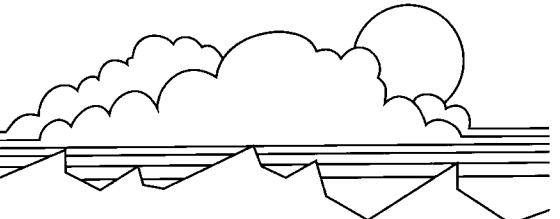


# Community Action on Industrial Facilities:

**Background Materials for  
Community Involvement in  
Air and Water Quality Monitoring and Enforcement**

By Cindy Chiasson and Brenda Heelan Powell

**ENVIRONMENTAL LAW CENTRE**



Chiasson, Cindy, 1961 -

Community action on industrial facilities: background materials for community involvement in air and water quality monitoring and enforcement

Includes bibliographical references.

ISBN 0-921503-70-9

1. Environmental monitoring--Alberta--Citizen participation. 2. Environment monitoring--Law and legislation--Alberta. 3. Air quality management--Alberta--Citizen participation. 4. Air--Pollution--Law and legislation--Alberta. 5. Water quality management --Alberta--Citizen participation. 6. Water--Pollution--Law and legislation--Alberta. I. Powell, Brenda Heelan, 1971- II. Environmental Law Centre (Alta.) III. Title.

TD182.4.A4C455 2001      363.73'63'097123      C2001-911656-X

Copyright © 2002

All Rights Reserved

Environmental Law Centre (Alberta) Society

204, 10709 Jasper Avenue

Edmonton, AB T5J 3N3

## About the **Environmental Law Centre**

---

The Environmental Law Centre (Alberta) Society is a non-profit charitable organization operating in Alberta since 1982. The Society believes in making the law work to protect the environment and in support of this objective provides services in environmental law education, information and referral, environmental law reform and environmental law research. The Society operates the Environmental Law Centre which is staffed by four full-time lawyers.

Funding is provided to the Society in part by the Alberta Law Foundation and through the generous support of the public. The Environmental Law Centre also accepts private and government research contracts for work relevant to and consistent with the Society's objectives.

For more information, contact:

**Environmental Law Centre**  
204, 10709 Jasper Avenue  
Edmonton, Alberta T5J 3N3  
**Phone:** (780) 424-5099  
**Fax:** (780) 424-5133  
**Alberta Toll free:** 1-800-661-4238  
**E-mail:** elc@elc.ab.ca  
**URL:** <<http://www.elc.ab.ca>>

# Sponsors

---

The Environmental Law Centre thanks the Edmonton Community Lottery Board and the Alberta Law Foundation for their generous support of this project.



## Table of Contents

<b>INTRODUCTION.....</b>	<b>1</b>
<b>Introduction to Air Matters.....</b>	<b>11</b>
Particulate Matter.....	11
What is particulate matter? .....	11
Why is particulate matter a concern?.....	11
Health concerns .....	11
Environmental concerns.....	12
For more information.....	12
Smog and Ground-Level Ozone .....	15
What is smog?.....	15
Ozone .....	15
What is ozone? .....	15
Why is ozone a concern?.....	15
Nitrogen oxides (NOx) .....	16
Volatile organic compounds (VOCs).....	16
For more information.....	16
Resource List for Air Matters .....	19
<b>Introduction to Water Matters.....</b>	<b>27</b>
Eutrophication.....	27
What is eutrophication? .....	27
How does eutrophication occur?.....	27
What are the effects of eutrophication? .....	28
For more information.....	28
Infectious Organisms .....	31
What are infectious organisms? .....	31
For more information.....	31
Sedimentation .....	33
What is sedimentation? .....	33
What are the effects of sedimentation? .....	33
For more information.....	34
Thermal Pollution .....	35
What is thermal pollution?.....	35
What are the effects of thermal pollution?.....	35
For more information.....	36

Resource List For Water Matters .....	37
<b>Introduction to Matters Affecting both Air and Water Quality .....</b>	<b>41</b>
Acid Deposition .....	41
What is acid deposition? .....	41
How does acid deposition occur? .....	41
What are the effects of acid deposition? .....	42
For more information.....	42
Climate Change.....	45
What is climate change? .....	45
What are greenhouse gases? .....	45
What are the effects of climate change? .....	46
For more information.....	46
Ozone Depletion .....	49
What is the ozone layer? .....	49
What is ozone depletion? .....	49
Ozone depletion .....	49
Ozone-depleting substances.....	50
Why is ozone depletion a concern? .....	50
For more information.....	50
Toxic Substances .....	53
What are toxic substances? .....	53
What are the sources of toxics? .....	53
Sources of metals in the environment .....	53
Sources of POPs in the environment.....	54
Why are toxics a concern? .....	54
Persistence.....	54
Potential for exposure .....	55
Society's reliance on chemicals.....	55
Effects of toxic substances.....	56
For more information.....	56
Resource List For Matters Affecting Both Air And Water Quality.....	59
<b>Air Quality Monitoring.....</b>	<b>67</b>
Source Monitoring .....	67
Basics of source monitoring.....	67
Manual source emission surveys .....	67
Continuous emission monitoring .....	68
Visible emission monitoring .....	68
Who does source monitoring in Alberta? .....	68
Industrial source monitoring .....	68

Government source monitoring .....	69
For more information.....	70
 Ambient Monitoring .....	75
Basics of ambient monitoring .....	75
Continuous monitoring.....	75
Intermittent monitoring .....	75
Requirements for monitoring .....	75
Purposes of ambient monitoring .....	76
Regional assessment of air quality .....	76
Development of specific source emission requirements .....	76
Can ambient air requirements be enforced? .....	77
Who does ambient monitoring in Alberta?.....	77
Industrial ambient monitoring .....	77
Government ambient monitoring .....	77
Other ambient monitoring .....	80
For more information.....	80
 Reporting of Monitoring Data .....	85
Industrial reporting.....	85
Reporting under approvals .....	85
Accessibility of monitoring data.....	85
Release reporting .....	86
Alberta Environment.....	86
Other sources .....	86
For more information.....	87
 Resource List for Air Quality Monitoring .....	93
 <b>Water Quality Monitoring.....</b>	<b>103</b>
Introduction to Water Quality Monitoring.....	103
The purpose of water quality monitoring.....	103
Types of monitoring.....	103
Fixed station monitoring .....	103
Periodic monitoring .....	104
Monitoring parameters.....	104
Physical parameters .....	104
Chemical parameters.....	104
Biological parameters .....	104
For more information.....	105
 Monitoring of Biological Water Quality Parameters.....	107
What are biological water quality parameters?.....	107
Benthic invertebrate surveys.....	107
Fish surveys .....	107
Plant surveys .....	108

Chlorophyll a .....	108
Bacteria .....	108
For more information.....	109
Monitoring of Chemical Parameters.....	111
What are chemical water quality parameters? .....	111
pH.....	111
Acidity.....	111
Alkalinity .....	112
Dissolved oxygen.....	112
Nitrogen .....	112
Phosphorus.....	113
Dissolved solids .....	113
Conductivity.....	113
Salinity .....	113
Hardness.....	114
Water Toxics .....	114
For more information.....	114
Monitoring of Physical Water Quality Parameters .....	117
What are physical water quality parameters? .....	117
Watershed monitoring.....	117
Water depth.....	118
Rainfall.....	118
Flow rate .....	118
Temperature .....	119
Colour .....	119
Turbidity .....	119
For more information.....	119
Reporting of Monitoring Data .....	123
Who does water quality monitoring in Alberta?.....	123
Water quality monitoring by industrial facilities .....	123
Water quality monitoring by the Alberta government.....	125
Hydrometeorological data collection.....	125
Water quality monitoring .....	126
For more information.....	127
Resource List for Water Quality Monitoring .....	131
<b>Air and Water Quality Monitoring .....</b>	<b>137</b>
Tips on Reading and Understanding Monitoring Information .....	137
Measurement matters .....	137
Notes and other helpful stuff.....	137
So what does it all mean?.....	138
For more information.....	138

<b>Basic Legal Requirements .....</b>	<b>145</b>
Introduction to the Canadian Legal System.....	145
Where do our laws come from? .....	145
Common law.....	145
Statute law.....	145
Policy .....	147
Law versus policy .....	147
Power to make environmental laws .....	148
The Canadian court system.....	148
For more information.....	149
 Statutes and Regulations .....	151
How to find statutes (Canada and Alberta).....	151
Print versions .....	151
Electronic versions.....	151
How to refer to statutes .....	152
How to find regulations (Canada and Alberta) .....	152
Print versions .....	152
Electronic versions.....	152
How to refer to regulations .....	153
Tips on how to read statutes and regulations .....	153
Helpful tools.....	153
Definitions.....	153
Enabling powers.....	154
Offences .....	154
Interpretation of statutes and regulations .....	154
Where to find statutes and regulations.....	154
For more information.....	155
 Provincial Legislation Applicable to Air and Water Quality.....	159
Overview of Alberta legislation.....	159
<i>Environmental Protection and Enhancement Act</i> .....	159
<i>Water Act</i> .....	163
Legislation glossary .....	163
For more information.....	164
 Federal Legislation Applicable to Air and Water Quality .....	167
Overview of federal legislation.....	167
<i>Canadian Environmental Protection Act, 1999</i> .....	167
<i>An Agreement on the Equivalency of Federal and Alberta Regulations for the Control of Toxic Substances in Alberta</i> .....	169
<i>Alberta Equivalency Order</i> .....	170
<i>Fisheries Act</i> .....	170
Legislation glossary .....	170
For more information.....	171

Registrations and Approvals .....	173
What are registrations and approvals? .....	173
Registrations .....	173
Approvals .....	173
Approvals generally .....	173
How does an approval relate to air or water quality? .....	174
How do I find an approval? .....	174
Tips on reading approvals.....	174
For more information.....	176
 Other Administrative Bodies - Alberta.....	179
What other administrative bodies play a role in relation to air and water quality? ....	179
The Alberta Energy and Utilities Board (AEUB).....	179
The Alberta Environmental Appeal Board (EAB).....	180
For more information.....	180
 Resource List for Legal Matters .....	185
 <b>Enforcement and Community Involvement.....</b>	<b>199</b>
Enforcement of the Environmental Protection and Enhancement Act .....	199
Introduction.....	199
Enforcement principles for EPEA .....	199
What gives rise to an investigation under EPEA? .....	200
Industry reports .....	200
Public reports .....	200
Initial review .....	201
Investigations under EPEA .....	201
How are investigations started? .....	201
Investigative steps .....	202
Purposes of an investigation .....	202
Outcomes of an investigation.....	203
Enforcement under EPEA.....	203
Selection of enforcement tools.....	203
Enforcement tools .....	203
Appeals .....	206
For more information.....	206
 Your Involvement in Air and Water Quality Monitoring and Enforcement .....	209
Learn more about what concerns or interests you .....	209
Get involved in industry or government monitoring .....	210
Seek opportunities for involvement .....	210
Review monitoring data.....	210
Join a group.....	211
Environmental groups.....	211
Municipal opportunities .....	211

