guaranteed for 30 years. Presently, seven concrete wharves have been erected in Nova Scotia and others are planned for other parts of the world.



Environment Canada
Atlantic RegionEnvironnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Freshwater Finfish Aquaculture

The following environmental assessment considerations for freshwater finfish aquaculture projects are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area (drawn to scale) showing project components, drainage and nearby water bodies.
2. Identify possible constraints to the siting, design and construction of the proposed project. A priority should be placed on impact avoidance.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species, migratory birds, wetlands and hydrological conditions
 - potential impacts on ground and surface water quality
 - potential impacts of migratory birds/endangered species on the project (e.g. risk of predation)
 - potential impacts of point and nonpoint pollution sources (e.g. sewage, industrial wastewaters, agricultural and urban runoff, solid waste facilities, contaminated areas, acid generating rock) on the project
 - potential impacts of meteorological conditions and flooding on the project
3. Describe the design of the proposed project.
 - type of technology proposed (e.g. flow-through or recirculating system)
 - water source, volume requirements, and necessary intake and pretreatment facilities
 - volume and number of fish tanks/ponds
 - species, size of fish and number of fish per tank/pond
 - wastewater treatment system including provisions for routing and discharge - for settling ponds: number and capacity with attention to meteorological conditions
4. Identify and describe the design of related infrastructure (e.g. access roads, buildings) and show their locations on a map.
5. Describe construction, operation, maintenance and decommissioning activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention opportunities.
 - clearing, grubbing and excavation of land (e.g. for construction of access roads, buildings, water intake facilities, and treatment systems) including provisions for minimizing and controlling erosion, dusting and introduction of suspended solids into receiving waters
 - transportation, use and storage of hazardous materials (e.g. petroleum products, preservatives) including provisions for preventing and responding to accidental releases
 - the need for antibiotics, pesticides and other chemicals to control disease and pest outbreaks

- and provisions for preventing and responding to accidental releases
- measures for preventing predation by migratory birds and endangered species
- the feeding regime and method of administering food including provisions for minimizing waste
- provisions for monitoring water quality including sampling schedule, parameters (e.g. temperature, total suspended solids, pH, BOD, DO, phosphate, orthophosphate, nitrate, nitrite and ammonia) and locations (effluent, groundwater, receiving waters).

6. Describe waste management practices.

- provisions for disposal of hazardous and non-hazardous wastes with attention to pollution prevention opportunities (reduce, reuse and recycle). Particular consideration should be given to methods for dealing with:
 - sludge from settling ponds
 - spent cleaning and treatment solutions
 - offal and/or diseased and dead fish

7. Prepare an environmental management plan.

An environmental management plan which outlines how potential impacts associated with a freshwater finfish aquaculture project will be minimized or eliminated should be prepared (consult the FACT SHEET - [Environmental Assessment and Environmental Management Plans](#))

For more details on environmental assessment considerations for freshwater finfish aquaculture projects, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrey@ec.gc.ca.

Fact Sheets | Environmental Assessment Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

Canada

Send comments to the [Internet Communications Officer](#).

This URL: <http://www.ns.ec.gc.ca/assessment/frshfish.html>

Copyright © 1998, Environment Canada. All rights reserved.

Environment Canada
Atlantic RegionEnvironnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Marine Shellfish/Finfish Aquaculture

The following environmental assessment considerations for marine shellfish and caged finfish farming projects are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area which is drawn to scale.

2. Identify possible constraints to the siting, design and construction of the proposed project. A priority should be placed on impact avoidance.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species and migratory birds
 - potential impacts on surface water quality with attention to water depth, efficiency of tidal flushing and presence of other marine finfish/shellfish operations
 - potential impacts of migratory birds/endangered species on the project (e.g. risk of predation)
 - potential impacts of ocean disposal sites, and land-based pollution sources (e.g. sewage, industrial wastewaters, port facilities, agricultural and urban runoff), on the project
 - potential impacts of meteorological conditions on the project

3. Describe the design of the proposed project.
 - number and characteristics of cages for finfish (e.g. dimensions, materials used in construction, net and collar type, mooring system)
 - method of culturing shellfish
 - species of fish and numbers of fish per cage/number and species of shellfish cultured

4. Identify and describe the design of related infrastructure (e.g. access roads, buildings, wharves, boat launching ramps) and show their locations on a map.

