Guide For Responding
To Potential “Hot Spots”
Resulting From Air Emissions
From The Thermal Electric
Power Generation Sector

IMPLEMENTATION OF RECOMMENDATIONS 32 AND 33 OF THE CASA ELECTRICITY PROJECT TEAM, DECEMBER 2003

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

RE: GUIDE FOR RESPONDING TO POTENTIAL HOT SPOTS RESULTING FROM AIR EMISSIONS FROM THE THERMAL ELECTRIC POWER SECTOR

EXECUTIVE SUMMARY

This guide is designed to help stakeholders—including the public, non-governmental groups and government officials—to identify and manage potential hot spots caused or potentially caused by air emissions from thermal electrical generation facilities. This publication follows up on recommendations made in 2003 by the Clean Air Strategic Alliance's (CASA) Electricity Project Team (EPT) and subsequently adopted by the Alberta Government.

The guide focuses on Recommendations 32 and 33 of the *Emissions Management Framework for the Alberta Electrical Sector* (EPT Framework) made by EPT. These recommendations acknowledge that a sector-wide management approach to thermal electrical generation facility emissions may not always be appropriate. As a result, a mechanism to deal with specific area air quality concerns sometimes is needed. The EPT recommendations and this guide provide information on how to identify and submit to Alberta Environment potential hot spots related to air emissions from existing or new Alberta electric power generating facilities. The guide outlines the process for screening, responding to and deciding on issues relating to potential hot spots. In addition, the guide specifies how to communicate resulting decisions to stakeholders.

Where there already are management frameworks (e.g. particulate matter and ozone, and acid deposition), those existing avenues will be used to deal with potential hot spots as they relate to electric power generating facilities. If an area concern does not fall under an existing framework, EPT Recommendation 33 calls for a multi-stakeholder team—with industry, government, non-governmental association and public participation—to be formed under Alberta Environment's leadership. The team is to produce a timely and cost-effective plan to deal with the area concern. Alberta Environment will use the EPT framework, plus appropriate legislation and standards, to implement a management response plan, which includes an economic, health and environmental analysis.

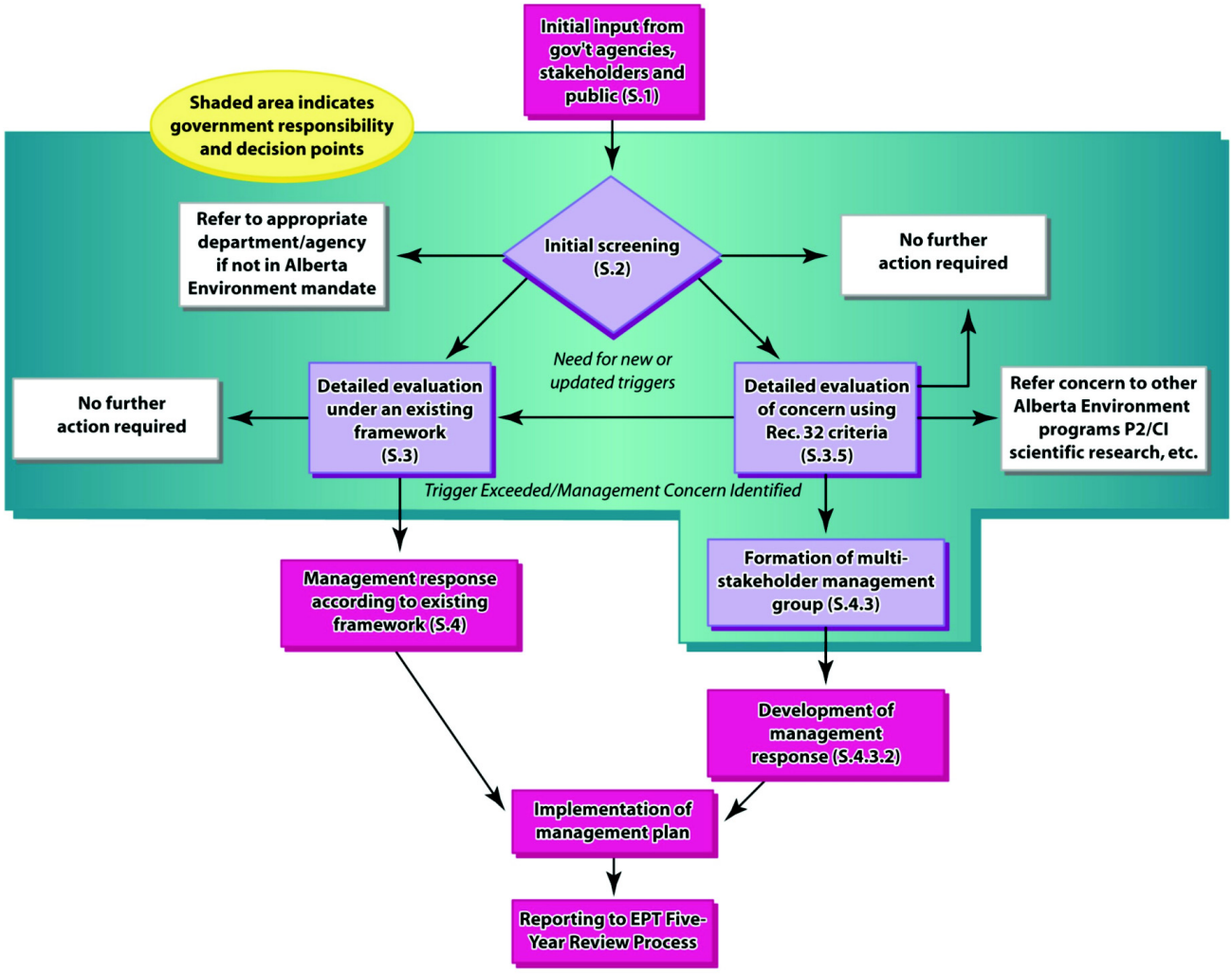
This guide specifies some key stakeholders and agencies that Alberta Environment may deal with in handling potential hot spots. Possible partners include Alberta Health and Wellness, Alberta Sustainable Resource Development, the (Alberta) Energy and Utilities Board, regional health authorities, local airshed zones, local municipalities, environmental non-government organizations, stakeholder groups and federal departments.

EXECUTIVE SUMMARY

In addition to specifying the potential hot spots framework, this guide summarizes key elements of existing review procedures, such as those relating to Alberta's Ambient Air Quality Objectives, and existing frameworks, notably the *Particulate Matter and Ozone Framework and the Acid Deposition Management Framework*. The guide also specifies approaches to use when potential hot spots do not lend themselves to review under other existing procedures or frameworks. The guide draws attention to the EPT-recommended Five-Year Review Process, intended to consider additional controls on substances emitted by thermal power plants. The guide includes a bibliography of relevant Internet-based information resources.

HOW THE PROCESS WORKS

This diagram provides an overview of the potential hot spots management process.



INTRODUCTION

This guide outlines a clear and transparent process for identifying and managing potential hot spots caused or potentially caused by air emissions of thermal electric generation facilities. Specifically, the guide describes how Recommendations 32 and 33 of the *Emissions Management Framework for the Alberta Electricity Sector* (EPT Framework)[1] will be implemented. The two recommendations outline a process for responding to potential hot spots arising from new information or scientific evidence about the health or environmental impacts of air emissions from the thermal electric power generation sector. This guide describes the detail steps that will be followed in response to such an area concern. Alberta Environment developed the guide in consultation with Alberta Health and Wellness, Alberta Energy, Energy Utilities Board, the Electricity Project Team (EPT) Implementation Advisory Steering Committee and interested public stakeholders

INTRODUCTION

The EPT Framework and its recommendations were accepted and adopted by the Government of Alberta in early 2004 following an extensive two-year consensus process carried out through the Clean Air Strategic Alliance (CASA), a non-profit association comprised of government, industry and non-governmental organizations. Development of the EPT Framework involved an Electricity Project Team (EPT) that included representatives from environmental and health organizations, senior provincial and federal officials, as well as municipal and industry leaders. The EPT Framework provides a comprehensive management framework for air emissions from the thermal electric power generation sector in Alberta.[1]

The outcome of any management planning process described within this document will be included in the subsequent Five-Year Review.[3]

The EPT Framework recognizes that an air emissions management system for a particular sector or substance may not produce the same level of emissions reductions in all areas. This is the basis for Recommendations 32 and 33. These recommendations help ensure that the EPT Framework is responsive to new information or scientific evidence suggesting that air emissions from thermal electric power plants are having or could have, local impacts. The relevant sections of the EPT Framework and recommendations are excerpted from section 6.8 of the EPT's final report, which states:

Identifying and Addressing Hotspots

It was recognized that a sector emission management approach, as opposed to a facility-by-facility approach, might not specifically protect against hotspots. To address this issue the team defined "hotspots" and recommended additional emission management actions that should be taken if a hotspot is identified. The intent is to ensure that, as necessary, the management framework is supplemented by other actions when there are local air quality issues related to electricity generation emissions either alone or in combination with other types of emissions.