Do your own monitoring.....	212
What air quality matters do you want to monitor? .....	212
What water quality matters do you want to monitor?.....	212
Be consistent in monitoring .....	213
What will you do with your monitoring information?.....	213
Other participation options .....	213
Public consultations .....	213
Clean Air Strategic Alliance .....	214
Airshed monitoring zones.....	214
Participation in water monitoring .....	214
Start your own group .....	214
What can you do about enforcement?.....	215
Reporting.....	215
Investigations .....	215
Private prosecutions .....	215
For more information.....	216
Resource List for Enforcement Matters and Community Involvement.....	217



# Introduction

---

## What is environmental monitoring?

In many ways, environmental monitoring is a cornerstone of environmental protection. Simply put, it is the act of measuring environmental conditions, and matters that can affect those conditions and the environment as a whole. Monitoring data can give us a picture of the health of our environment and point us to those things that adversely affect it.

Environmental monitoring can be used for a number of purposes. Monitoring can be used to collect initial “baseline data”. Baseline data is used as a starting point to provide an initial snapshot of the condition of an area. Future monitoring results can be compared against the baseline data as a means of assessing any change, either better or worse, in environmental conditions. Monitoring data can also be used to measure the environmental performance of industrial operators, either directly or as an audit. It can indicate when remedial action is needed to restore the environment and can be used as the basis for enforcement action under environmental laws.

Many elements of our environment can be monitored. This includes our air, water, soil and vegetation. As well, the health of animal and human populations can be monitored as an indication of the condition of our environment. Generally, government and industry carry out a great deal of environmental monitoring. Much of this monitoring is technical in nature and can involve complicated and expensive monitoring equipment. However, there are a number of ways that ordinary citizens can become involved in environmental monitoring.

## Why is the public interested in environmental monitoring?

One reason for the public’s interest in environmental monitoring is that our society has become much more aware of the effect that we have on our environment, both directly and indirectly through our everyday actions and consumption. With this greater awareness has come greater concern about how our actions and their effects on the environment will ultimately affect us as individuals and our future generations.

As well, in many communities, relationships between citizens and both industry and government in this area are poor or non-existent. Industry and government sources may be reluctant or ineffective in sharing environmental monitoring information, while citizens are often not aware of how to access this information and build working relationships with industry and government. As a consequence, many citizens feel that environmental protection and their related concerns are being ignored or pushed aside. They mistrust monitoring information produced by these organizations, and become frustrated in their attempts to learn about and understand environmental matters. In many instances, members of the public want to take personal action to protect their environment, but are unsure of how to get started and what to do.

## INTRODUCTION

### What can the public do about environmental monitoring?

Ordinary citizens like you are becoming involved in environmental monitoring in increasing numbers. Their involvement runs from activities such as the annual Christmas bird count, which when compiled gives information about the ranges and numbers of various types of birds, to keeping written and pictorial records of stack emissions, to taking samples of water from local watercourses and analyzing these samples for certain environmental indicators. Others review monitoring data created by government and industry in an auditing function, to reassure themselves that they are being presented with an accurate picture of environmental conditions. Still others sit as representatives of the public or special interest groups on bodies involved in environmental monitoring initiatives.

Chapter 2 of the guidebook includes an appendix which is an article entitled *Volunteer Monitoring: No Limit*. It gives excellent examples of how members of the public can become involved in a wide variety of environmental monitoring activities.

### What will use of these materials do for you and your community?

At its most basic, use of these materials, which include these background materials and the guidebook, and participation in a community monitoring training program will give you skills that will enable you to find, critically review, understand and analyze information about air and water quality monitoring and enforcement, with a focus on industrial facilities. This will give you greater confidence in your understanding of air and water quality issues and monitoring data produced by any source. Many of these skills can also be used in relation to environmental matters other than air or water quality.

Involvement in the development and presentation of a community monitoring training program, or participation in such a program, can bring you into contact with a wide range of individuals involved in air and water quality matters and increase your familiarity with these people and air and water quality issues within your community and Alberta. As well, it can provide your community with a means of focusing its air and water quality concerns and examining how it wants to deal with those concerns.

Ultimately, you can use the knowledge and understanding that you can gain through the use of this package and participation in a community monitoring training program to take personal action in protecting your environment. Having learned about the regulatory requirements related to air and water quality, you will be able to assess whether an environmental offence may have occurred, and take action to deal with it by reporting the situation to environmental regulators or initiating an investigation under Alberta's environmental laws. In this way, you can take positive action to protect your community and environment and gain a greater element of personal involvement and control over matters that affect you personally.

If you find that you and others within your community have concerns about your local air or water quality and are committed to spending the time and energy necessary to train your community and undertake monitoring activities, this package can guide you through those initial steps. It is important that you be realistic about the commitment that you are willing to make, as

air and water quality monitoring and enforcement are not topics that can be easily understood through a quick review. Developing and presenting a community monitoring training program like that described in this package can take some months. Once you begin monitoring activities, you will need to monitor regularly and on an ongoing basis to compile sufficient data to establish the credibility of your data and identify any environmental trends or unusual conditions. You must also be aware that some types of environmental monitoring are technically complex and may not be easily adopted to a community-based monitoring program.

## How should you use these materials?

These materials consist of two parts. The first part is the guidebook, and the other is the background materials.

The guidebook is a “how-to” manual of community monitoring, and deals in detail with community monitoring training programs and subsequent community action to monitor and enforce air and water quality as affected by industrial facilities. It provides you with practical guidance in developing and presenting a community monitoring training program, and in establishing a volunteer group within your community to undertake air and water quality monitoring activities.

The background materials contain information set up in a “fact sheet” format that can be used as part of a community monitoring training program. These materials have been written in plain, straightforward language, and ideally can be used without any expert assistance. They could be used as the main written information source for participants in a community monitoring training program, and could also be supplemented by additional, more detailed information. It is not necessary to use all of the background materials. They have been designed to enable planners of community monitoring training programs to select the portions that are most relevant to their programs and their communities’ interests and concerns.

Both parts include a number of resource lists for the different topics. These resource lists are intended to refer you and participants in your community monitoring training program to further sources of information on air and water quality related matters.

## About the background materials

As mentioned above, the background materials are intended to provide you with basic information and resource lists for topic areas related to community monitoring of air and water quality. Like the guidebook, they are written in plain language, to allow you to work through them without assistance if you choose. These materials are presented in an unbound format to facilitate their copying for use in community monitoring training programs, and to allow you to make use of only those materials that relate specifically to your community’s community monitoring training program. Chapter 1 of the guidebook discusses (in greater detail) the ways that you can make use of these materials as part of your community monitoring training program.

The background materials are divided into various subject areas. Each subject area includes resource lists that provide other sources of information about that subject.

## INTRODUCTION

### *Introduction to Air Matters*

The *Introduction to Air Matters* section provides basic background information about different classes of substances that can affect air quality and some air quality issues that may be relevant to your community. The topics covered include:

- particulate matter; and
- smog and ground-level ozone.

The resource list refers to sources of further information about these topics, and also some sources for basic introductory information about atmospheric science.

### *Introduction to Water Matters*

The *Introduction to Water Matters* section provides basic background information about different classes of substances that can affect water quality and some water quality issues that may be relevant to your community. The topics covered include:

- eutrophication;
- infectious organisms;
- sedimentation; and
- temperature.

The resource list refers to sources of further information about these topics, and also some sources for basic introductory information about aquatic science.

### *Introduction to Matters Affecting Both Air and Water Quality*

The *Introduction to Matters Affecting Both Air and Water Quality* section provides basic background information about different classes of substances that can affect both air and water quality and some related issues that may be relevant to your community. The topics covered include:

- acid deposition;
- climate change;
- toxic substances; and
- ozone depletion.

The resource list refers to sources of further information about these topics, and also some sources for basic introductory information about atmospheric and aquatic science.

### *Air Quality Monitoring*

The *Air Quality Monitoring* section provides you with an introduction to different methods of air quality monitoring. It discusses the purposes and uses of each method and indicates who currently carries out such monitoring in Alberta. This section also provides information on how air monitoring data and results are reported. The resource list refers you to various information sources, including sources from which you can obtain monitoring data and results.

### *Water Quality Monitoring*

The *Water Quality Monitoring* section provides you with an introduction to different methods of water quality monitoring. It discusses the purposes and uses of each method and indicates who currently carries out such monitoring in Alberta. This section also provides information on how water monitoring data and results are reported. The resource list refers you to various information sources, including sources from which you can obtain monitoring data and results.

### *Air and Water Quality Monitoring*

This section provides guidance on hot to read and interpret air and water quality monitoring data and results.

### *Basic Legal Requirements*

The materials in the *Basic Legal Requirements* section provide you with a basic overview of laws in general and our legal system, and deal more specifically with environmental laws that apply to air and water quality in Alberta. This section covers how you can find, read and understand laws, focusing on environmental laws, and will help you understand how our environmental laws regulate air and water quality and the activities that can affect air and water quality.

### *Enforcement and Community Involvement*

The final section, *Enforcement and Community Involvement*, provides an overview of how environmental laws, and more specifically the requirements of the *Environmental Protection and Enhancement Act*, are enforced in Alberta. As well, these materials offer suggestions and discuss different options for personal involvement in air and water quality monitoring and enforcement. The resource list refers to various sources and contacts that will be helpful to you and your community in increasing your involvement in air and water quality monitoring.

## About the guidebook

The guidebook consists of five separate chapters, each with its own resource list. Some chapters have appendices such as checklists or sample forms. Every chapter has been written in plain language and contains many practical tips to assist you in increasing your involvement with community-based air and water quality monitoring.