5. Describe construction, operation, maintenance and decommissioning activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention opportunities.
 - clearing, grubbing and excavation of land (e.g. for construction of access roads and buildings) including provisions that minimize and control erosion, dusting and introduction of suspended solids into receiving waters
 - in-water activities for wharf and boat ramp construction (e.g. dredging, infilling, dewatering, pier installation) including provisions for minimizing and controlling the resuspension of sediments and release of contaminants
 - transportation, use and storage of hazardous materials (e.g. petroleum products, preservatives) including provisions for preventing and responding to accidental releases
 - the need for antibiotics, pesticides and other chemicals to control disease and pest outbreaks

- and provisions for preventing and responding to accidental releases
- measures for preventing predation by migratory birds and endangered species
- for finfish: the feeding regime and method of administering food including provisions for minimizing waste
- provisions for water quality monitoring including sampling schedule, parameters (e.g. temperature, DO, BOD, suspended solids, nitrates, nitrites, ammonia, phosphorus, coliforms) and locations

6. Describe waste management practices.

- provisions for disposal of hazardous and non-hazardous wastes with attention to pollution prevention opportunities (reduce, reuse and recycle). Particular consideration should be given to methods for dealing with:
 - the accumulation of faeces and unconsumed food beneath caged farming areas
 - offal and/or diseased or dead fish

7. Prepare an environmental management plan.

An environmental management plan which outlines how potential impacts associated with a marine shellfish/finfish aquaculture project will be minimized or eliminated should be prepared (consult the FACT SHEET - [Environmental Assessment and Environmental Management Plans](#)).

For further details on environmental assessment considerations for marine finfish and shellfish aquaculture projects, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrev@ec.gc.ca.

Fact Sheets Environmental Assessment Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

Canada

Send comments to the [Internet Communications Officer](#).

This URL: <http://www.ns.ec.gc.ca/assessment/marine.html>

Copyright © 1998, Environment Canada. All rights reserved.

Environment Canada
Atlantic RegionEnvironnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Composting Facilities

The following environmental assessment considerations for composting facilities are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area (drawn to scale) showing project components, drainage and nearby water bodies.

2. Identify possible constraints to the siting, design and construction of the proposed project. A priority should be placed on impact avoidance.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species, migratory birds, wetlands and hydrological conditions
 - potential impacts on groundwater and surface waters including shellfish growing waters
 - presence of contaminated areas and acid generating rock
 - type and permeability of surficial materials
 - potential impacts of meteorological conditions and flooding on the project

3. Describe the design of the proposed project.
 - type of technology to be employed (e.g. windrow system or in-vessel system)
 - for windrows: covered or uncovered
 - for in-vessel systems: non-agitated or agitated system
 - aerobic or anaerobic (anaerobic digester)
 - control and treatment of exhaust air (e.g. biofilters)
 - type, thickness, and placement of impermeable liners if needed
 - provisions for runoff/leachate collection with attention to meteorological conditions
 - recirculation/treatment system including provisions for routing and discharge of effluents

4. Identify and describe the design of related infrastructure (e.g. access roads, buildings) and show their locations on a map.

5. Describe construction, operation, maintenance and decommissioning activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention opportunities.
 - clearing, grubbing and excavation of land (e.g. for construction of access roads, tipping areas, composting and curing pads, liners, leachate collection system, treatment ponds, and buildings) including provisions for minimizing and controlling erosion, dusting and the introduction of suspended solids into receiving waters
 - transportation, use and storage of hazardous materials (e.g. petroleum products) including provisions for preventing and responding to accidental releases
 - measures for preventing exposure/attraction of migratory birds (e.g., gulls) and endangered

- species to feedstock and compost
- provisions for monitoring water quality including sampling schedule, parameters (e.g. BOD, TSS, pH, nitrates, nitrites) and locations (e.g. effluent, groundwater, receiving waters)
- proposed composting procedures with particular attention to:
 - source, volume and composition of feedstock, and provision for separation of feedstock from other waste materials (e.g. at source or on-site)
 - size and composition of bulking agents
 - parameters to be measured during composting process (e.g. carbon:nitrogen ratio, temperature, oxygen, moisture content) and proposed quality control measures
 - turning mechanism and interval used
 - length of composting and curing processes
 - parameters to be measured in analysis of final compost product (e.g. foreign matter, maturity, organic matter content, organic contaminants, pathogens, trace elements)
 - end product uses

6. Describe waste management practices.

- provisions for disposal of hazardous and non-hazardous wastes (e.g. non-compostable material) with attention to pollution prevention opportunities (reduce, reuse and recycle). Particular consideration should be given to methods for dealing with accumulated solids and sludges in treatment systems and anaerobic digesters

7. Prepare an environmental management plan.

An environmental management plan which outlines how potential impacts associated with a composting project will be minimized or eliminated should be prepared (consult the FACT SHEET - Environmental Assessment and Environmental Management Plans)

For more details on environmental assessment considerations for composting facilities, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrey@ec.gc.ca.