[1] **The EPT Framework is available at www.casahome.org/uploads/Emissions_Mgmt_Framework.pdf**

[1] **The EPT identified five priority substances: particulate matter, nitrogen oxides, sulphur dioxide, carbon dioxide and mercury. See also Appendix A for additional information on the review and prioritization of substances by the EPT.**

[3] **The Five-Year review process is outlined in Recommendation 70 of the EFT Framework.**

INTRODUCTION

Recommendation 32: Identifying Hotspots
The EPT recommends:

For the purposes of this management framework, that an area will be defined as a hotspot if, due to its location relative to, or its proximity to, one or more electricity generation facilities, one of a, b, or c applies:

a) It is an area where Alberta ambient air quality guidelines have been, or are projected to be, exceeded on an ongoing or repeated basis. It is understood that the existing mechanism used by regulatory agencies to respond to exceedances of ambient air quality guidelines will be maintained. Projected exceedances of emissions will be determined in one of two ways. For a new unit, emission projections and dispersion modelling will be done by the proponent as part of the environmental impact assessment process, and subjected to review by regulatory authorities. For existing units, ambient air quality monitoring, possibly supplemented by dispersion modelling, will be used. Emphasis should be placed on ambient air monitoring in areas where there is greater potential for hotspot issues; for example, where there is a large number of emitters and/or there are large amounts of emissions. Where appropriate, timely actions should be taken to address any gaps that may exist in ambient air monitoring systems.

b) It is an area that, under the Acid Deposition Management Framework or the PM and Ozone Management Framework, meets or exceeds the trigger level that requires emissions reduction action under a management plan (see recommendation 33).

c) The available peer-reviewed scientific information and/or risk-based assessment evidence indicates that electricity generation-related air emissions, either alone, or in combination with other emission sources, are contributing to or are projected to contribute to, adverse health or environmental outcomes. The precautionary principle will apply when this circumstance arises; the precautionary principle states "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."* The precautionary principle is endorsed by Canada and Alberta in the Canada-wide Environmental Standards sub-agreement of the Harmonization Accord, which specifies that a lack of scientific certainty shall not be used as a reason to postpone the development and implementation of standards.

INTRODUCTION

* Principle 15 of the Rio Declaration, agreed to by Canada and 178 other nations during the 1992 United Nations Conference on Environment and Development; http://www.unep.org/Documents/Default.asp?DocumentID=78&ArticleID=1163 .

Recommendation 33: Addressing Hotspots
The team further agreed that a process is required to resolve hotspots in a timely fashion, and therefore recommends that the following process be followed in the event a hotspot is identified:

- Where a framework for dealing with a specific type of hotspot exists (e.g., PM and Ozone framework or Acid Deposition framework) that it be implemented as designed.
- Where a framework does not exist for dealing with a specific type of hotspot, that the following steps be taken:
  - A multi-stakeholder team, consisting of representatives from industry, government, non-government organizations and communities with an interest in the electricity sector and under the leadership of Alberta Environment, be formed to develop and recommend a timely and cost effective plan to resolve the hotspot as quickly as possible.
  - Alberta Environment use the EPT framework, legislation, standards and approvals as appropriate to implement the plan.
  - When a hotspot has been identified, an economic, health and environmental analysis will be part of the plan developed to address it.

PURPOSE AND SCOPE OF THIS GUIDE

This guide outlines Alberta Environment's response options from when an initial area concern is raised through to the implementation of a management response plan, if required.

PURPOSE AND SCOPE OF THIS GUIDE

The guide covers:

- Identification of a potential hot spot concern
- Initial screening of a potential hot spot
- Detailed evaluation of a potential hot spot concern
- Triggering and implementation of a management response plan.

The process described in this guide is intended as an integral part of the province's management framework for the electricity sector. As such, it provides an additional safeguard to prevent adverse environmental or health effects and non-compliance with ambient objectives. The process is not intended to duplicate or parallel other processes or programs already addressing issue(s) of concern. Furthermore, it is not intended to be used for area issues that, in the absence of new information or scientific evidence, have been addressed previously by Alberta Environment, Alberta Health and Wellness, or another government agency.

This guide applies to the air emissions of existing and new Alberta electric power generation facilities that are of greater than one megawatt capacity and are regulated by Alberta Environment. It does not cover air emissions from emergency power generation facilities.

The guide describes the management response processes and/or frameworks that may be used by the Alberta government to identify, assess and manage potential hot spots resulting in whole or in part from the air emissions of the electric power sector. The guide encompasses adverse effects to human health or environmental receptors including soil, water, vegetation, fish, wildlife and livestock.

This guide does not change or alter the scope and authority of Alberta's existing air emissions and air quality management processes.

Alberta Environment has a comprehensive air quality management system, which includes:

- environmental assessment processes
- ambient air quality objectives
- management frameworks for specific substances or sectors
- an industrial release limits policy

PURPOSE AND SCOPE OF THIS GUIDE

- source emission standards
- plume dispersion modelling
- ambient air and source emissions monitoring
- environmental reporting
- emission inventories
- approvals
- inspections/abatement
- enforcement, and
- research.

Air emissions from thermal electric power generation facilities are subject to all of these general tools, frameworks and approaches as well as the sector-specific EPT Framework. This comprehensive management framework relies on a wide variety of scientific, economic, and social information inputs to protect air quality for Albertans.

1.0 SUBMITTING AN INITIAL POTENTIAL HOT SPOT CONCERN

Potential hot spots could emerge for various reasons, including:

- new scientific evidence about a particular substance emitted to the air by electric power generation and the substance's subsequent behaviour in the environment;
- non-conformance with air quality objectives due to new projects or changes to existing facilities;
- emergence of adverse impacts in an area (for example, soil, vegetation or livestock) attributable to air emissions from power plants.

SUBMITTING AN INITIAL POTENTIAL HOT SPOT CONCERN

1.1 WHO CAN SUBMIT A POTENTIAL HOT SPOT CONCERN

A Potential Hot Spot Concern can be submitted by:

i) someone who is 18 years of age and over and an Alberta resident; or

ii) a government, scientific or other agency.

Alberta Environment has internal processes that involve the identification and tracking of emerging environmental and health issues that could necessitate a re-assessment of the adequacy of current emission controls and/or ambient air quality objectives. This process also involves dealing with representatives from other governments, industry, scientific, academic and health organizations, and non government organizations. Alberta Environment and Health and Wellness staff will forward submissions on |ssues that may cause potential hot spots based on their environmental and health assessment activities.

The following are some examples of processes that include scientific review activities that may identify potential hot spot issues:

- Canadian Council of Ministers of the Environment Air Management committee
- Canadian Environmental Protection Act Domestic Substances List review
- Alberta Environment Conference
- Clean Air Strategic Alliance Priority Setting Workshop for the development of Air Quality Objectives
- Alberta Ambient Air Quality Objectives Working Groups and
- Clean Air Strategic Alliance Scientific conference
- International Conferences
- Review of scientific and technical journals.

1.2 WHEN TO SUBMIT A POTENTIAL HOT SPOT CONCERN

A stakeholder may submit an initial concern to Alberta Environment's Director if the stakeholder:

i) has new evidence, information or data that a potential hot spot area concern exists;

ii) is satisfied that the concern is not being or has not already been addressed by another governmental process or program.