### Chapter 1

Chapter 1 provides practical guidance on developing and presenting a community monitoring training program. It takes you through the practical steps you should follow to create a program that will address your community's specific needs and concerns about air and water quality. One of the appendices describes a successful community monitoring training program that provided the basis for these materials. Another appendix is a checklist for you to follow in setting up your own community monitoring training program.

### Chapter 2

Chapter 2 sets out a process for establishing a community-based volunteer group to undertake air and water quality monitoring and enforcement. The emphasis is on the practical concerns that you need to keep in mind in order to give your group its best chance at success. Similar to Chapter 1, it includes a checklist to guide you in setting up your group. Another appendix is an article illustrating the wide range of roles that members of the public can play in environmental monitoring.

### Chapters 3 - 5

Chapters 3 – 5 deal with more specific matters that are relevant to the success of both community monitoring training programs and volunteer monitoring groups. Chapter 3 offers practical suggestions on how to make contacts and build partnerships with those who can help your cause. Appendices include a checklist and a sample sheet for recording contact information.

Many people regard government departments as complicated and confusing structures. Environmental regulators can be an important source of information and feedback for your monitoring activities, particularly if you intend to become involved in enforcement matters. Chapter 4 provides you with guidance on working with government regulators who deal with air and water quality matters and prepares you to navigate your way through government offices.

Chapter 5 deals with the all-important matter of funding. It leads you through the stages of fundraising, from planning and research through proposals and follow-up. The appendices include general fundraising and budgeting checklists. The resource list refers to a wide range of information sources on fundraising and a variety of potential funders for community-based environmental projects.

## A word of caution about your use of this material

Regardless of how you make use of the guidebook and these background materials in your community monitoring training program and subsequent monitoring activities, it is very important that you check to ensure that the information within them is current to the date of your use. We suggest the following steps:

- Your first step should be to check the Environmental Law Centre home page on the Internet at <<http://www.elc.ab.ca>>. The Centre plans to make any necessary updates to the guidebook and the background materials available on the home page. Both the guidebook and the background materials can be downloaded free of charge from that location. You may also wish to contact the Centre directly if you have specific questions.
- You can make use of the contacts in the resource lists included in the guidebook and the background materials to check their currency. Contacts can also be used to update and supplement these background materials in particular.
- You should seek the input of your contacts, including those involved in planning and presenting your community monitoring training program, in assessing the currency of the package. They may have helpful suggestions for other sources of current information.

We cannot emphasize enough the need to ensure that the guidebook and these background materials are current to the date that you make use of them. This applies in particular to the resource lists. Failure to check and update information, as necessary, may lead you to rely on outdated information, which will be of little or no use to you and others who are interested in protecting local air and water quality. The success of your community monitoring training program and your other air and water quality monitoring activities depends largely on your familiarity with the most current information related to air and water quality monitoring and enforcement.



# Introduction To Air Matters



# Introduction to Air Matters

---

## Particulate Matter

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### What is particulate matter?

Particulate matter (PM) is extremely small solid or liquid particles of substances that can remain airborne. References are commonly made to PM<sub>10</sub> and PM<sub>2.5</sub>. PM<sub>10</sub> refers to particulate matter sized from under 10 micrometers to 2.5 micrometers in diameter, while PM<sub>2.5</sub> refers to particulate matter under 2.5 micrometers in diameter (approximately 1/20 the width of a human hair). Any particulate matter under 10 micrometers in diameter can be inhaled by humans.

PM, which is a major component of smog, is produced from both natural and human sources. Natural sources include things such as sea spray, erosion, forest fires and windblown dust and pollen. Human sources include burning of fuels, such as through automobile use, and various processes using grinding or friction. PM can be produced directly from both natural and human sources, and can also be formed as a result of airborne chemical reactions. The composition of PM can vary in different areas, depending on its source.

Currently, the chief concern related to PM is its potential health effects, although it can also cause environmental effects of concern.

### Why is particulate matter a concern?

#### Health concerns

PM has been linked to aggravated heart and lung diseases such as asthma, bronchitis and emphysema and there is some evidence that increased levels of PM correspond to greater rates of hospitalization and premature death. PM<sub>2.5</sub> is of great concern as it can be inhaled deep into the lungs and absorbed into the bloodstream due to its smaller size. It also can cause a number of respiratory effects. As well, toxic air pollutants can attach themselves to airborne PM. These toxics can then be inhaled into the lungs and subsequently absorbed into the bloodstream and tissues.

## **Environmental concerns**

Together with ozone, PM is one of the major components of smog. PM affects visibility and makes up the colored portion of smog. In addition to affecting visibility, PM can affect the esthetics of structures such as buildings due to the deposit of the airborne particles on surfaces. The deposit of PM may also cause crop and other plant damage, by coating plant surfaces and affecting photosynthesis or otherwise smothering plants. This can weaken plants and make them more susceptible to disease. Toxic substances may also bind to and be carried by PM. This can result in toxics deposited by PM on soil being taken up by plants and crops. PM can also cause chemical reactions that may affect plant health.

## **For more information**

For further information about particulate matter, check the following sources.

- <[http://www.ec.gc.ca/air/p-matter\\_e.shtml](http://www.ec.gc.ca/air/p-matter_e.shtml)>

This Internet site provides access to a fact sheet on particulate matter and its environmental and health effects.

- <<http://www.msc-smc.ec.gc.ca/saib/Pmbrochure/Ecapm3x.PDF>>

This Internet site provides access to *Ambient Particulate Matter: An Overview*. This Environment Canada report provides a good overview of particulate matter, including information on its sources and environmental and health effects.

- <<http://www.health.gov.bc.ca/hlthfile/hfile35.html#E46E319>>

This British Columbia government website provides information on particulate matter and health effects.

- <<http://www.gov.ab.ca/env/protenf/publications/AmbientPartMatter.pdf>>

This Internet site provides access to *Ambient Particulate Matter in Alberta*, a report commissioned by Alberta Environment. The report provides scientific background about particulate matter, monitoring and its characteristics, in the Alberta context. Print copies of this report are available from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <<http://www.gov.ab.ca/env/protenf/publications/OverviewOnParticulateMatter.pdf>>

This Internet site provides access to a fairly technical report titled *Overview on Particulate Matter*. However, chapter 6 is a short summary of Alberta sources of particulate matter and Alberta studies related to particulate matter. Print copies of the report are available from Alberta Environment's Information Centre (contact information above).

- <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/PMO3.asp](http://www.casahome.org/for_stakeholders/issue_teams/PMO3.asp)>

This Internet site gives access to information about the activities of the Clean Air Strategic Alliance's Particulate Matter and Ozone Project Team.

- <[http://www.ccme.ca/pdfs/backgrounder\\_060600/PM\\_Ozone\\_Backgrounder\\_E.pdf](http://www.ccme.ca/pdfs/backgrounder_060600/PM_Ozone_Backgrounder_E.pdf)>

This Internet site provides access to a background document summarizing the Canada Wide Standard for Particulate Matter and Ozone. This document also gives some background information on the effects of particulate matter.

- *Alberta Multi-Stakeholder Group for Particulate Matter and Ozone: Report to Alberta Environment*

This report, published in December 1999, was produced by a multi-stakeholder group. The group was established to advise Alberta Environment on the development of Canada Wide Standards for particulate matter and ozone and Alberta ambient air quality guidelines for these two substances. The report contains background information on particulate matter in Alberta and recommendations on regulating particulate matter. The report can be accessed on the Internet at either <[http://www.casahome.org/uploads/MSG\\_final\\_report.pdf](http://www.casahome.org/uploads/MSG_final_report.pdf)> or <<http://www.gov.ab.ca/env/protenf/publications/MSGFinalReport 00-01-04.pdf>>. Print copies of the report can be obtained from either Alberta Environment's Information Centre (contact information above) or:

Clean Air Strategic Alliance  
9<sup>th</sup> Floor, 9940 - 106 Street  
Edmonton, AB T5K 2N2  
Phone: (780) 427-9793  
Fax: (780) 422-3127  
E-mail: [casa@casahome.org](mailto:casa@casahome.org)  
<<http://www.casahome.org>>



# Introduction to Air Matters

---

## Smog and Ground-Level Ozone

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### What is smog?

Smog is a mixture of air pollutants that can have a variety of effects on the environment and human health. Many people are familiar with the brown haze that can be seen over some urban areas. This is one effect of smog. Smog can also cause short and long-term human health effects, as well as effects on both the natural and man-made environments.

### Ozone

#### What is ozone?

Ozone ( $O_3$ ), a major component of smog, is created through the chemical reaction of nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. Other pollutants may be involved in these chemical reactions.

Ground-level ozone refers to ozone present at the lower level of the atmosphere (from ground level to about 1 kilometre above the earth). It results from human activity and natural sources. Ozone is created when nitrogen dioxide ( $NO_2$ ) absorbs sunlight, breaks apart and combines with oxygen. It contributes to the brown haze seen when smog is present and can lead to reduced visibility. It can also give rise to health concerns.

#### Why is ozone a concern?

Exposure to ozone can cause a variety of human health effects. Immediate effects include eye, nose and throat irritation. Over the short term, ozone can cause coughing, chest pain and respiratory discomfort. In the long term, continued exposure may contribute to lung tissue damage, chronic lung disease and reduced life expectancy.

Ozone can also have effects on both the natural and man-made environments. Exposure to ozone can cause corrosion of buildings and machinery and the deterioration of rubber products. Agricultural crops and forests can also suffer damage from ozone, including leaf damage, reduced growth and greater susceptibility to insects and diseases.

## **Nitrogen oxides (NOx)**

A main component of smog is nitrogen oxides (NOx). These substances include nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>). NOx occurs both naturally and from human activity. Natural sources include bacterial processes, biological growth and decay, lightning and fires. Burning of fossil fuels is the main human source of NOx, but fertilizer use also releases NOx into the atmosphere. Major sources of NOx in Alberta include oil and gas production, oil refining, electricity generation, transportation and residential fuel combustion.

Nitric oxide (NO) is the form of NOx that is most commonly emitted into the atmosphere. It is a colourless, odourless, tasteless non-toxic gas. In the atmosphere, it rapidly oxidizes into nitrogen dioxide (NO<sub>2</sub>). Nitrogen dioxide is a reddish-brown gas; it contributes to the brown haze of smog. By itself, it can cause plant injury and reduced crop yields at high levels. These effects occur at lower levels where nitrogen dioxide is combined with ozone or sulphur dioxide. As well, it is a lung irritant and can contribute to greater susceptibility to respiratory infections.