Fact Sheets Environmental Assessment
Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

Canada

Send comments to the [Internet Communications Officer](#).

This URL: <http://www.ns.ec.gc.ca/assessment/compost.html>

Copyright © 1998, Environment Canada. All rights reserved.

Environment Canada
Atlantic RegionEnvironnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Landfills

The following environmental assessment considerations for landfills are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area showing project components, drainage and nearby water bodies.

2. Identify possible constraints to the siting, design and construction of the proposed project and how they will be addressed.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species, migratory birds, wetlands and hydrological conditions
 - potential impacts on groundwater and surface water quality including shellfish growing waters
 - presence of contaminated areas and acid generating rock
 - surficial and hydrogeological conditions (e.g. soil type and grain size, hydraulic conductivity, depth to bedrock and groundwater, direction of groundwater flow)
 - potential impacts of meteorological conditions and flooding on the project

3. Describe the design of the proposed project.
 - landfilling method (e.g. trench or area) and source of cover material
 - area of entire site, landfill area, waste diversion areas, stockpiled cover material area, buffer zones (e.g. surface waters, adjacent lands)
 - type, thickness and placement of impermeable liners
 - expected volume of acceptable wastes
 - waste diversion strategy (e.g. provisions for acceptance, storage and transfer of appliances/scrap metals, tires, construction/demolition waste and other recyclable materials; compostable materials)
 - provisions for composting (If applicable - consult the FACT SHEET - Environmental Assessment Considerations for Composting Facilities)
 - provisions for source separation (e.g. blue bag/box program, paper, organics)
 - expected lifespan of the landfill
 - provisions for runoff/leachate collection with attention to meteorological conditions
 - recirculation/treatment system including provisions for routing and discharge of effluents
 - provisions for management of methane emissions

4. Identify and describe the design of related infrastructure (e.g. access roads, weigh stations, buildings) and show their locations on a map.

5. Describe construction, operation and maintenance activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention opportunities.

- clearing, grubbing and excavation of land (e.g. for construction of access roads, weigh stations, waste diversion areas, landfill areas, composting/recycling areas, liners, leachate collection system, treatment ponds, and buildings) including provisions for minimizing and controlling erosion, emission of dust and the release of suspended solids into receiving waters
- transportation, use and storage of hazardous materials (e.g. petroleum products) including provisions for preventing and responding to accidental releases
- measures for identifying and rejecting unacceptable wastes
- measures for preventing exposure/attraction of migratory birds (e.g. gulls) and endangered species to the landfill
- provisions for monitoring water quality including sampling schedule, parameters (e.g. BOD, TSS, pH, ammonia, nitrates, nitrites) and locations (e.g. runoff/leachate, groundwater, receiving waters)
- provisions for monitoring air quality including sampling schedule, parameters (methane, suspended particulates) and location (emissions, ambient air)

6. Describe waste management practices.

- plans for storage, transport and disposal of hazardous wastes which are not accepted by the landfill with attention to pollution prevention opportunities (reduce, reuse, recycle)

7. Prepare an environmental management plan.

An environmental management plan which outlines how potential impacts associated with a landfill project will be minimized or eliminated should be prepared (consult the FACT SHEET - [Environmental Assessment and Environmental Management Plans](#)).

For further details on environmental assessment considerations for landfill facilities, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrey@ec.gc.ca.

Fact
Sheets

Environmental Assessment
Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

OK

Canada

Send comments to the [Internet Communications Officer](#).

This URL: <http://www.ns.ec.gc.ca/assessment/landfills.html>

Copyright © 1998, Environment Canada. All rights reserved.

Environment Canada
Atlantic RegionEnvironnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Peat Harvesting

The following environmental assessment considerations for peat harvesting projects are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area (drawn to scale) showing project components, drainage and nearby water bodies.