1.3 WHAT TO DO BEFORE MAKING A SUBMISSION

Prior to submitting the concern, individuals with a concern are strongly encouraged to gather as much background information as possible. It may involve contacting a variety of sources. This will help ensure that the area concern is indeed "new" and suitable for initial screening under this guide.

SUBMITTING AN INITIAL POTENTIAL HOT SPOT CONCERN

The concern must link air emissions from an electric utility or utilities to an environmental or health issue that is not currently being managed or which new scientific information indicates may not, currently, be adequately managed.

It is possible that stakeholders within government, the public, scientific community or industry could initially identify a potential hot spot.

If a concern is of an urgent and pressing nature, individuals can contact Alberta Environment's 24-hour environmental emergencies or complaints number (1-800-222-6514 **toll-free)**

The many other organizations, programs and sources of information on air emissions and air quality concerns in Alberta include:

- Local airshed zones
- Local stakeholder groups
- Alberta Environment website (www.gov.ab.ca/env)
- Representatives of the plant(s) responsible for air emissions
- Company websites
- Clean Air Strategic Alliance data warehouse (www.casadata.org.)
- Alberta Sustainable Resource Development
- Regional health authorities
- Environmental non-governmental organizations.

Under their terms and conditions of approval, electric generation facilities collect and report considerable compliance data about their air emissions and ambient air quality. In addition, they must conduct specialized monitoring programs and studies as directed by Alberta Environment. These programs can also provide a valuable source of information for interested stakeholders.

1.4 WHAT TO INCLUDE IN A POTENTIAL HOT SPOT CONCERN SUBMISSION

Stakeholders must include the following when submitting a concern on a potential hot spot:

i) name and contact information;

ii) a concise description of the concern;

SUBMITTING AN INITIAL POTENTIAL HOT SPOT CONCERN

iii) the reason(s) that the current management system is not adequate; and

iv) a concise overview of the available evidence supporting the concern, including any applicable references to ambient monitoring data, scientific studies, environmental assessments or investigations.

2.0 INITIAL SCREENING

Once submitted, a preliminary screening will determine the next steps, if any, to be taken. If the issue is related to the assessment of new scientific information, the submission will be forwarded to Alberta Environment's Director of Environmental Policy Branch.

The Director will screen the potential hot spot concern to determine if there is sufficient basis to warrant a detailed evaluation under section 4 by taking into consideration the following questions.

- Has it been previously submitted to Alberta Environment as a statement of concern under *Environmental Protection and Enhancement Act* or the *Water Act*?
- Has it been previously reviewed as part of a hearing or approval process under Alberta Environment and the Energy and Utilities Board?
- Has it been or is it currently being addressed through another program or process?
- Does it bring forward new information/evidence not previously considered by Alberta Environment?
- Is it within the scope of Alberta Environment's mandate?
- Is it within the scope and authority of this guide?
- Is there sufficient credible evidence of a real or potential adverse effect to warrant further investigation?

3.0 DETAILED EVALUATION OF A POTENTIAL HOT SPOT

If it is determined that a potential hot spot requires detailed evaluation, it will be referred for evaluation under an existing framework. (*See sections 3.2, 3.3 and 3.4 of this guide as well as Appendix E.*) If it falls outside the scope of these frameworks, it will be evaluated under section 3.5- 32-C (Evaluation of New Evidence or Information).

When an area concern is referred to either the *Particulate Matter and Ozone Management Framework* or the *Acid Deposition Management Framework it* will be evaluated and managed under that framework

If the potential hot spot relates to on-going and repeated non-compliance with an ambient air quality objective, the non-compliance will be evaluated according to the description in section 3.2.

Section 3.5 outlines in general terms when potential hot spots arising from new information, data or scientific evidence should be evaluated.

DETAILED EVALUATION OF A POTENTIAL HOT SPOT

3.1 TIMELY REVIEW BY DIRECTOR

Within three months of receiving submissions, the Director will review all potential hot spots submitted and decide if:

a) The concern has no basis and therefore, no further action is required;

b) The concern will be referred for detailed evaluation by Alberta Environment under an existing process or framework (*See sections 3.2, 3.3 and 3.4 of this guide*);

c) The concern will be referred to an existing Alberta Environment program or process;

d) The concern will be referred for detailed evaluation by Alberta Environment under the "32-C" provisions of this guide described in section 3.5;

e) The concern is being addressed satisfactorily by another Alberta Environment program or process and therefore, no further action is required;

f) The concern falls outside of Alberta Environment's mandate and will be referred to the appropriate jurisdiction;

g) The concern is more appropriately addressed by another department; or

h) Any other decision that is in keeping with the intent of this guide is needed.

3.2 AMBIENT AIR QUALITY OBJECTIVES

Alberta's Ambient Air Quality Objectives are used to monitor and report on air quality, to establish approval conditions for industrial facilities, and to assess compliance and evaluate performance.[4] These objectives are generally established for one-hour, 24-hour, and annual averaging periods. Alberta Environment describes an objective as "a numerical concentration, value or narrative statement which is intended to provide protection of the environment and human health to the extent which is technically and economically feasible, and is socially and politically acceptable." [5]

Under this guide, a detailed evaluation of an area concern relating to ambient air quality objectives could arise due to:

1. An on-going or repeated non-compliance (*Appendix E1*)
2. If a revised/new ambient air quality objective is needed. (*See below.*)

Every three to four years, Alberta Environment holds consultations to set Ambient Air Quality Objectives and to receive stakeholder input. This priority-setting consultation process identifies existing objectives that require review or

updating, substances that require objectives to be created or adopted, and substances that require a program of information gathering to inform the next priority setting process.[6]

Objective development occurs through *creation, review, adoption and updating*. The approach followed depends on:

a) whether an objective exists in Alberta, and

b) whether it is a stakeholder priority or a department need.

- Objective *creation* occurs if no Alberta objective exists and the substance is a stakeholder priority.
- Objective *review* results if an Alberta objective is already in place and the objective is a stakeholder priority.
- Objective *adoption* happens if no Alberta objective exists and Alberta Environment needs the objective.
- Objective *updates* take place if an Alberta objective is in place and Alberta Environment sees that objective needing revision.

See also Appendix E1 Ambient Air Quality Objectives Detailed Evaluation Criteria.

3.3 PARTICULATE MATTER AND OZONE FRAMEWORK

The *Particulate Matter and Ozone Management Framework* was developed as a "made-for-Alberta" management process for $PM_{2.5}$ and ozone. It meets and, in some cases, exceeds the *Canada-wide Standard* (CWS) for $PM_{2.5}$ and ozone.[7] The framework sets four action levels representing a continuum of analysis and management activities based on measured ambient concentrations in the province.

a) Baseline monitoring and data gathering

b) Surveillance actions

c) Management plans

d) Mandatory plans to reduce below the Canada-wide Standard.

[8] For detailed information on the Acid Deposition Management Framework and the determination of trigger levels, see www.casahome.org

[9] Nilsson, 1986; cited in Bull, K.R. (1991) The critical loads/levels approach to gaseous pollutant emission control, *Environmental Pollution* 69:105-123.

3.4 ACID DEPOSITION MANAGEMENT FRAMEWORK

DETAILED EVALUATION OF A POTENTIAL HOT SPOT

For more details on the Particulate Matter and Ozone Management Framework Criteria, see Appendix E2.

Applied since 1999, this framework ensures effective management of acid deposition in Alberta.[8] The framework establishes three levels of management based on the levels of acid deposition relative to critical, target and monitoring loads. A critical load is defined as "the highest load that will not cause chemical changes leading to long-term harmful effects on the most sensitive ecological systems."[9] Target loads have been defined under the framework as “the maximum level of acidic atmospheric deposition that affords long-term protection from adverse ecological consequences, and that is politically and practically achievable.” The term “politically and practically” encompasses social, economic, and technological considerations. Actual critical, target and monitoring loads will vary according to the sensitivity of the receptor region.

The framework’s management levels, from least stringent to most stringent are:

- **Continuous Improvement** - applies at levels between current deposition and natural background. It relies solely on voluntary efforts for continuous improvement.
- **Emission Minimization** - occurs when acid deposition is below target levels, and involves the application of continuous improvement, voluntary approaches, application of Best Available Demonstrated Technology and operating approval conditions.
- **Emission Reduction** - applied when an area experiences acid deposition between target and critical loads. At this level, stakeholders are expected to work together to develop a reduction plan.