## **Volatile organic compounds (VOCs)**

Volatile organic compounds (VOCs) are chemicals that contain hydrogen and carbon and evaporate easily. They may also contain other elements. Natural sources of VOCs include fossil fuel deposits, volcanoes, vegetation, and bacteria. Man-made sources include transportation and the use of motor vehicle fuel, gasoline evaporation, dry-cleaning solvents, oil-based paints and petrochemical industrial processes. As a result, levels of VOCs tend to be more concentrated in urban and industrial areas. VOCs react in sunlight with NOx to contribute to the formation of smog.

## **For more information**

For further information about smog and ground-level ozone, check the following sources.

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This Internet site, titled “Introduction to Atmospheric Chemistry”, provides basic introductory information about air matters, including ground-level ozone.

- <[http://www.ec.gc.ca/air/introduction\\_e.cfm](http://www.ec.gc.ca/air/introduction_e.cfm)>

This Environment Canada Internet site leads to general information about clean air concerns such as smog and ground-level (stratospheric) ozone.

<[http://www.ec.gc.ca/air/smog\\_e.shtml](http://www.ec.gc.ca/air/smog_e.shtml)>

This site provides introductory information about smog and its components.

- <[http://www.msc.ec.gc.ca/cd/factsheets/smog/index\\_e.cfm](http://www.msc.ec.gc.ca/cd/factsheets/smog/index_e.cfm)>

This Environment Canada site provides a wide range of information about smog and its effect, including human health effects.

- <<http://www.ec.gc.ca/ozone/indexe.htm>>

This Environment Canada Internet site provides a broad range of information about stratospheric ozone and ozone depletion.

- <[http://www2.ec.gc.ca/air\\_e.html](http://www2.ec.gc.ca/air_e.html)>

This Environment Canada Internet site contains a list of issues and topics related to smog and air quality, and provides a number of links.

- <<http://www.gov.ab.ca/env/protenf/publications/REPORT-Apr99.pdf>>

This Internet site gives access to a study commissioned by Alberta Environment titled *Ground-Level Ozone in Alberta*. Print copies of the study are available from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/pmo3.asp](http://www.casahome.org/for_stakeholders/issue_teams/pmo3.asp)>

This Internet site gives access to information about the activities of the Clean Air Strategic Alliance's Particulate Matter and Ozone Project Team.

- <[http://www.ccme.ca/pdfs/backgrounders\\_060600/PM\\_Ozone\\_Backgrounder\\_E.pdf](http://www.ccme.ca/pdfs/backgrounders_060600/PM_Ozone_Backgrounder_E.pdf)>

This Internet site provides access to a background document summarizing the recently developed Canada Wide Standard for Particulate Matter and Ozone. This document also gives some background information on the effects of ground-level ozone.



# Introduction to Air Matters

---

## Resource List for Air Matters

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

For more information about air matters, check the following sources.

### *Clean Air Strategic Alliance (CASA)*

- CASA is a non-profit, multi-stakeholder body that carries out strategic management of air quality in Alberta. It is made up of a Board of Directors representing various stakeholders and project teams that address specific air quality issues. CASA has a wide range of information on air quality matters specific to Alberta, including monitoring information. CASA can be contacted at:

9<sup>th</sup> Floor, 9940 – 106 Street  
Edmonton, AB T5K 2N2  
Phone: (780) 427-9793  
Fax: (780) 422-3127  
E-mail: [casa@casahome.org](mailto:casa@casahome.org)  
[<http://www.casahome.org>](http://www.casahome.org)

- CASA also maintains another website that provides air quality and ecological data for Alberta, known as the Alberta Ambient Air Data Management System (AAADMS). This site can be accessed at <<http://www.casadata.org>> or through the "Air Quality Data" link on the main CASA website at <<http://www.casahome.org>>.
- CASA has various subgroups that deal with specific air quality matters or issues. Listed below are locations on the CASA website where information can be found about particular groups' activities:

CASA Teams Directory: <[http://www.casahome.org/about\\_casa/directory/teams\\_directory.asp](http://www.casahome.org/about_casa/directory/teams_directory.asp)>

**INTRODUCTION TO AIR MATTERS** Resource list for air matters

Acidifying Emissions Management Implementation Team <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/AEMIT.asp](http://www.casahome.org/for_stakeholders/issue_teams/AEMIT.asp)>

Climate Change Project Team <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/CCPT.asp](http://www.casahome.org/for_stakeholders/issue_teams/CCPT.asp)>

Particulate Matter and Ozone Project Team <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/PMO3.asp](http://www.casahome.org/for_stakeholders/issue_teams/PMO3.asp)>

*Environment Canada*

- This federal government department deals with a wide range of environmental matters, including air quality matters. The Prairie and Northern Region, which includes Alberta, can be contacted at:

Environment Canada  
Prairie and Northern Region  
200, Twin Atria Building  
4999 – 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 951-8600 (general information & inquiries); (780) 951-8899 (environmental protection)

- For specific information on air quality science, contact the Atmospheric and Hydrological Sciences Division at:

Environment Canada  
Prairie and Northern Region  
Atmospheric and Hydrological Sciences Division  
200, Twin Atria Building  
4999 – 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 951-8600

- Environment Canada also maintains a website on the Internet called “The Green Lane”. It can be accessed at <<http://www.ec.gc.ca>>. It provides links to a great deal of information on air matters and to regional “Green Lane” sites. Alberta is included in the Prairie and Northern regional site <<http://www.pnr-rpn.ec.gc.ca/index.en.html>>.
- The federal government publication *The State of Canada’s Environment – 1996* provides extensive information about Canada’s environment. Chapter 13 deals with toxic substances, including air toxics, in detail. The federal government provides Internet access to the report <<http://www2.ec.gc.ca/soer-ree/English/1996report/Doc/1-1.cfm>>. Print or CD-rom versions can be purchased from the federal government for \$25.00 and can be ordered through the Internet by following the link at the location shown above. For further information, contact:

Environment Canada  
Inquiry Centre  
351 St. Joseph Boulevard  
Hull, Quebec K1A 0H3  
Phone: (819) 997-2800 or 1-800-668-6767  
Fax: (819) 953-2225  
E-mail: enviroinfo@ec.gc.ca

*Alberta Environment*

- This provincial government department is primarily responsible for regulation of environmental matters, including air quality, within Alberta.
- The Science and Technology Branch of the Environmental Sciences Division deals with air issues, develops standards related to ambient air and compiles inventories related to dispersion modelling and emissions. This branch can be contacted at:

Alberta Environment  
4<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-0787 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-4192

- The *Air Toxics Management Program in Alberta*, published by Alberta Environment, discusses air toxics in the Alberta context and provides an overview of how Alberta Environment seeks to control emission of air toxics from industrial sources. This document can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/atmtpgab.pdf>>. Print copies can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@ gov.ab.ca

*Internet sites*

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This site, titled “Introduction to Atmospheric Chemistry”, is maintained by York University and provides basic introductory information about air matters. It includes a number of links to air-related sites.

**INTRODUCTION TO AIR MATTERS** Resource list for air matters

- <[http://www2.ec.gc.ca/air/introduction\\_e.cfm](http://www2.ec.gc.ca/air/introduction_e.cfm)>

This Environment Canada site includes general information about clean air concerns, in particular smog and ground-level (stratospheric) ozone. It also provides links to further information about smog and ground-level (stratospheric) ozone.

- <[http://www.msc.ec.gc.ca/cd/factsheets/smog/index\\_e.cfm](http://www.msc.ec.gc.ca/cd/factsheets/smog/index_e.cfm)>

This Environment Canada site provides a wide range of information about smog and its effects, including human health effects.

- <<http://www.ec.gc.ca/ozone/primer>>

This Environment Canada site provides access to the document *A Primer on Ozone Depletion*.

- <<http://www.ec.gc.ca/ozone/indexe.htm>>

This Environment Canada site provides a broad range of information about stratospheric ozone and ozone depletion.

- <[http://www2.ec.gc.ca/air\\_e.html](http://www2.ec.gc.ca/air_e.html)>

This Environment Canada site contains a list of issues and topics related to smog and air quality, and provides a number of links.

<[http://www2.ec.gc.ca/pdb/ape/cape\\_home\\_e.cfm](http://www2.ec.gc.ca/pdb/ape/cape_home_e.cfm)>

This site provides access to the Criteria Air Contaminants Emissions Inventories. It includes information about emissions inventories compiled by Environment Canada in cooperation with the provinces. The 1990 inventory information covers sulfur oxides, nitrogen oxides, volatile organic compounds, total suspended particulates and carbon monoxide, and is accessible through this site. The site also provides general information about subsequent inventories.

- <[http://www2.ec.gc.ca/ind/English/Urb\\_Air/default.cfm](http://www2.ec.gc.ca/ind/English/Urb_Air/default.cfm)>

This Environment Canada site deals with urban air quality trends and contains information about urban air quality in relation to ground-level ozone, sulfur dioxide, carbon monoxide and nitrogen dioxide. Also included is information about ambient air quality objectives and air quality index guidelines and the National Urban Air Quality Report for 1981-1990.

- <<http://www.gov.ab.ca/env/resedu/edu/eefocson.html>>

This site provides access to Alberta Environment's "Focus On" series of environmental information documents. Specific documents related to air matters include *Focus on Ozone Depletion* at <<http://www.gov.ab.ca/env/resedu/edu/focuson/ozone%20depletion.pdf>>, and *Focus on Air Quality* at <<http://www.gov.ab.ca/env/resedu/edu/focuson/Air%20Quality.pdf>>.

Print copies of any or all of the "Focus On" series can be obtained from Alberta Environment's Information Centre (contact information above).

- <<http://www.gov.ab.ca/env/protenf/publications/REPORT-Apr99.pdf>>

This Internet site gives access to a study commissioned by Alberta Environment titled *Ground-Level Ozone in Alberta*. Print copies of the study are available from Alberta Environment's Information Centre (contact information above).

- <[http://www.ec.gc.ca/air/p-matter\\_e.shtml](http://www.ec.gc.ca/air/p-matter_e.shtml)>

This Internet site provides access to a factsheet on particulate matter and its environmental and health effects.