2. Identify possible constraints to the siting, design and construction of the proposed project. A priority should be placed on impact avoidance.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species, migratory birds, and hydrological conditions
 - potential impacts on surface water quality including shellfish growing waters
 - potential loss of wetland functions (e.g., habitat, flood control, water quality)
 - potential impacts of meteorological conditions and flooding on the project

3. Describe the design of the proposed project.
 - area to be mined and physical dimensions of peat deposit
 - volume of peat to be removed and estimated lifespan of the project
 - width of vegetated buffer zone around mining perimeter
 - location, length and orientation (relative to prevailing winds) of ditches
 - provisions for collection and treatment of drainage:
 - for settling ponds: location and dimensions (including volume) with attention to
 - meteorological conditions and area drained
 - use of overland drainage, area involved and surface gradient (if applicable)

4. Identify and describe the design of related infrastructure and show their locations on a map.
 - processing and packaging facilities
 - product storage areas
 - access roads
 - refuelling facilities
 - equipment storage and laydown areas

5. Describe construction, operation, maintenance and decommissioning activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention opportunities.
 - clearing, grubbing and excavation of land (e.g. for construction of access roads, buildings and related infrastructure) including provisions for minimizing and controlling erosion, dusting and the introduction of suspended solids into receiving waters

- transportation, use and storage of hazardous materials (e.g. fuels, oils, lubricants, hydraulic fluid, cement, concrete additives and agents) including provisions for preventing and responding to accidental releases
- harvesting, stockpiling, processing and packaging of peat including provisions for minimizing and controlling dusting
- provisions for monitoring water quality including sampling parameters, schedule and locations (e.g. effluent, receiving waters). Particular consideration should be given to:
 - suspended solids, pH, heavy metals, phosphate, nitrate, nitrite and ammonia
 - faecal coliform and Klebsiella sp. bacteria
 - the buffering capacity of receiving waters
 - need for special treatment measures (in addition to settling of solids)
- procedures for detecting and removing peat accumulations in settling ponds
- restoration/reclamation plans

6. Describe waste management practices.

- provisions for disposal of hazardous and non-hazardous wastes associated with attention to pollution prevention opportunities (reduction, reuse, recycling)

7. Prepare an Environmental Management Plan.

An environmental management plan which outlines how potential impacts associated with a peat harvesting project will be minimized or eliminated should be prepared (consult the FACT SHEET - Environmental Assessment and Environmental Management Plans)

For more details on environmental assessment considerations for peat harvesting projects, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrev@ec.gc.ca.

Fact Sheets | Environmental Assessment Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

Canada

Send comments to the *Internet Communications Officer*.

This URL: <http://www.ns.ec.gc.ca/assessment/peat.html>

Copyright © 1998, Environment Canada. All rights reserved.

Environment Canada
Atlantic RegionEnvironnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Roads and Bridge/Causeway Structures

The following environmental assessment considerations for roads and bridge/causeway structures are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area (drawn to scale) showing project components, drainage and nearby water bodies.

2. Identify possible constraints to the siting, design and construction of the proposed project. A priority should be placed on impact avoidance.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species and migratory birds. Consideration should be given to habitat loss and fragmentation
 - potential loss of wetlands and wetland functions (e.g. habitat, flood control)
 - potential impacts on groundwater / surface water quality
 - potential impacts on the hydrodynamic regime and implications for ice jamming, flooding, erosion and deposition patterns. Consideration should be given to potential future increases in flow volume and sea level due to climate change
 - potential impacts of project on microclimate conditions (e.g., cold air drainage) and implications for frost sensitive crops
 - presence of acid generating rock and contaminated areas
 - potential impacts of meteorological conditions and flooding on the project

3. Describe designs of the proposed project, and any existing structure requiring removal.
 - length and width of road and right-of-way and/or bridge and causeway structures
 - placement and orientation of bridge piers and abutments
 - type and placement of lighting
 - source and type of construction materials (e.g. asphalt, concrete, steel, treated wood)
 - source, volume, type and placement of infill materials

4. Identify and describe the design of related infrastructure (e.g. weigh stations, interchanges) and temporary construction facilities (e.g. access roads, borrow pits, stockpiles, bailey bridges, trestles and causeways, work camps, refuelling facilities, asphalt plants, concrete production, laydown areas) and show their locations on a map.

5. Alternatives to the proposed project and related structures should be contemplated. A priority should be placed on alternatives which best enable impact avoidance and pollution prevention.

6. Describe construction, operation, maintenance and decommissioning activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention.