Under this guide, acid deposition levels must be over the target load for the receptor sensitivity of the area (*See Table 3 in Appendix E3*) to be considered a management concern that requires an emission reduction plan.

For more details on Acid Deposition Management Framework Criteria, see Appendix E3.

3.5 32-C EVALUATION OF NEW EVIDENCE OR INFORMATION

DETAILED EVALUATION OF A POTENTIAL HOT SPOT

The Electricity Project Team's recommendations provide for situations when a potential hot spot may be caused by a substance or parameter without existing standards or limits, and cannot be appropriately evaluated using numerical criteria or trigger levels as described in this guide. In such cases, the following guidance should be followed to direct the detailed evaluation:

available peer-reviewed scientific information and/or risk-based assessment evidence indicates that electricity generation-related air emissions, either alone, or in combination with other emission sources, are contributing to, or are projected to contribute to, adverse health or environmental outcomes. The precautionary principle applies. The precautionary principle is endorsed by Canada and Alberta in the *Canada-wide Environmental Standards sub-agreement* of the *Harmonization Accord*[10] , which specifies that a lack of scientific certainty shall not be used as a reason to postpone the development and implementation of standards.

Alberta Environment, in conjunction with other interested departments, will conduct the evaluation. These agencies will collaborate to evaluate the available peer-reviewed science. This science will assist in determining the level of potential harm or threat, and further course of action.

Agencies may consider the following information in the evaluation:

- known health and/or environmental issues associated with the emissions of concern;
- available peer-reviewed scientific evidence; information, data or modelling provided through the environmental impact assessment or approvals process;
- studies or information indicating the potential level of harm/threat posed;
- links between power plant emissions and local ambient levels;
- related standards or guidelines in place or being developed in other jurisdictions;
- available local data;
- link to provincial priority-setting processes;
- issues identified by local stakeholders.

[10]Canadian Council of Ministers of the Environment, Canada Wide Accord on Environmental Harmonization, 1998. Available at http://www.ccme.ca/assets/pdf/cws_accord_env_harmonization.pdf

DETAILED EVALUATION OF A POTENTIAL HOT SPOT

Possibly detailed evaluation of a potential hot spot under this sub-section will find that standards, objectives or trigger levels in existing frameworks require review. If so, the findings will be referred for further action by the parties responsible for managing the existing framework. For example, after evaluating the concern, Alberta Environment may refer a substance to the objectives priority setting process (*See section 3.2*).

4.0 DETAILED EVALUATION DECISION TRIGGERING AND IMPLEMENTING A MANAGEMENT RESPONSE PLAN

Following detailed evaluation of a potential hot spot using the most appropriate process described in this guide, Alberta Environment may decide one of the following:

a) The potential hot spot requires a management response under the requirements of an existing management framework. This could mean the findings of the detailed evaluation indicate a need to review numerical triggers, standards or objectives under an existing framework. These findings will be referred to the parties responsible for managing the existing framework.

b) The potential hot spot is of such a nature that the ambient level is in the range of causing adverse health and environmental outcomes and it requires the formation of a multi-stakeholder management response group to develop a management response. If this is the case, Alberta Environment will specify a timeline for the development of a timely and cost-effective plan to address the concern.

c) No further action is required because;

i) the concern is already being managed under an existing provincial or federal program, or

ii) the concern does not meet the criteria for a management response.

d) The concern does not meet the criteria for a management response but is of such a nature that Alberta Environment will refer the issue to other existing programs; or

e) Make any other decision that is in keeping with the intent of the recommendations.

DETAILED EVALUATION DECISION TRIGGERING AND IMPLEMENTING A MANAGEMENT RESPONSE PLAN

4.1 COMMUNICATING DECISIONS

Alberta Environment will communicate its decision in writing to the stakeholder(s) who submitted the initial concern and known source(s) of the air emissions causing the area concern. The decision will also be communicated to other interested stakeholder groups and members of the public.

If the decision indicates that further action is required under this guide, the Director will forward a copy of his decision to the operator of the electric generation facility involved in the potential hot spot.

The same process applies regardless of whether the concern is raised by a government agency or outside stakeholder.

4.2 MANAGMENT RESPONSES

This section describes the management responses that may occur when a detailed evaluation concludes that further action is required. Recommendation 33 outlines that management responses will be conducted either under an existing framework or using a multi-stakeholder management process[11]:

a) Where a framework for dealing with a specific type of hotspot exists (e.g., PM and Ozone framework or Acid Deposition framework) that it be implemented as designed.

b) Where a framework does not exist for dealing with a specific type of hotspot, that the following steps be taken:

- A multi-stakeholder team, consisting of representatives from industry, government, non-government organizations and communities with an interest in the electricity sector and under the leadership of Alberta Environment, be formed to develop and recommend a timely and cost effective plan to resolve the hotspot as quickly as possible.
- Alberta Environment use the EPT framework, legislation, standards and approvals as appropriate to implement the plan.
- When a hotspot has been identified, an economic, health and environmental analysis will be part of the plan developed to address it.

DETAILED EVALUATION DECISION TRIGGERING AND IMPLEMENTING A MANAGEMENT RESPONSE PLAN

Existing frameworks include:

- PM and Ozone Management Framework
- Acid Deposition Management Framework

In this document, the management responses under these frameworks are described in summary form only. Further information can be obtained as per the links and references provided in Appendix G.

Sometimes management concerns may be addressed most appropriately under one of the following multi-stakeholder processes:

- Substance Review Component of EPT Five-Year Review Process
- Ambient Air Quality Objectives Priority Setting (*See section 3.2*)

Alberta Environment may find it most expedient and effective to address repeated or on-going exceedances of an ambient air quality objective using its regulatory management tools. (*See section 4.2.3)*

A special Multi-Stakeholder Management Group will be formed to address concerns that do not easily fit existing frameworks or processes (*See section 5.3*).

All of these management response frameworks or processes are summarized below. The list is not exhaustive. This means that other frameworks may be used if Alberta Environment determines that they better address the management concern.

4.2.1 RESPONSE UNDER PARTICULATE MATTER AND OZONE MANAGEMENT FRAMEWORK

If the Canada-wide Standard for PM or ozone is exceeded in an area, Alberta Environment will develop and implement a management plan containing measures to reduce ambient concentrations to below the numeric of this standard. The goal of the management action plan is to prevent non-conformance with the Canada-wide Standard, in order to maintain and improve air quality wherever possible. By following the framework guidance document, a management plan with actions appropriate to the ambient concentrations, trends and contextual factors will be developed and implemented by stakeholders from source and receptor areas. Alberta Environment or the affected airshed zone(s), as appropriate, may coordinate the plan development. If not done within two years, Alberta Environment may impose a plan.

DETAILED EVALUATION DECISION TRIGGERING AND IMPLEMENTING A MANAGEMENT RESPONSE PLAN

4.2.2 RESPONSE UNDER ACID DEPOSITION MANAGEMENT FRAMEWORK

When a specified area exceeds its target load, Alberta Environment, and the Energy and Utilities Board will establish an Acid Deposition Management Zone. The framework directs formation of a multi-stakeholder group to develop a management plan to reduce emissions and decrease acid deposition to below the target load(s). The group will have two years to submit such a plan. Alberta Environment participates in, and, if necessary, facilitates this process. If stakeholders are unable to derive a management plan, or if emission reductions under such a plan are not achieved, Alberta Environment, in consultation with other Alberta regulatory bodies, will develop and impose a management plan.

Implementation begins immediately upon acceptance of the plan, and implementation should be complete within three years. However, if major changes are required in the design and/or operation of a facility, emission reductions will be achieved within up to ten years.

4.2.3 RESPONSE UNDER AMBIENT AIR QUALITY OBJECTIVES

Alberta Environment has various regulatory management options to address on-going and repeated non-conformance with Ambient Air Quality Objectives. Such non-conformances are considered management concerns under this document when they involve emissions from thermal electric generation facilities:

a) If the management concern results from non-compliance with approval conditions, the Director will initiate compliance and enforcement actions as appropriate.

b) If new information or scientific evidence not previously considered in an approval or environmental impact assessment process suggests that a significant concern exists despite compliance with all relevant approval conditions, and it can be shown that the management concern was not reasonably foreseeable when approval was issued, the Director can make approval conditions more stringent.

c) If a management concern is projected to occur as a result of a proposed new unit or changes to an existing unit, the Director may apply more stringent approval conditions and stack emission limits.