- <<http://www.health.gov.bc.ca/hlthfile/hfile35.html#E46E319>>

This British Columbia government website provides information on particulate matter and health effects.

- <<http://www.gov.ab.ca/env/protenf/publications/AmbientPartMatter.pdf>>

This Internet site provides access to *Ambient Particulate Matter in Alberta*, a report commissioned by Alberta Environment. The report provides scientific background about particulate matter, monitoring and its characteristics, in the Alberta context. Print copies of this report are available from Alberta Environment's Information Centre (contact information above).

- <<http://www.gov.ab.ca/env/protenf/publications/OverviewOnParticulateMatter.pdf>>

This Internet site provides access to a fairly technical report titled *Overview on Particulate Matter*. However, chapter 6 is a short summary of Alberta sources of particulate matter and Alberta studies related to particulate matter. Print copies of the report are available from Alberta Environment's Information Centre (contact information above).

- <[http://www.ccme.ca/pdfs/backgrounder\\_060600/PM\\_Ozone\\_Backgrounder\\_E.pdf](http://www.ccme.ca/pdfs/backgrounder_060600/PM_Ozone_Backgrounder_E.pdf)>

This Internet site provides access to a background document summarizing the Canada Wide Standard for Particulate Matter and Ozone. This document also gives some background information on the effects of particulate matter and ground-level ozone.

**INTRODUCTION TO AIR MATTERS Resource list for air matters**

- <<http://www.msc-smc.ec.gc.ca/saib/Pmbrochure/Ecapm3x.PDF>>

This internet site provides access to Ambient Particulate Mater: An Overview. This Environment Canada repot provides a good overview of particulate matter, including information on its sources and environmental and health effects.

*Others*

- Alberta Multi-Stakeholder Group for Particulate Matter and Ozone: Report to Alberta Environment.

This report, published in December 1999, was produced by a multi-stakeholder group. The group was established to advise Alberta Environment on the development of Canada Wide Standards for particulate matter and ozone and Alberta ambient air quality guidelines for these two substances. The report contains background information on particulate matter and ozone, Alberta and recommendations on regulating these substances. The report can be accessed on the Internet at either <[http://www.casahome.org/uploads/MSG\\_Final\\_report.pdf](http://www.casahome.org/uploads/MSG_Final_report.pdf)> or <<http://www.gov.ab.ca/env/protenf/publications/ MSGFinalReport00-01-04.pdf>>. Print copies of the report can be obtained from either Alberta Environment's Information Centre (contact information above) or the Clean Air Strategic Alliance (contact information above).

# Introduction to Water Matters



# Introduction to Water Matters

---

## Eutrophication

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### What is eutrophication?

There are two types of eutrophication – natural and cultural. Lakes naturally pick up nutrients from surface runoff and precipitation. Over time, the natural accumulation of nutrients in lakes can transform shallow lakes into swampland and then into dry land. In this process, plant growth is stimulated by inorganic nutrients such as phosphorus and nitrogen. As the plants die, they contribute organic sediment to the lake bottom that combines with silt from erosion to gradually fill in the lake.

When accelerated by human activities, this process is called cultural eutrophication. Healthy, productive lakes become choked with excessive vegetation. The vegetation rots, producing an offensive odour and depleting oxygen. Ultimately, the lake can be filled and destroyed by sediment and organic debris.

### How does eutrophication occur?

Cultural eutrophication is caused by the addition of inorganic nutrients into a lake. These nutrients stimulate excessive plant growth. As the plants die, bacteria that reside in the lake sediments decompose the organic debris. The bacteria require oxygen for the decomposition process, which causes oxygen depletion in the lake. Eventually, oxygen levels fall so low that anaerobic bacteria (bacteria that exist in very low or no oxygen conditions) take over the decomposition of organic debris. Toxic methane and hydrosulphide gases are released as by-products of the anaerobic decomposition.

Several inorganic nutrients may trigger the eutrophication process – nitrogen, phosphorus, iron, sulphur, sodium and potassium. However, the substances of greatest concern are nitrogen and phosphorous. The main sources of nitrogen and phosphorous are feedlots, farm run-off, sewage treatment plants and industries such as meat packing plants.

## **What are the effects of eutrophication?**

As described above, eutrophication can result in a lake that is filled in and destroyed by organic debris and sediment. There are several other alterations that can occur in the aquatic ecosystem before this final, dramatic change occurs.

While there is excessive growth of vegetation, human activities can be disrupted. These activities include swimming, fishing, navigation and recreational boating. In addition, some of the vegetation that is stimulated to grow by the addition of nutrients may produce toxins (for example, certain species of algae).

As the vegetation dies and decomposes, there is oxygen depletion of the water. The low oxygen conditions can kill fish and other species resulting in a change of species composition of the lake. In very low oxygen conditions, anaerobic bacteria thrive and release toxic, foul gases.

During the process of eutrophication, the water quality for drinking is degraded. The water can have taste and odour problems. In addition, nitrates are converted into nitrites in human intestines which causes the production of methemoglobin. Methemoglobin has a reduced capacity for carrying oxygen in the blood-stream and can be fatal in infants (blue-baby syndrome).

## **For more information**

For further information about eutrophication, check the following sources:

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.) Chapter 17 of this textbook provides an overview of the common types of water pollution.
- <<http://www.pnr-rpn.ec.gc.ca/water/wqprairie/fi00s03.en.html>>

This Internet website, produced by Environment Canada, describes the problem of eutrophication in the Prairie Provinces.

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific information about water.



# Introduction to Water Matters

---

## Infectious Organisms

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### What are infectious organisms?

Bacteria, viruses and protozoans that cause disease may be transmitted through water bodies. These bacteria, viruses and protozoans are generally referred to as infectious organisms. There is a variety of infectious organisms with an equally wide variety of diseases caused.

Of particular concern in Alberta are *cryptosporidium parvum* (*crypto*), *giardia lamblia* (*g. lamblia*, also known as "Beaver Fever") and some forms of *escherichia coli* (*e.coli*). All these infectious organisms can cause mild to severe intestinal disease. In some cases, the resulting intestinal disease can be fatal. For example, the *e.coli* outbreak in the water supplies of Walkerton, Ontario resulted in the illness of hundreds and the death of at least 7 persons.

Rather than test for the presence of a wide variety of infectious organisms, tests for the presence of *coliform* bacteria are generally conducted. While not usually harmful itself, the presence of *coliform* bacteria indicates fecal contamination that may be accompanied by infectious organisms.

The major sources of infectious organisms in water are: untreated or improperly treated human sewage, animal wastes and feedlots, and meat packing and tanning plants that release untreated animal wastes. In addition, certain infectious organisms may be transmitted by wildlife species.

### For more information

For further information about infectious organisms, check the following sources:

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.)

Chapter 17 of this textbook provides an overview of the common types of water pollution.

**INTRODUCTION TO WATER MATTERS** Infectious organisms

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

# Introduction to Water Matters

---

## Sedimentation

**NOTE:** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### What is sedimentation?

Sedimentation is an increase in the amount of solid particles in water. Human activities - such as construction, mining, timber cutting and agriculture – cause sedimentation. These activities increase soil erosion thereby increasing the amount of solid particles introduced into the aquatic environment.

### What are the effects of sedimentation?

Sedimentation has several effects. One effect is the alteration of habitat for fish and other organisms. The spawning and feeding grounds of fish are smothered and destroyed. In addition, fish eggs and fry are smothered by the presence of excessive sediment. As a result, fish populations are reduced.

Another effect is to reduce the transparency and light penetration of the water body. As a result of reduced light, the ecosystem's photosynthetic activity is reduced. In other words, the productivity of the water body is reduced.

Sedimentation of streambeds causes the streams to widen and become shallower, which increases water temperature. The increased water temperature lowers the amount of dissolved oxygen. As a result, the stream is more vulnerable to organic pollutants that deplete oxygen and may result in loss of species diversity.

Finally, certain pollutants – pesticides, nitrates, phosphates and pathogens – bind to the sediment. By so doing, the lifetime and impact of these pollutants is increased.

## For more information

For further information about sedimentation, check the following sources:

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.)

Chapter 17 of this textbook provides an overview of the common types of water pollution.

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

# Introduction to Water Matters

---

## Thermal Pollution

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### What is thermal pollution?

Certain human activities can result in accumulation of heat in water bodies to such an extent that there are undesirable changes in the natural flow of heat energy. In other words, thermal pollution refers to undesirable increases in the temperature of water bodies as a result of human activities.

Thermal pollution can result from various human activities. For example, industrial processes often draw water from nearby water bodies to be used as a coolant. After serving its cooling function, the water is returned to the water body at a higher temperature. Another cause of thermal pollution is the removal of trees and other vegetation along water bodies. Normally, trees and other vegetation control the temperature of water bodies by providing shade.

### What are the effects of thermal pollution?

Thermal pollution can alter the natural species composition and abundance in water bodies. Even small temperature changes can drive away naturally occurring species of wildlife and attract different species. The new heat tolerant species attracted by the artificially heated waters are susceptible to death by thermal shock when an industrial facility stops its activities. As well, this alteration in the natural environment can affect the sensitivity of wildlife species to toxic waste, parasites and disease.

Higher temperature also interferes with the availability of dissolved oxygen to organisms living in the water body. As temperature increases, the rate of plant photosynthesis and growth increases. Increased plant growth results in increased dead organic matter which increases the oxygen demand of bacteria that break down the dead organic matter.

## INTRODUCTION TO WATER MATTERS Thermal Pollution

The higher temperature also increases the metabolic rate of many organisms, such as fish. At the same time, water contains less dissolved oxygen as temperature increases. Thus, many species require more oxygen to support their increased metabolic rate while the availability of oxygen in the water is decreased.

### **For more information**

For further information about thermal pollution, check the following sources:

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.)

Chapter 17 of this textbook provides an overview of the common types of water pollution.

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

# Introduction to Water Matters

---

## Resource List For Water Matters

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.)

Chapter 17 of this textbook provides an overview of the common types of water pollution.

- <[http://199.212.18.79/~ind/English/AcidRain/Bulletin/ar\\_iss\\_e.cfm](http://199.212.18.79/~ind/English/AcidRain/Bulletin/ar_iss_e.cfm)>

This Internet site, produced by Environment Canada, provides information about acid deposition in Canada.