- procedures for decommissioning existing structures
- clearing, grubbing and excavation of land including provisions for minimizing and controlling erosion, dusting and introduction of suspended solids into receiving waters
- in-water activities (e.g. dredging, infilling, dewatering, pier installation) including provisions for minimizing and controlling resuspension of sediments and release of contaminants
- concrete and asphalt production including measures for minimizing, controlling and treating effluents and emissions
- transportation, use and storage of hazardous materials (e.g. petroleum products, protective coatings, degreasers, pesticides, cement, concrete additives and agents, asphalt and binders) including provisions for preventing and responding to accidental releases
- equipment cleaning and measures for minimizing, controlling and treating washwater
- the need for surface preparation of structures (e.g. water jetting, abrasive blasting, grinding, chipping, sanding, scraping) and provisions for preventing the release of dust and debris (paint flakes, abrasive grits)
- the need for application of protective coatings (e.g. liquid paints, primers, rust inhibitors) to structures and provisions for preventing overspray and spillage
- proposed de-icing agents and application procedures

7. Describe waste management practices.

- provisions for hazardous and non-hazardous waste disposal with attention to pollution prevention opportunities (reduction, reuse, recycling), giving particular consideration to:
- whether ocean disposal of dredge spoils or other wastes is planned (a permit pursuant to Section 67 of the Canadian Environmental Protection Act will be required); and
- leachate toxicity of wastes such as dredge spoils, paint flakes and abrasive grits based on application of Canadian General Standards Board (CGSB) provisional standard No. 164-G-1MP, "Leachate Extraction Procedure"

8. Prepare an Environmental Management Plan.

An environmental management plan which outlines how potential impacts associated with a road and bridge/causesway project will be minimized or eliminated should be prepared (consult the FACT SHEET - [Environmental Assessment and Environmental Management Plans](#))

For more details on environmental assessment considerations related to roads and bridge/causesway structures, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrev@ec.gc.ca.

Fact Sheets | Environmental Assessment Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

Canada

Send comments to the [Internet Communications Officer](#).

This URL: <http://www.ns.ec.gc.ca/assessment/roads.html>

Copyright © 1998, Environment Canada. All rights reserved.

1.0 Introduction
 2.0 Objectives
 3.0 Scope
 4.0 Methodology
 5.0 Results
 6.0 Conclusions
 7.0 Recommendations
 8.0 References
 9.0 Appendixes
 10.0 Glossary
 11.0 Acronyms
 12.0 Abbreviations
 13.0 Figures
 14.0 Tables
 15.0 Bibliography
 16.0 Index
 17.0 Distribution List
 18.0 Revision History
 19.0 Approval
 20.0 Distribution

21.0 Environmental Assessment
 22.0 Environmental Impact
 23.0 Environmental Effects
 24.0 Environmental Quality
 25.0 Environmental Protection
 26.0 Environmental Monitoring
 27.0 Environmental Reporting
 28.0 Environmental Stewardship
 29.0 Environmental Sustainability
 30.0 Environmental Transparency
 31.0 Environmental Accountability
 32.0 Environmental Integrity
 33.0 Environmental Responsibility
 34.0 Environmental Ethics
 35.0 Environmental Justice
 36.0 Environmental Equity
 37.0 Environmental Inclusion
 38.0 Environmental Participation
 39.0 Environmental Collaboration
 40.0 Environmental Partnership
 41.0 Environmental Cooperation
 42.0 Environmental Solidarity
 43.0 Environmental Unity
 44.0 Environmental Harmony
 45.0 Environmental Balance
 46.0 Environmental Well-being
 47.0 Environmental Health
 48.0 Environmental Safety
 49.0 Environmental Security
 50.0 Environmental Peace
 51.0 Environmental Prosperity
 52.0 Environmental Progress
 53.0 Environmental Innovation
 54.0 Environmental Creativity
 55.0 Environmental Leadership
 56.0 Environmental Vision
 57.0 Environmental Mission
 58.0 Environmental Values
 59.0 Environmental Principles
 60.0 Environmental Standards
 61.0 Environmental Guidelines
 62.0 Environmental Policies
 63.0 Environmental Programs
 64.0 Environmental Initiatives
 65.0 Environmental Projects
 66.0 Environmental Activities
 67.0 Environmental Services
 68.0 Environmental Products
 69.0 Environmental Solutions
 70.0 Environmental Outcomes
 71.0 Environmental Impacts
 72.0 Environmental Effects
 73.0 Environmental Consequences
 74.0 Environmental Results
 75.0 Environmental Achievements
 76.0 Environmental Successes
 77.0 Environmental Failures
 78.0 Environmental Challenges
 79.0 Environmental Opportunities
 80.0 Environmental Threats
 81.0 Environmental Risks
 82.0 Environmental Uncertainties
 83.0 Environmental Unknowns
 84.0 Environmental Questions
 85.0 Environmental Issues
 86.0 Environmental Concerns
 87.0 Environmental Problems
 88.0 Environmental Dilemmas
 89.0 Environmental Dilemmas
 90.0 Environmental Dilemmas