4.2.4 SUBSTANCE REVIEW UNDER EPT FIVE-YEAR REVIEW PROCESS

Should new information or scientific evidence indicate the need for a new Ambient Air Quality Objectives or revision of existing objectives, it will be referred to the objectives priority-setting process. (*See section 3.2*.)

DETAILED EVALUATION DECISION TRIGGERING AND IMPLEMENTING A MANAGEMENT RESPONSE PLAN

In developing the EPT Framework, the Electricity Project Team undertook a detailed substance review and prioritization process.[12] It recommended a substance review component be included as part of the multi-stakeholder EPT framework review conducted every five years. The substance review would assess whether or not additional substances in thermal electric generation air emissions should be formally controlled. The review would take into account new or emerging information, including the effects of complex mixtures emitted by power plants. (See also Appendix F, Figure 3).

The details of the EPT Five-Year Review process were still being developed at the time this guide was prepared.

4.3 MULTI-STAKEHOLDER MANAGEMENT GROUP

A multi-stakeholder management group will be formed when Alberta Environment determines that this would be the most effective response to a management concern. Recommendation 33 outlines the formation and general mandate of a multi-stakeholder management group and specifies:

- Alberta Environment will form and lead the group
- Participants will reflect key organizations and interests (*See below.*)
- The group will develop a timely and cost-effective plan to resolve the concern as quickly as possible
- Alberta Environment will use the EPT Framework, legislation, standards and approvals as appropriate to implement the plan
- When a management concern has been confirmed, an economic, health and environmental analysis will be part of the plan developed to address the concern.

4.3.1 INTERESTED PARTIES

Alberta Environment will take the lead in forming the group by identifying and inviting key interested parties to participate. In doing so, the department will take into account the following potential stakeholders:

- Local municipalities, counties, and municipal districts
- Associations or companies representing major emission sources

[12] For more information, see EPT Prioritization Subgroup Report, May 2003, available at http://www.casahome.org/uploads/Prioritization_Subgroup_Final_Report.pdf. See also Appendix A for a summary of the substances reviewed and the risk indices applied

- Local business groups
- Local agricultural groups
- Local airshed zone
- Environmental organizations
- Academic or research-oriented organizations
- Community-based groups comprising citizens at large
- Regional health authorities
- Local aboriginal communities
- Alberta Environment and other provincial government departments or agencies
- Federal government departments or agencies
- Public at large.

Alberta Environment leads the process and may coordinate it with a local airshed zone if the airshed zone involves many of the interested stakeholders.

A multi-stakeholder management group is advisory. It will strive for consensus on its management response plan and recommendations and document the basis for different views when consensus is not achieved. This will enable Alberta Environment to take these views into consideration when determining appropriate actions.

Consistent with Recommendation 33, the group will develop an appropriate management response plan as quickly as possible, while balancing social, economic, environmental and health considerations. If the group is unable to develop a plan, Alberta Environment may impose a plan. Wherever possible, the multi-stakeholder management group should use existing processes or mechanisms to meet the management response plan objectives.

4.3.2 MANAGEMENT RESPONSE OPTIONS

Management response options could include, but are not limited to:

a) Identifying all contributing sources

b) Setting emission reduction targets and timeline for contributing sources to reduce the ambient levels

c) Developing an air quality objective

d) Referring to the appropriate regional office of regulatory agencies for follow-up

e) Referring to Alberta Health and Wellness and/or regional health authority for appropriate actions

f) Compliance action

g) Approval amendment.

All multi-stakeholder management group recommendations should be clear, actionable, have a timeframe for completion and identify the implementing agencies and/or parties.

4.3.3 COMPLETION AND ACCEPTANCE

Upon completion and acceptance of the management plan by Alberta Environment, it may choose to a) disband the group, or b) create a smaller implementation advisory group. Alberta Environment will implement the management plan and report back to the stakeholders on the status of the implementation.

4.4 LINKAGES TO FIVE-YEAR REVIEW

Recommendation 33 directs that any plans or actions be taken into account in the EPT's Five-Year Review process. For greater certainty, this would include plans and actions undertaken to address management concerns under existing frameworks as well as those developed by a multi-stakeholder management group as described in this guide.

APPENDICES

APPENDIX A

ESTIMATED MAXIMUM GROUND LEVEL CONCENTRATIONS OF SCREENED SUBSTANCES BASED ON WORST CASE ESTIMATES (from EPT prioritization subgroup report, May 2003)

ESTIMATED MAXIMUM GROUND LEVEL CONCENTRATIONS OF SCREENED SUBSTANCES BASED ON WORST CASE ESTIMATES (from EPT prioritization subgroup report, May 2003)

List 2 Substance	Hydrogen fluoride	Hydrogen chloride	Arsenic	Beryllium	Cadmium	Chromium	Cobalt
Potential Issue or Concern	Health and Quantities Released	Health and Quantities Released	Health, Persistence & Bioaccumulation	Health, Persistence, Bioaccumulation & Quantities Released	Health, Persistence & Bioaccumulation	Health & Persistence	Health & Persistence
Emissions (kg/year)	998,200	448,000	30	126.144	420.48	823	344
Calculated Emission Intensity (mg/MWh	24955	11200	0.75		10.512	20.6	8.6
Emission Intensity (mg/MWh)			10		3.5	100	
U.S. EPA Median Emission Factor Times 1.5 (mg/MWh)	29000	145000	20	3.1	5	58	18.6
Calculated concentration in flue gas (ug/m3)	6931.94	3111.11	2.78	0.86	2.92	27.78	2.39
Measured Flue Gas Concentrations (ug/m3)							
Maximum Flue Gas Concentration (ug/m3)	6931.94	3111.11	2.78	0.86	2.92	27.78	2.39
Calculated Ground Level Concentration (ng/m3)	693	311	0.28	0.09	0.29	2.78	0.24
Calculated MGLC using ratio method (ng/m3)	2110	947	0.063	0.27	0.89	1.74	0.73
IRIS/ATSDR Acceptable Air Exposure Health Level	Not available	Inhalation RfC = 20,000ng/m3	Inhalation RfC = 2ng/m3	Inhalation RfC = 20ng/m3	Inhalation RfC = 6ng/m3	ATSDR intermediate MRL = 1000ng/m3 Cr(VI)	ATSDR MRL inhalation = 100ng/m3
Ratio of MGLC Estimate to Acceptable Air Exposure Health Level		0.047	0.14	0.013	0.15	0.0028	0.0073
Alberta Ambient Air Quality Guideline Value (1 hr) (ng/m3)	4,900	75,000				1000	

ESTIMATED MAXIMUM GROUND LEVEL CONCENTRATIONS OF SCREENEDSUBSTANCES BASED ON WORST CASE ESTIMATES (from EPT prioritization subgroup report, May 2003)

List 2 Substance	Lead	Manganese	Nickel	Selenium	Thallium	TCDD/TCDFF	Hexachloro-benzene
Potential Issue or Concern	Health, Persistence & Bioaccumulation	Health, Persistence? & Bioaccumulation?	Health & Persistence	Health & Persistence	Health, Persistence & Bioaccumulation	Health, Persistence Bioaccumulation & Long Range Transport	Health, Persistence Bioaccumulation & Long Range Transport
Emissions (kg/year)	287	1826	563	10301.76	0	0	15
Calculated Emission Intensity (mg/MWh	7.175	45.65	14.075			0.0000525	0.37
Emission Intensity (mg/MWh)	18.5		70	75			
U.S. EPA Median Emission Factor Times 1.5 (mg/MWh)	33.1	103.5	57.3	428			
Calculated concentration in flue gas (ug/m3)	5.14	12.68	19.44	20.83	0	0.000014583	0.1
Measured Flue Gas Concentrations (ug/m3)							
Maximum Flue Gas Concentration (ug/m3)	5.14	12.68	19.44	20.83	0	0.000014583	0.1
Calculated Ground Level Concentration (ng/m3)	0.51	1.27	1.94	2.08	0	0	0.01
Calculated MGLC using ratio method (ng/m3)	0.61	3.86	1.19	21.78	0	4.44E-06	0.03
IRIS/ATSDR Acceptable Air Exposure Health Level	Not available	ATSDR MRL Inhalation = 40 ng/m3	ATSDR MRL inhalation = 200ng/m3	IATSDR MRL Oral = 5 ug/kg/dy	Oral RfD= 80ng/kg/dy	WHO oral RfD= 1pg/kg/dy	ATSDR -inhalation - no MRL (data too uncertain) Chronic oral MRL 0.05ng/kg/dy
Ratio of MGLC Estimate to Acceptable Air Exposure Health Level			0.0097				0.0008
Alberta Ambient Air Quality Guideline Value (1 hr) (ng/m3)	1,500						