- <<http://www.pnr-rpn.ec.gc.ca/water/wqprairie/fi00s03.en.html>>

This Internet website, produced by Environment Canada, describes the problem of eutrophication in the Prairie Provinces.

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

**INTRODUCTION TO WATER MATTERS Resource list for water matters**

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

- <<http://www.geocities.com/RainForest/Vines/4301/links.html>>

This is the Internet website for the Waterose Aquatic Ecology of Links Index Page. There are links to organizations and biological stations, general aquatic information sites, general biology and ecology sites, and other sites.

# Introduction To Matters Affecting Both Air And Water Quality



# Introduction to Matters Affecting both Air and Water Quality

---

## Acid Deposition

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### What is acid deposition?

Acid deposition refers to the deposition of acidifying compounds from the atmosphere into our environment. The acidifying compounds are formed within the atmosphere through chemical reactions involving sulfur and nitrogen emissions. Wet deposition, more commonly known as acid rain, occurs when acidic droplets fall to earth from the atmosphere. Dry deposition occurs when the acidic substances react directly with soil, plants and water in the environment.

### How does acid deposition occur?

The emission of sulfur dioxide ( $\text{SO}_2$ ) into the atmosphere contributes greatly to acid deposition. The sulfur dioxide chemically changes in the atmosphere into sulfuric acid ( $\text{H}_2\text{SO}_4$ ). In water droplets, the sulfuric acid falls back to earth as wet deposition. Sulfur dioxide is produced largely by the burning of fossil fuels. In Alberta, major sources of sulfur dioxide include natural gas processing, oil sands plants and coal-fired power plants.

Acid deposition can also result from the presence of nitrogen oxides ( $\text{NO}_x$ ) in the atmosphere. The nitrogen oxides can be converted by chemical reaction to nitric acid ( $\text{HNO}_3$ ), which may then be deposited at ground level through wet or dry deposition. In Alberta, major sources of  $\text{NO}_x$  are auto exhaust, residential fuel combustion and various industrial activities, including oil and gas production, oil refining, and electricity generation.

The extent of environmental harm caused by acid deposition is determined by two factors. The first is the presence of sensitive ecosystems downwind from the source of the pollutants that cause acid deposition. The second is the presence of weather patterns that transport those pollutants to the sensitive ecosystems within the time and distance that allow the acidifying chemical reactions to occur.

Some natural conditions can have an effect on acid deposition. On the prairies, natural levels of airborne alkaline dust act to neutralize the acidity of rainfall. Generally, Alberta has alkaline soils and bedrock, which makes its environment less susceptible to damage from acid deposition than that of eastern Canada. However, there are some areas of northeastern Alberta that are quite sensitive to acid deposition.

## **What are the effects of acid deposition?**

Acid deposition can have effects on the natural and man-made environments and on human health. Vegetation can suffer adverse effects, with agricultural crops suffering from direct damage to plants and from reduced soil fertility, and forests having retarded growth and damage to leaves and needles.

Streams and lakes can become more acidic due to long-term acid deposition. This increased acidity will have effects on beings drinking from and living in the affected waters. Increased acidity reduces a water body's ability to support life which can lead to the death of fish and other reductions of biodiversity in these waters. Acid deposition can also cause the leaching, or movement in dissolved form, of metals from the soil and sediment into water. Many of these metals are toxic and can accumulate in the food chain.

In the man-made environment, acid deposition can cause the erosion of stone and brick in buildings and the corrosion of metal. The presence of the pollutants related to acid deposition in the atmosphere can cause reduced visibility and effect the aesthetic enjoyment of the environment, especially in parks and wilderness areas.

In relation to human health, airborne acidic particles can affect lung function and breathing. Severe respiratory problems may occur at high concentrations of these substances, but there is a continuum of effects with exposure to lower levels.

## **For more information**

For further information about acid deposition, check the following sources.

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This Internet site, titled “Introduction to Atmospheric Chemistry”, provides basic introductory information about air matters, including acid deposition.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/Acid%20Dep.pdf>>

This Internet site provides access to the Alberta Environment information document *Focus on Acidic Deposition*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

- <<http://www.gov.ab.ca/env/protenf/publications/AcidDeposition.pdf>>

This Internet site provides access to the document *Application of Critical, Target and Monitoring Loads for the Evaluation and Management of Acid Deposition*. This document, produced by a multi-stakeholder group, sets out the framework for management of acid deposition in Alberta.

- <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/AEMIT.asp](http://www.casahome.org/for_stakeholders/issue_teams/AEMIT.asp)>

This Internet site provides information about the Clean Air Strategic Alliance's Acidifying Emissions Management Implementation Team and work done by that group related to management of acidifying emissions in Alberta.

- <[http://199.212.18.79/~ind/English/AcidRain/Bulletin/ar\\_iss\\_e.cfm](http://199.212.18.79/~ind/English/AcidRain/Bulletin/ar_iss_e.cfm)>

This Internet site is produced by Environment Canada. It provides access to the document *Acid Rain* which is a bulletin in the National Environmental Indicator Series. This document provides information regarding the formation of acid deposition and the trends in lake acidification in South-Eastern Canada. Eventually, a technical supplement will be attached to this document.



# Introduction to Matters Affecting both Air and Water Quality

---

## Climate Change

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### What is climate change?

Various gases in the earth's atmosphere act as an insulating blanket, holding in energy radiated by the planet to keep the land, air and water warm. This is referred to as the "greenhouse effect" and the gases that contribute to this effect are referred to as "greenhouse gases".

Human activity has resulted in increases in the levels of greenhouse gases in the atmosphere. These increased levels of gases absorb radiated energy from the earth that would otherwise pass into space. The trapping of this extra energy in the atmosphere leads to increased temperatures on the earth's surface.

### What are greenhouse gases?

Greenhouse gases include water vapour, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), ozone (O<sub>3</sub>), and nitrous oxide (N<sub>2</sub>O). The main greenhouse gases are carbon dioxide, methane and nitrous oxide. Some of these gases have a greater impact on the greenhouse effect than others. The increase in greenhouse gases has arisen due to greater levels of these gases being produced through human activity, either through their manufacture or through their release into the atmosphere as a result of human activity. Water vapour is naturally occurring, but other greenhouse gases are made mainly through human activity.

Carbon dioxide (CO<sub>2</sub>) is the most common greenhouse gas made by human activity. It is produced when any substance containing carbon is burned. Carbon dioxide is naturally removed from the atmosphere by plants and oceans. However, there is currently more carbon dioxide entering the atmosphere than is being absorbed. This is largely due to the burning of fossil fuels and the cutting down of forests globally.

The sources of Alberta's carbon dioxide emissions that are generated by human activity can be divided into three categories. About one-third of these emissions come from the oil and gas industry, including gas processing, oil sands, pipelines and refineries. Another one-third of Alberta's carbon dioxide emissions come from coal-generated electricity, which is used mainly by individuals for personal purposes. A further one-third of Alberta's carbon dioxide emissions result from energy use in business, industry, residences and transportation, with a main source being transportation in personal vehicles.

## **What are the effects of climate change?**

The matter of climate change is a topic that is the subject of much debate. At present, its effects cannot be determined with certainty. However, scientists have made predictions about possible effects of a significant increase in the earth's temperature.

Possible effects of climate change include:

- substantial changes in precipitation (rain and snow) patterns;
- more extreme weather;
- more frequent and severe droughts; and
- rising sea levels due to melting of glaciers and polar ice and the expansion of oceans as they warm.

Sectors in Alberta that may need to consider possible adaptive action in response to potential effects of climate change include forestry and agriculture. Possible changes in weather patterns could have effects on food production, fresh water supplies, forest growth and land use.

It is thought that climate change could also result in the shifting of vegetation zones. In Alberta, this could result in a shift of the boreal forest northwards or a replacement of some forested areas with grassland. This would obviously have an effect on the forestry sector. While a shifting of vegetation zones may have a positive effect on agriculture in northern regions of Alberta, it is thought that the most southern regions of the province could be adversely affected by climate change, with current agriculturally productive areas becoming non-arable and unable to be used for agricultural production. Some scientists believe that increased carbon dioxide levels in the atmosphere could stimulate plant growth, which may be beneficial to agriculture.

## **For more information**

For further information about climate change, check the following sources.

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This Internet site, titled "Introduction to Atmospheric Chemistry", provides basic introductory information about air matters, including global warming (climate change).

- <<http://www2.ec.gc.ca/climate/index.html>>

This Environment Canada site tells us what climate change is, how climate change will affect us, what Canada is doing to address it and what we can do. It also provides many links to various government sites including links to the Government of Canada Climate Change site which tells how the Government of Canada is addressing the climate change challenge, and what you can do to participate; the Climate Change 2000 Website, which highlights climate change initiatives announced in the Government of Canada's Budget 2000; and a site focussed on Canada and the Kyoto Protocol.

- <[http://www2.ec.gc.ca/climate/resource/index\\_e.html](http://www2.ec.gc.ca/climate/resource/index_e.html)>

This Environment Canada Internet site provides a resource list for climate change information, including bulletins, fact sheets, news releases, reports, speeches and links to other sites.

- <[http://www2.ec.gc.ca/climate/primer/main\\_e.html](http://www2.ec.gc.ca/climate/primer/main_e.html)>

This Environment Canada Internet site provides access to the document *A Matter of Degrees: A Primer on Climate Change*. Of interest for general information and understanding are section 2 “The Atmospheric Environment” and section 4 “Understanding Climate Change”. Print copies of this document can be obtained free of charge from:

Environment Canada  
Inquiry Centre  
351 St. Joseph Boulevard  
Hull, Quebec K1A 0H3  
Phone: (819) 997-2800 or 1-800-668-6767  
Fax: (819) 953-2225  
E-mail: [enviroinfo@ec.gc.ca](mailto:enviroinfo@ec.gc.ca)

- <<http://www2.ec.gc.ca/climate/fact/science.html>>

This Environment Canada Internet site provides access to the fact sheet *The Science of Climate Change*, and includes an extensive discussion of the potential effects of global warming on Canada.

- <[http://www2.ec.gc.ca/pdb/ghg/ghg\\_home\\_e.cfm](http://www2.ec.gc.ca/pdb/ghg/ghg_home_e.cfm)>

This Environment Canada Internet site focuses on greenhouse gases and contains detailed information on greenhouse gas emissions, including maps and graphs. It also contains information about trends in greenhouse gas emissions.