Environnement Canada
Région de l'Atlantique

Environmental Assessment Considerations

Wastewater Treatment

The following environmental assessment considerations for wastewater treatment facilities are related to Environment Canada's specialist knowledge and expertise (consult the FACT SHEET - Environmental Assessment and Environment Canada's Mandate).

1. Identify location of proposed project (latitude and longitude) and provide map of area (drawn to scale) showing project components, drainage and nearby water bodies.

2. Identify possible constraints to the siting, design and construction of the proposed project and how they will be addressed.
 - potential impacts on National Wildlife Areas, Migratory Bird Sanctuaries, endangered species, migratory birds, wetlands and hydrological conditions
 - potential impacts on groundwater and surface water quality including shellfish growing waters
 - presence of contaminated areas and acid generating rock
 - surficial and hydrogeological conditions (e.g. soil type and grain size, hydraulic conductivity, depth to bedrock and groundwater, direction of groundwater flow)
 - potential impacts of meteorological conditions and flooding on the project

3. Describe the design of the proposed project. A design brief for the proposal should be provided if available.
 - area of land on which the facility is situated
 - type, thickness, and placement of impermeable liners if needed
 - characteristics of wastewater to be treated with attention to:
 - sources
 - flow rates and volumes
 - contaminant loadings (e.g. BOD, TSS)
 - design average and peak hydraulic and organic loadings
 - type of treatment proposed
 - physical characteristics of proposed treatment system
 - expected treatment efficiency
 - expected effluent quality
 - outfall pipe and discharge location

4. Identify and describe the design of related infrastructure (e.g. lift stations, access roads, buildings) and show their locations on a map.

5. Describe construction, operation and maintenance activities together with environmental protection measures. A priority should be placed on impact avoidance and pollution prevention opportunities.

- clearing, grubbing and excavation of land (e.g. for construction of access roads, treatment system, outfall, lift stations, bulidings) including provisions for minimizing and controlling erosion, emissions of dust and the release of suspended solids into receiving waters.
- in-water activities (e.g. for placement of outfalls) including provisions for minimizing and controlling resuspension of sediments and release of contaminants
- transportation, use and storage of hazardous materials (e.g. petroleum products) including provisions for preventing and responding to accidental releases
- provisions for monitoring water quality including:
 - sampling schedule
 - sampling parameters (e.g. BOD, TSS, pH, phenols, nitrates, nitrites, ammonia, phosphorus, oil and grease, fecal coliforms)
 - sampling locations (e.g. wastewater influents and effluents, receiving waters, groundwater)
- strategies for reducing water consumption, and the volume of water routed to the treatment system
- strategies for minimizing or eliminating the potential for hazardous substances to enter the treatment system

6. Describe waste management practices.

- provisions for disposal of hazardous and non-hazardous wastes during construction and operation of the treatment facility with attention to pollution prevention opportunities (reduce, reuse and recycle). Particular consideration should be given to methods for dealing with accumulated solids and sludges in treatment systems.

7. Prepare an environmental management plan.

An environmental management plan which outlines how potential impacts associated with a wastewater treatment facility will be minimized or eliminated should be prepared (consult the **FACT SHEET - Environmental Assessment and Environmental Management Plans**)

For more details on environmental assessment considerations for wastewater treatment facilities, contact the Environmental Assessment Section (Atlantic Region) of Environment Canada at barry.jeffrev@ec.gc.ca.

Fact
Sheets

Environmental Assesment
Home Page

Last update: January 13, 1998

Employment Opportunity: Meteorologist

[Home](#) | [What's New](#) | [Weather](#) | [Climate](#) | [Pollution](#) | [Wildlife](#) | [Conserving Nature](#) | [Issues](#) | [Links](#)

Search Query:

OK

Canada

Send comments to the [Internet Communications Officer](#).

This URL: <http://www.ns.ec.gc.ca/assessment/waste.html>

Copyright © 1998, Environment Canada. All rights reserved.