ESTIMATED MAXIMUM GROUND LEVEL CONCENTRATIONS OF SCREENED SUBSTANCES BASED ON WORST CASE ESTIMATES (from EPT prioritization subgroup report, May 2003)

List 2 Substance	Acrolein	Formaldehyde	Pentachloro-phenol	Benzene	Ethylbenzene	Toluene	Xylene
Potential Issue or Concern	Health	Health		Health	Health	Health	Health
Emissions (kg/year)	0	0	0	3988	95	1,681	792
Calculated Emission Intensity (mg/MWh	0	0	0		2.3798	42.02975	19.7903
Emission Intensity (mg/MWh)							
U.S. EPA Median Emission Factor Times 1.5 (mg/MWh)	22.8	27.6	0.06	17.25	2.8	24.8	38.1
Calculated concentration in flue gas (ug/m3)	6.33	7.67	0.02	4.79	0.78	6.89	10.58
Measured Flue Gas Concentrations (ug/m3)				20.39	0.48	9.94	4.46
Maximum Flue Gas Concentration (ug/m3)	6.33	7.67	0.02	20.39	0.78	9.94	10.58
Calculated Ground Level Concentration (ng/m3)	0.63	0.77	0	2.04	0.08	0.99	1.06
Calculated MGLC using ratio method (ng/m3)	0	0	0	8.43	0.2	3.55	1.67
IRIS/ATSDR Acceptable Air Exposure Health Level	Inhalation RfC = 20ng/m3		Oral/water RfC= 3,000ng/L	Inhalation RfC = 4,500ng/m3	Inhalation RfC = 1,000,000ng/m3	Inhalation RfC = 400,000ng/m3	Inhalation RfC = 100,000ng/m3
Ratio of MGLC Estimate to Acceptable Air Exposure Health Level	0.032			0.0019	0.1	8.89E-06	1.67E-05
Alberta Ambient Air Quality Guideline Value (1 hr) (ng/m3)		65,000		30,000			

ESTIMATED MAXIMUM GROUND LEVEL CONCENTRATIONS OF SCREENED SUBSTANCES BASED ON WORST CASE ESTIMATES (from EPT prioritization subgroup report, May 2003)

List 2 Substance	PAHs	Ammonia	Carbon monoxide	Radionuclides	Ozone	PM 2.5	Reduced sulphurs
Potential Issue or Concern	Health, Persistence & Bioaccumulation		Health	Health	Health	Health	
Emissions (kg/year)	66.5	60,900	0	0	0	0	0
Calculated Emission Intensity (mg/MWh	0.662648	1522.5	0				
Emission Intensity (mg/MWh)							
U.S. EPA Median Emission Factor Times 1.5 (mg/MWh)							
Calculated concentration in flue gas (ug/m3)	0.46	422.92	0	0	0	0	0
Measured Flue Gas Concentrations (ug/m3)	1.213						
Maximum Flue Gas Concentration (ug/m3)	1.21	422.92	0	0	0	0	0
Calculated Ground Level Concentration (ng/m3)	0.01	42.29	0	0	0	0	0
Calculated MGLC using ratio method (ng/m3)	0.01	128.74	0	0	0	0	0
IRIS/ATSDR Acceptable Air Exposure Health Level	WHO suggested guideline RfC= 0.1 ng/m3	Inhalation RfC = 100,000ng/m3		ATSDR 1mSv/yr (100mrem/yr)			
Ratio of MGLC Estimate to Acceptable Air Exposure Health Level	0.07	0.0013	0	0.0015			
Alberta Ambient Air Quality Guideline Value (1 hr) (ng/m3)		2,000,000	15,000,000		160,000	30,000	

APPENDIX B

GLOSSARY OF TERMS AND ACRONYMS

GLOSSARY OF TERMS AND ACRONYMS

This guide minimizes use of abbreviations and acronyms. The following list may prove useful in using this document or in searching for additional information.

AENV: Alberta Environment

CASA: Clean Air Strategic Alliance

CCME: Canadian Council of Ministers of the Environment

CWS: Canada-wide Standard

EIA: Environmental Impact Assessment

EPEA: (Alberta) Environmental Protection and Enhancement Act

EUB: (Alberta) Energy and Utilities Board

EPT: Electricity Project Team

NO_x: Nitrogen oxides (also oxides of nitrogen)

PM: Particulate matter

$PM_{2.5}$: Particulate matter less than 2.5 microns in diameter

PM_{10}: Particulate matter less than 10 microns in diameter

SO_2: Sulphur dioxide (SO_x refers to sulphur oxides)

APPENDIX C

DEFINITIONS

DEFINITIONS

a) **Adverse Effect:** impairment of or damage to the environment, human health or safety or property and is used interchangeably with "adverse outcomes" as used in Recommendation 32 and in this document;

b) **Ambient Air Quality Objective:** an ambient air quality objective established pursuant to section 14(1) of the Environmental Protection and Enhancement Act

c) **EPT Framework:** Refers to "*An Emissions Management Framework for the Alberta Electricity Sector: Report to Stakeholders*", developed by the CASA Electricity Project Team and approved by the CASA Board in November 2003.

d) **Existing Framework:** An existing environmental management framework includes the *Particulate Matter and Ozone Framework*, *Acid Deposition Management Framework*, *Ambient Air Quality Objectives*, *EPT Framework*, as well as management frameworks of a similar nature for receptors other than air.

e) **Detailed Evaluation:** the evaluation of an area concern under the most appropriate evaluation criteria noted in section 3 of this guide.

f) **Potential Hot Spot:** a term used to describe an area, resource or population identified by a stakeholder as a concern because of the adverse environmental or health impacts of air emissions from the electric power generating sector, either alone or in combination with another source. Information about a potential hot spot is submitted for initial screening under section 2, and, if applicable, detailed evaluation under section 3 of this document.

g) **Management Concern:** a potential hot spot that Alberta Environment determines to require a multi-stakeholder management response plan under section 4.3.

APPENDIX D

OVERVIEW OF KEY AGENCIES AND STAKEHOLDERS

OVERVIEW OF KEY AGENCIES AND STAKEHOLDERS

Alberta Environment is responsible for the overall process and will be the lead agency for potential hot spots that fall within the scope of this guide. Depending on their mandate and expertise, and the nature of the potential hot spot, other government agencies and stakeholders will participate. Alberta Health and Wellness is a key partner in developing or revising ambient air quality objectives.

Alberta Environment

Alberta Environment regulates the emissions of electric power generation facilities by approvals issued under the *Environmental Protection and Enhancement Act*. Regulatory approvals cover:

- source emission limits;
- required pollution control equipment/technologies and allowable emission sources;
- operational procedures required to minimize emissions;
- stack design criteria; and
- environmental monitoring and reporting requirements.

Through approvals, compliance and enforcement, monitoring and evaluation, and environmental standards, Alberta Environment assures
that the quantity and quality of water, air and land support healthy communities, industry performance, recreation and tourism in Alberta.
The Ministry also works to anticipate sources of environmental risks, and ensures rapid, coordinated responses to environmental emergencies.

Alberta Health and Wellness

Alberta Health and Wellness collaborates with partners to assure the delivery of quality affordable health services and wellness programs for Albertans. A core business areas is protecting the health of Albertans. The department will be a key stakeholder in the process outlined in this guide when a potential hot spot relates to human health impacts of air emissions from electric power generation.

The Provincial Health Officer provides direction and guidelines on public health policy to regional health authorities, and informs the public about communicable diseases and public health programs.