**INTRODUCTION TO MATTERS AFFECTING BOTH AIR AND WATER QUALITY** Climate change

- <<http://www.climatechange.gc.ca>>

This Internet site is the federal government home page on climate change. It includes background information on climate change and its impacts and information about action being taken to address climate change. The resource centre page, which provides links to publications, reports, fact sheets and other resources about climate change, can be accessed at <<http://www.climatechange.gc.ca/english/html/resource.html>>. A separate links page at <<http://www.climatechange.gc.ca/english/html/links.html>> provides links to various Canadian and international resources.

# Introduction to Matters Affecting both Air and Water Quality

---

## Ozone Depletion

***NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### **What is the ozone layer?**

The ozone layer is an area within the atmosphere that has a fairly high ozone concentration. It is located about 25 kilometres above the earth at mid latitudes within the stratospheric layer of the atmosphere, which is about 15 – 35 kilometres above the earth. The thickness of the ozone layer varies depending on the latitude. Normally, the ozone layer is thinner over the equatorial region and thicker over the higher latitudes, which includes Alberta. The ozone layer absorbs ultraviolet (UV) light that would otherwise reach the earth's surface. Most of the ozone within the ozone layer is naturally occurring, arising from reactions between the UV light and oxygen within the atmosphere.

### **What is ozone depletion?**

#### Ozone depletion

Ozone depletion refers to thinning of the ozone layer. This is different from the day-to-day variations in thickness of the layer; it is instead significant thinning on an ongoing basis of the ozone layer over the earth. The greatest thinning of the ozone layer is apparent over the higher latitudes, including Alberta.

Ozone depletion is caused by the presence of various chemicals, known as ozone-depleting substances, in the stratosphere. These substances, many of which take a long time to break down, react with the UV light and decompose into elements such as chlorine. These products of decomposition, which do not occur naturally within the stratosphere, interfere with the natural ozone cycle and contribute to the depletion of the ozone layer.

## Ozone-depleting substances

Ozone-depleting substances are man-made or result from human activity. They include chlorofluorocarbons (CFCs), halons, methane and nitrous oxide ( $N_2O$ ). CFCs are used in refrigeration, foam blowing, solvents and special aerosol propellants. Halons are similar to CFCs and are used in fire extinguishers. Methane is a gas that is produced by agricultural, industrial and mining activities. Nitrous oxide is produced by fuel combustion and fertilizer use.

## Why is ozone depletion a concern?

Ozone depletion can have negative effects on human health. Thinning of the ozone layer results in an increased amount of UV light reaching the earth's surface. This increase can have a number of effects on the environment and human health. Some of the human health effects that can result from increased UV light include sunburn, skin cancer, eye aging and suppression of the immune system.

In addition, ozone depletion can have negative effects on both natural and man-made environments. Increased UV light can affect the growth of plants, by reducing leaf area and photosynthesis. Many food crops are very sensitive to UV radiation and can suffer damage from increased UV levels. Increased UV levels can also cause damage to aquatic life near the ocean surface, including fish populations.

The man-made environment is affected by accelerated aging of industrial materials such as plastics and paints. As well, an increase in the amount of UV light reaching the earth's surface leads to an increase in ground-level ozone and smog.

## For more information

For further information about ozone depletion, check the following sources.

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This Internet site, titled "Introduction to Atmospheric Chemistry", provides basic introductory information about air matters, including ozone depletion.

- <<http://www.ec.gc.ca/ozone/primer>>

This Environment Canada Internet site provides access to the document *A Primer on Ozone Depletion*.

- <<http://www.ec.gc.ca/ozone/indexe.htm>>

This Environment Canada Internet site provides a broad range of information about stratospheric ozone and ozone depletion.

**INTRODUCTION TO MATTERS AFFECTING BOTH AIR AND WATER QUALITY Ozone depletion**

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/ozone%20depletion.pdf>>

This Internet site provides access to the Alberta Environment information document *Focus on Ozone Depletion*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)



# Introduction to Matters Affecting both Air and Water Quality

---

## Toxic Substances

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### What are toxic substances?

Toxic substances are substances that can cause adverse effects in living beings, including humans, either as an immediate effect or due to continuing long-term exposure. Toxic substances may be present in the atmosphere or in water bodies.

There are two categories of toxic substances that are of particular concern:

- Heavy Metals: Examples of heavy metals include mercury, lead and cadmium.
- Persistent Organic Pollutants (POPs): POPs are organic compounds that resist being broken down by sunlight, biological action or chemical processes. Examples of POPs include some pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and dioxins and furans.

Other toxics are substances such as volatile organic compounds (VOCs), including benzene and carbon tetrachloride.

### What are the sources of toxics?

While some toxics occur naturally, human activity has greatly increased their concentrations in the environment and added many new toxics that are wholly man-made.

#### Sources of metals in the environment

The main natural sources of metals in the environment are dust blown by wind, volcanoes, forest fires and sea salt spray. With respect to sources related to human activity, virtually every

industrial activity that operates at high temperatures releases some metals to the environment. Main sources include:

- the combustion of fossil fuels, which involves personal as well as industrial use,
- metal extraction,
- waste and sludge incineration, and
- metal fabrication and recycling.

## Sources of POPs in the environment

Many chemicals can be classified as POPs. These chemicals enter the environment from a wide range of sources. Some chemicals, such as pesticides, are present in the environment as a result of intentional use. Others may enter the atmosphere as byproducts of incineration or other fires, as waste products from industrial or commercial activities, or as a result of accidental discharges. In Alberta, one major source of POPs is gas dehydrators.

## Why are toxics a concern?

There are a number of reasons why toxics are an environmental concern. These include:

- the persistent nature of many of these substances,
- the potential for exposure,
- the reliance by modern society on chemicals related to these substances, and
- the effects of these substances on human health and the environment.

## Persistence

Many toxic substances are referred to as persistent because they take a long time to break down in the environment. This persistence ties into two factors that are of particular concern:

- the long-range transport of toxics within the atmosphere; and
- bioaccumulation and biomagnification of these substances within living beings.

### Long-range transport

The persistence of many toxic substances contributes to the ability for these substances to be transported long distances within the atmosphere. Atmospheric circulation can move large amounts of pollutants to areas a long distance from where the pollutants were originally emitted.

As well, the “grasshopper effect”, which describes the migration of toxic substances through successive emission, transport, deposit and re-emission processes, also can result in the long-range movement of toxic substances. For example, monitoring and studies have measured levels of PCBs in the bodies of Arctic wildlife and also in the local human population, although PCBs are generally not manufactured or otherwise found in the Arctic.

The distance of transport of toxic substances depends on the composition of the pollutants being transported within the atmosphere. Some of these substances can remain in the atmosphere for long periods without breaking down or otherwise changing. Others may bond to water drops, dust or other materials. In any event, all toxic substances will eventually return to earth and to water bodies from the atmosphere, falling as part of rain or snow or as a dry substance.

### **Bioaccumulation and biomagnification**

The presence and persistence of toxic substances in the environment is a concern because of their tendency to bioaccumulate and biomagnify. Bioaccumulation is the tendency for certain substances to accumulate in plants and animals, particularly wildlife, in increasing concentrations over time. Bioaccumulation contributes to biomagnification. Biomagnification refers to the process where the concentrations of toxic substances increase in beings that are higher on the food chain, due to their consumption of beings that have been accumulating increasing concentrations of toxic substances. This consumption magnifies the concentration of the toxic substances within the beings that are higher on the food chain. Humans often occupy the highest spot on the food chain, and, as such, may be most vulnerable to the effects of biomagnification.

### **Potential for exposure**

As many toxic substances remain in the environment for long periods of time, the potential for exposure for animals, including humans, increases. In other words, the longer these substances are in the environment, the greater the likelihood of exposure. As well, the persistence of these substances also increases the potential time or amount of exposure to them.

These exposure factors are a concern because even very low levels of toxic substances may cause adverse effects to beings that are continuously exposed to them over a long time period. In some instances, the effects of exposure may not be apparent for several years or may only appear in future generations.

### **Society's reliance on chemicals**

Many toxic substances result from the manufacture and use of chemicals. The number and type of chemicals is constantly increasing and often very little is known about their toxicity and their potential environmental effects. Chemicals are used in virtually every product made in today's society, and can contribute greatly to our quality of life. However, this reliance on chemical use has led to a situation in which toxic substances can potentially impact virtually every aspect of human life and activity throughout the world.

## **Effects of toxic substances**

Toxic substances can cause a number of human health and environmental effects, particularly when there is prolonged exposure. Given the wide range of substances that are considered toxic, there is a wide range of toxic effects. Toxic substances have been linked to cancer, cell mutation, birth defects, reproductive damage and failure, and damage to the nervous system and organs. Many toxic substances have the ability to mimic hormones thereby disrupting normal endocrine functions in animals including humans.

## **For more information**

For further information about air and water toxics, check the following sources.

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This Internet site, titled “Introduction to Atmospheric Chemistry”, provides basic introductory information about air matters, including air toxics.

- *Air Toxics Management Program in Alberta*

This Alberta Environment document discusses air toxics in the Alberta context and provides an overview of how Alberta Environment seeks to control emissions of air toxics from industrial sources. It can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/atmtpgab.pdf>>. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- *The State of Canada's Environment – 1996*

This federal government publication provides extensive information about Canada’s environment. Chapter 13 deals with toxic substances, including air toxics, in detail. The federal government provides Internet access to the report at <<http://www2.ec.gc.ca/soerre/English/1996report/Doc/1-1.cfm>>. Print or CD-rom versions can be purchased from the federal government for \$25.00 and can be ordered through the Internet by following the link at the location shown above. For further information, contact:

Environment Canada  
Inquiry Centre  
351 St. Joseph Boulevard  
Hull, Quebec K1A 0H3  
Phone: (819) 997-2800 or 1-800-668-6767  
Fax: (819) 953-2225  
E-mail: [enviroinfo@ec.gc.ca](mailto:enviroinfo@ec.gc.ca)

- <<http://www.ec.gc.ca/pops/index.html>>

This Internet Website, presented by Environment Canada, is devoted to the issues relating to persistent organic pollutants (POPs).

- <<http://irptc.unep.ch/pops/>>

This Internet website, presented by the United Nations Environment Programme, provides information on persistent organic pollutants (POPs) and the ongoing negotiations to develop.