OVERVIEW OF KEY AGENCIES AND STAKEHOLDERS

Alberta's health services are delivered by nine regional health authorities (see separate description below), two provincial health authorities, health professionals in fee-for-service practice and others who provide equipment, supplies and services.

Energy and Utilities Board

The Alberta Energy and Utilities Board is an independent, quasi-judicial agency of the Government of Alberta. The board adjudicates and regulates matters related to energy and utilities within Alberta to ensure development, transportation and monitoring of the province's energy resources are carried out in the public interest. That includes the safe, responsible and efficient development of electrical energy, including electric power generation facilities.

When reviewing applications for new electric power plants, the board addresses siting, land use, land ownership and other local issues. The board also has a broad mandate to review and consider environmental issues and matters that may be raised by those with an interest in a particular project. The board's responsibility includes collection, storage, analysis, appraisal and dissemination of information and making stakeholders aware of information.

Alberta Energy

Alberta Energy ensures development of Alberta's resources is appropriate, environmentally sustainable and in the public interest.

To ensure Albertans a long-term, reliable supply of competitively priced electricity, the department develops, supports and monitors the framework for bringing new generation on-line, competitive electricity markets and efficient delivery systems.

Alberta Sustainable Resource Development

Sustainable Resource Development manages Alberta's public lands, forest, rangelands, fish and wildlife resources. The department could become involved with the processes described in this guide when a management concern arises over adverse impacts on fish or wildlife.

OVERVIEW OF KEY AGENCIES AND STAKEHOLDERS

Regional Health Authorities

Alberta's nine regional health authorities are responsible for hospitals, continuing care facilities, community health services and public health programs. They deliver health services in the regions and work with communities to deliver health services to local residents.

Regional health authorities will be stakeholders in this process when a potential hot spot area concern relates to human health impacts of air emissions from electric power generation.

Local Airshed Zones

Airshed zones are local or regional multi-stakeholder, non-profit societies that use the Clean Air Strategic Alliance consensus model to make decisions. Airshed zones can enable local stakeholders to design local solutions to address local air quality issues. These societies work within a designated area to monitor, analyze and report on air quality. They recommend and implement actions to improve air quality within their zone.

Stakeholders involved in airshed zone management may also develop response plans to deal with air quality concerns in their region. In some cases, provincial management frameworks, such as the *Particulate Matter and Ozone Management Framework,* anticipate that zones could participate in planning and developing responses to the particular air quality issues the framework was designed to address. Airshed zones may be asked to participate in the management planning processes outlined in this document.

Local Municipalities, Counties and Municipal Districts

Municipalities, counties and municipal districts address issues of a local nature within their jurisdiction. They provide residents with ways to make decisions about local issues, such as land-use planning, and are potential stakeholders in developing management responses to potential hot spots.

OVERVIEW OF KEY AGENCIES AND STAKEHOLDERS

Environmental Non-Governmental Organizations

Environmental non-governmental organizations can be key stakeholders on air quality issues and environmental issues of local concern. They may be involved in the multi-stakeholder groups formed to develop management responses described in this guide.

Local Stakeholder Groups

Alberta has a strong tradition of local stakeholder groups forming around specific resource development issues or concerns. Often, these groups have accumulated significant experience, information and expertise related to their focus issues. These groups provide an important community perspective on area issues and may be stakeholders to the processes described in this guide.

Federal Departments

A concern may involve matters of federal jurisdiction and the appropriate federal departments would be invited to participate.

Industry

Industry stakeholders can provide valuable information about the causes and solutions to address air quality concerns. They would also be invited to participate.

APPENDIX E

EXISTING DETAILED EVALUATION CRITERIA

EXISTING DETAILED EVALUATION CRITERIA

APPENDIX E1

Ambient Air Quality Objectives Detailed Evaluation Criteria

Management concerns found under the province's Ambient Air Quality Objectives framework, need to satisfy two criteria, namely one of (a) **or** (b) below **AND** one of (c), (d) **or** (e) below.

a) An area where Alberta ambient air quality guidelines:

b) have been exceeded *on an on-going or repeated** basis, or
are projected to be exceeded on an on-going or repeated* basis,

as determined by:

c) emissions projections or dispersion modelling required by the environmental impact assessment process for a new electric power generation unit, **or**

d) ambient air quality monitoring trends and data, **or**

e) emissions projections or dispersion modelling performed as part of any regulatory requirements for existing electric power generating units (i.e. approvals for changes to existing units, permit conditions, etc.)

* In this guide only, ***"on-going and repeated basis"*** means achievement of less than 98th percentile of 24-hour ambient objectives, averaged over one year.

Table 1 illustrates ambient air quality objectives that may be related to emissions from the thermal electric power generation sector.

EXISTING DETAILED EVALUATION CRITERIA

Table 1: Ambient Air Quality Objectives for Substances Emitted by or Formed from the Emissions of Electric Power Generation Facilities

Substance	μg m^{-3}	Ppbv
Nitrogen Dioxide		
1-hour average	400	212
24-hour average	200	106
Annual Arithmetic Mean	60	32
Sulphur Dioxide		
1-hour average	450	172
24-hour average	150	57
Annual Arithmetic Mean	30	11

When dispersion modelling shows ambient air quality objectives are being exceeded, Alberta Environment will determine the nature of the exceedance by addressing:

- frequency and location of exceedance;
- possible confounding sources (e.g. road dust);
- what emission reductions already are in place;
- what meteorological conditions cause the exceedance;
- how conservative the dispersion modelling is;
- what additional monitoring is proposed;
- what additional study is proposed;
- the rationale behind the ambient guidelines (vegetation based or health based);
- the electricity sector's contribution to the exceedance, beyond the existing background level.

Depending on their nature, Alberta Environment may choose to address on-going and repeated exceedances by forming a multi-stakeholder management group under section 4.3. An alternative is to apply existing objectives management tools as described in section 4.2. Section 4.2 may be more appropriate when air emissions from the thermal electric power generation sector are largely responsible for the exceedances.

APPENDIX E2

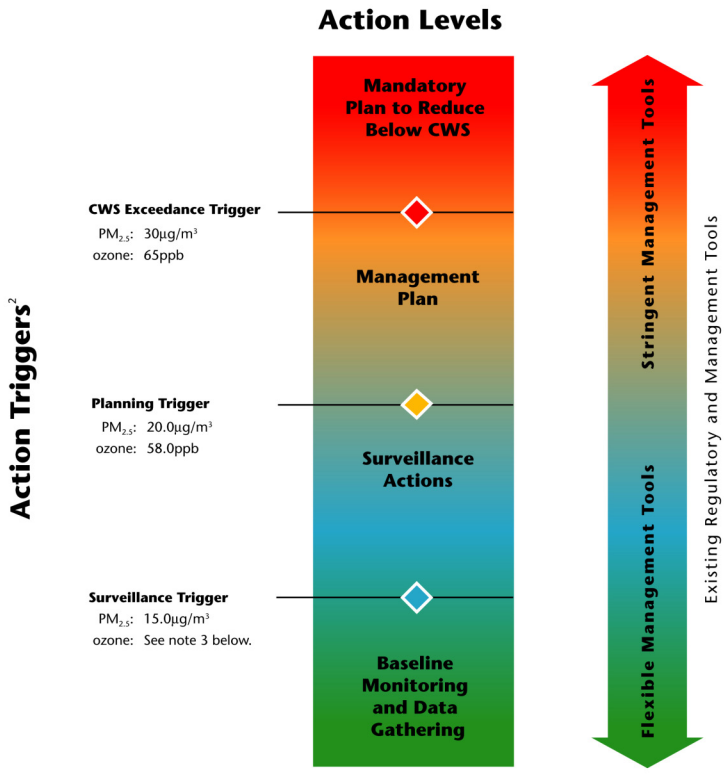
EXISTING DETAILED EVALUATION CRITERIA

Particulate Matter and Ozone Management Framework Criteria

Figure 2 shows ambient particulate matter or ozone levels falling within the ranges of action levels (c) and (d) constitute a management concern under this guide but one that still would be managed under that framework.

Alberta Environment determines the PM and ozone framework action levels across the province annually based on data collected from the provincial ambient monitoring network.

Fine Particulate Matter and Ozone Management Framework[1]



1. *The framework must be applied in the context of its key elements, including guiding principles, existing initiatives and mechanisms that support management of PM & ozone, and the goals and objectives for each action level.*

2. *Action triggers for $PM_{2.5}$ are based on a 24 hour average, and achievement is based on the 98th percentile ambient measurement annually, averaged over 3 consecutive years. Action trigger levels for ozone are based on an 8 hour average, and achievement is based on the 4th highest measurement annually, averaged over 3 consecutive years.*

3. *For ozone, Alberta Environment will determine on an annual basis which areas of the province are in baseline and which are in surveillance.*

Figure 2: PM and Ozone Management Framework - Overview

EXISTING DETAILED EVALUATION CRITERIA

When the $PM_{2.5}$ or ozone concentration in an area is higher than the planning or Canada-wide Standard exceedance trigger levels, the area will be managed under the PM and ozone framework.

For a brief description of the management steps under the framework, see Management Responses (*section 4.2*) of this guide.

The PM and ozone trigger criteria are as follows:

Table 2: Trigger Levels for PM and Ozone Management Plans

Substance	Management Plan Trigger	CWS Exceedance Trigger	Achievement Calculation
$PM_{2.5}$	20.0 $\mu g/m^3$	30.0 $\mu g/m^3$	24 hour average, achievement based on 98th percentile ambient measurement annually, averaged over three consecutive years
Ozone	58 ppb	65 ppb	8 hour average, achievement based on the 4th highest measurement annually, averaged over three consecutive years

Acid Deposition Management Framework Criteria

The framework evaluates acid deposition levels using a comparatively coarse 1^o x 1^o grid system. When an area meets or exceeds the acid deposition trigger levels for Emission Reduction and is equal or greater in area than a 1^o x 1^o segment of the province, it will be referred for management under the *Acid Deposition Management Framework*. See also Management Responses (*section 4.2*) in this guide.

As this guide was prepared initiatives were underway to develop more localized applications of the provincial *Acid Deposition Management Framework*. In 2004, a subgroup of the Cumulative Environmental Management Association, based in

EXISTING DETAILED EVALUATION CRITERIA

Alberta's Wood Buffalo Region, finalized the *Acid Deposition Management Framework Recommendations* for the region, primarily in response to rapid oil sands development. Alberta Environment's Acid Deposition Assessment Group, which includes some stakeholders, also is developing a regional acid deposition framework. This framework is designed to provide a process for managing emissions of sulphur dioxide and nitrogen oxides for a region or airshed rather than on a 1º by 1º grid. This work may be applicable to managing potential hot spots that involve acid deposition resulting from emissions of electric power generation facilities.

When acid deposition exceeds target loads at a scale less than 1^{o} x 1^{o} it is expected that the area concern would be considered a management concern under section 4(b) and referred to a multi-stakeholder management group under section 4.3.

Table 3: Trigger Criteria for Acid Deposition Management Framework

Sensitivity of Receptor Area	Target Load
High	0.22 keq
Moderate	0.45 keq
Low	0.90 keq

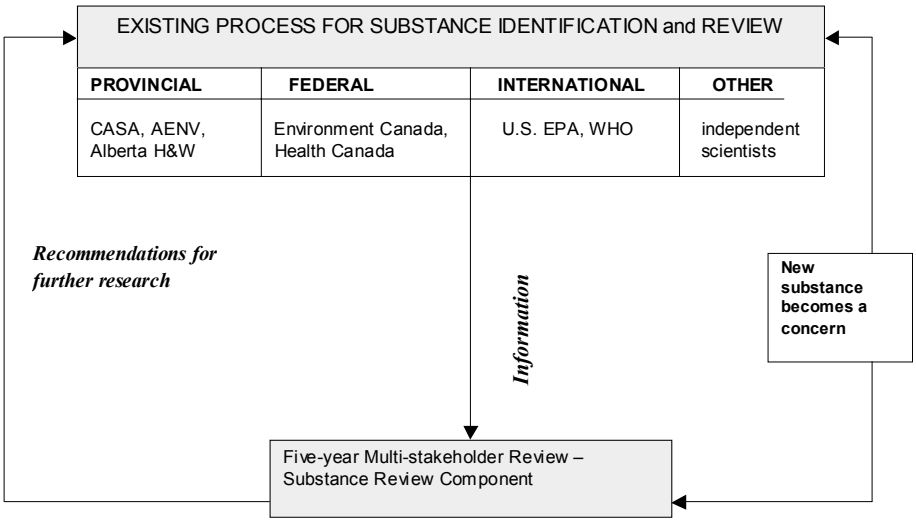
(Target loads are expressed in kilo-equivalent of hydrogen ions per hectare per annual, keq H+ ha-1 yr-1.)

Every five years, Alberta Environment updates its calculation of acid deposition loading levels based on the Regional Lagrangian Acid Deposition (RELAD) model as supplemented by actual monitoring data.

APPENDIX F

APPENDIX F

Figure 3: Process for Substance Review under EPT
Five-Year Review Process



APPENDIX G

ADDITIONAL DOCUMENTS AND REFERENCES

ADDITIONAL DOCUMENTS AND REFERENCES

The following sections provide a listing of useful background information and references. All of the documents and references listed below may be obtained electronically from Alberta Environment's website or from the website of the Clean Air Strategic Alliance. If electronic access is unavailable, for

Alberta Environment documents contact:

Information Centre

Alberta Environment

Main Floor, Great West Life Building

9920 – 108th Street

Edmonton, Alberta T5K 2M4

Phone: (780) 944-0313

Fax: (780) 427-4407

For Clean Air Strategic Alliance documents, contact:

Clean Air Strategic Alliance

10035 108th St NW, Flr 10

Edmonton, AB, T5J 3E1

Phone: (780) 427-9793

Fax: (780) 422-2137

Email: casa@casahome.org

EPT Documents

The **Electricity Project Team** gathered, reviewed and prepared numerous documents that could provide useful reference material. All of these are available at the EPT website attached to CASA's website.

Go to: http://casahome.org/electricity/index.asp

Approvals-Related References

Alberta Environment Approval Viewer

Go to: www3.gov.ab.ca/env/water/approvalviewer.html

Coal Fired Power Plant Approval Process

Go to: www3.gov.ab.ca/env/protenf/approvals/factsheets/Coal_Fired.pdf

Fuel Conversion Approval Process

ADDITIONAL DOCUMENTS AND REFERENCES

Go to: www3.gov.ab.ca/env/protenf/approvals/factsheets/fuel_conversion.pdf

Ambient Air Quality Objectives Related References

AAQO Fact Sheet

Go to: www3.gov.ab.ca/env/protenf/approvals/factsheets/ABAmbientAirQuality.pdf

AAQO Priority Setting – 2001 Work Plan

Go to: www3.gov.ab.ca/env/protenf/publications/AlbertaAmbientAir QualityGuidelinesWorkPlan.pdf

PM & Ozone Management Framework

Go to: www.casahome.org, follow the CASA library link to Final Reports

Acid Deposition Management Framework

Go to : www.casahome.org, follow the CASA library link to Final Reports

Compliance

Compliance Assurance Principles

Go to : www3.gov.ab.ca/env/protenf/documents/CAP_Final_2000.pdf

Compliance Inspection Program

Go to: www3.gov.ab.ca/env/protenf/approvals/factsheets/compinsp.html

Industrial Release Limits Policy

Go to :

www3.gov.ab.ca/env/protenf/publications/indlreleaselimitspolicynov00.pdf

Other Useful Links

Local Airshed Zones

At the publication of this report, there were seven air quality management zones. You may check out the Airsheds Directory (www.casahome.org/about_casa/directory/directory.asp) for information on recent additions as well as contact information for existing zones.

West Central Airshed Society

Wood Buffalo Environmental Association

ADDITIONAL DOCUMENTS AND REFERENCES

Parkland Airshed Management Zone

Fort Air Partnership

Peace Airshed Zone Association

Palliser Airshed Society

Lakeland Industry and Community Association

CASA Data Warehouse

This site houses the Alberta Ambient Air Data Management System which is the central repository for air quality data collected in Alberta. It provides access to data, reports, trends and maps of air quality in the province. (*See www.casadata.org*.)