# Introduction to Matters Affecting both Air and Water Quality

---

## Resource List For Matters Affecting Both Air And Water Quality

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

For information about matters affecting both air and water quality, check the following sources.

### *General air information*

- <[www.cac.yorku.ca](http://www.cac.yorku.ca)>

This Internet site, titled "Introduction to Atmospheric Chemistry", provides basic introductory information about air matters, including acid deposition, global warming (climate change), ozone depletion and air toxics.

### *General water information*

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.)

Chapter 17 of this textbook provides an overview of the common types of water pollution.

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

**INTRODUCTION TO MATTERS AFFECTING BOTH AIR AND WATER QUALITY**  
Resource list for matters affecting both air and water quality

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

*Acidic deposition*

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/Acid%20Dep.pdf>>

This Internet site provides access to the Alberta Environment Information document *Focus on Acidic Deposition*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920-108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <<http://www.gov.ab.ca/env/protenf/publications/AcidDeposition.pdf>>

This Internet site provides access to the document *Application of Critical, Target and Monitoring Loads for the Evaluation and Management of Acid Deposition*. This document, produced by a multi-stakeholder group, sets out the framework for management of acid deposition in Alberta.

- <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/AEMIT.asp](http://www.casahome.org/for_stakeholders/issue_teams/AEMIT.asp)>

This Internet site provides information about the Clean Air Strategic Alliance's Acidifying Emissions Management Implementation Team and work done by that group related to management of acidifying emissions in Alberta.

- <[http://199.212.18.79/~ind/English/AcidRain/Bulletin/ar\\_iss\\_e.cfm](http://199.212.18.79/~ind/English/AcidRain/Bulletin/ar_iss_e.cfm)>

This Internet site is produced by Environment Canada. It provides access to the document *Acid Rain* which is a bulletin in the National Environmental Indicator Series. The document provides information regarding the formation of acid deposition and the trends in lake acidification in South-Eastern Canada. Eventually, a technical supplement will be attached to this document.

*Climate Change*

- [>](http://www2.ec.gc.ca/climate/index.html)

This Environment Canada site tells us what climate change is, how climate change will affect us, what Canada is doing to address it and what we can do. It also provides many links to various government sites including links to the Government of Canada Climate Change site, which tells how the Government of Canada is addressing the climate change challenge, and what you can do to participate; the Climate Change 2000 Website, which highlights climate change initiatives announced in the Government of Canada's Budget 2000; and a site focussed on Canada and the Kyoto Protocol.

- <[>](http://www2.ec.gc.ca/climate/resource/index_e.html)

This Environment Canada site provides a resource list for climate change information, including bulletins, fact sheets, news releases, reports, speeches and links to other sites.

- <[>](http://www2.ec.gc.ca/climate/primer/main_e.htm)

This Environment Canada site provides access to the document *A Matter of Degrees: A Primer on Climate Change*. Of interest for general information and understanding are section 2 “The Atmospheric Environment” and section 4 “Understanding Climate Change”. Print copies of this document can be obtained free of charge from:

Environment Canada  
Inquiry Centre  
351 St. Joseph Boulevard  
Hull, Quebec K1A 0H3  
Phone: (819) 997-2800 or 1-800-668-6767  
Fax: (819) 953-2225  
E-mail: [enviroinfo@ec.gc.ca](mailto:enviroinfo@ec.gc.ca)

- <[>](http://www2.ec.gc.ca/climate/fact/science.html)

This Environment Canada Internet site provides access to the fact sheet *The Science of Climate Change*, and includes an extensive discussion of the potential effects of global warming in Canada.

- <[>](http://www2.ec.gc.ca/pdb/ghg/ghg._home_e.cfm)

This Environment Canada Internet site focuses on greenhouse gases and contains detailed information on greenhouse gas emissions, including maps and graphs. It also contains information about trends in greenhouse gas emissions.

**INTRODUCTION TO MATTERS AFFECTING BOTH AIR AND WATER QUALITY**  
Resource list for matters affecting both air and water quality

- <<http://www.climatechange.gc.ca>>

This Internet site is the federal government home page on climate change. It includes background information on climate change and its impacts and information about action being taken to address climate change. The resource centre page, which provides links to publications, reports, fact sheets and other resources about climate change, can be accessed at <<http://www.climatechange.gc.ca/english/html/resource.html>>. A separate links page at <<http://www.climatechange.gc.ca/english/html/links.html>> provides links to various Canadian and international websites dealing with climate change.

*Ozone Depletion*

- <<http://www.ec.gc.ca/ozone/primer>>

This Environment Canada Internet site provides access to the document *A Primer on Ozone Depletion*.

- <<http://www.ec.gc.ca/ozone/indexe.htm>>

This Environment Canada Internet site provides a broad range of information about stratospheric ozone and ozone depletion.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/ozone%20depletion.pdf>>

This Internet site provides access to the Alberta Environment information document *Focus on Ozone Depletion*. Print copies of this document can be obtained from Alberta Environment's Information Centre (contact information above).

*Toxic Substances*

- *Air Toxics Management Program in Alberta.*

This Alberta Environment document discusses air toxics in the Alberta context and provides an overview of how Alberta Environment seeks to control emission of air toxics from industrial sources. It can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/atmtpgab.pdf>>. Print copies of this document can be obtained from Alberta Environment's Information Centre (contact information above).

- *The State of Canada's Environment – 1996*

This federal government publication provides extensive information about Canada's environment. Chapter 13 deals with toxic substances, in detail. The federal government provides Internet access to the report at <<http://www2.ec.gc.ca/soer-ree/English/1996report/Doc/1-1.cfm>>. Print or CD-rom versions can be purchased from the federal government for \$25.00 and can be ordered through the Internet by following the link at the location shown

above. For further information, contact Environment Canada's Inquiry Centre (contact information above).

- <<http://www.ec.gc.ca/pops/index.html>>

This Internet Website, presented by Environment Canada, is devoted to the issues relating to persistent organic pollutants (POPs).

- <<http://irptc.unep.ch/pops>>

This Internet website, presented by the United Nations Environment Programme, provides information on persistent organic pollutants (POPs) and the ongoing negotiations to develop an international POPs treaty



# Air Quality Monitoring



# Air Quality Monitoring

---

## Source Monitoring

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### Basics of source monitoring

Source monitoring involves monitoring specific sources of air emissions. This monitoring seeks to measure the levels of particular substances emitted from the source(s) being monitored. The sources monitored are usually stacks at industrial facilities.

There are three different types of source monitoring:

- manual source emission surveys (also known as stack sampling);
- continuous emission monitoring; and
- visible emissions monitoring.

### Manual source emission surveys

This form of source monitoring involves taking samples of air emissions from a stack over a short period of time (for example, one hour). Often this involves the use of equipment referred to as a stack sampling train, which is inserted into a stack to take samples of the emissions within the stack.

Requirements for this form of monitoring are set out in the *Alberta Stack Sampling Code*, an Alberta Environment guideline. The code includes:

- procedures for sampling and analysis of air emissions from stacks;
- general requirements for stack sampling and analysis of samples; and
- a number of sampling methods for different types of emissions and circumstances.

## Continuous emission monitoring

This form of monitoring involves continuous measurement of concentrations of pollutants and their mass emission rates. Measurements are taken on an ongoing year-round basis by equipment that is permanently installed within the stack.

Requirements for this type of monitoring are set out in the *Continuous Emission Monitoring System Code*, a guideline published by Alberta Environment. This code includes the following requirements for continuous emission monitoring systems:

- design specifications;
- installation requirements;
- operation requirements;
- performance requirements; and
- quality assurance and quality control.

## Visible emission monitoring

This form of monitoring involves the observation of a visible emission source and determination of the opacity of that visible emission by a trained individual, known as a visible emissions observer. Opacity is the degree to which a visible emission obstructs the passage of light and the view of the certified observer.

The *Substance Release Regulation* regulates the allowed degree of opacity of visible emissions and also sets out the requirements for training and certification of visible emissions observers. The *Manual for Training and Certification of Observers and Evaluation of Visible Emissions* is the document that sets out specific training and certification requirements. The manual and a training course are used by observers to train in making field evaluations of opacity and in observing and properly recording all relevant information. Observers must obtain a new certification every six months.

## Who does source monitoring in Alberta?

In Alberta, source monitoring is carried out by industrial operators and by Alberta Environment.

### Industrial source monitoring

Industrial operators must carry out source monitoring to meet requirements set out in approvals issued under the *Environmental Protection and Enhancement Act* or in applicable codes of practice made under that Act. The results of such monitoring are used to assess operators' compliance with requirements set out in any or all of the following:

- an approval;
- applicable codes of practice;
- the *Environmental Protection and Enhancement Act*;
- the *Substance Release Regulation* or other applicable regulations.

Operators may also carry out other source monitoring in addition to that legally required. This is often done to assess the performance of operating systems and equipment. The Air Quality Monitoring fact sheet *Reporting of Monitoring Data*, from the background materials, discusses industry requirements to report monitoring data and the availability of that data to the public.

## Government source monitoring

Alberta Environment (AENV) also carries out source monitoring in accordance with their Source Monitoring Program. Activities carried out under this program include:

- manual source emission surveys (stack sampling) carried out by AENV staff to determine whether an operator is in compliance with legal requirements and to collect evidence. These surveys are done without any advance notice to the operator.
- audits of manual source emission surveys carried out by industry, in which AENV staff observe while industrial operators carry out their stack sampling. This can include audits of sampling procedures used by industry and of the analytical procedures used by the laboratories that analyze industry's samples.
- audits of continuous emission systems by inspection of instruments, procedures and maintenance records. As well, AENV staff may test system operation through the use of gas samples.
- visible emission checks by AENV staff who are certified visible emissions observers.
- review of all source emission survey reports that are submitted by industry to AENV to ensure that industrial operators are in compliance.

The source monitoring activities carried out by AENV focus on assessing compliance with legal requirements by industrial operators. Findings of non-compliance lead to investigation and enforcement by AENV. The Enforcement and Community Involvement fact sheet *Enforcement of the Environmental Protection and Enhancement Act*, from the background materials, discusses investigations and enforcement by AENV in greater detail.

## For more information

For further information about source monitoring, check the following sources.

- The Monitoring Division of Alberta Environment deals with environmental enforcement and monitoring matters on a province-wide basis, and coordinates the department's activities related to source and ambient air monitoring. This division can be contacted at:

Alberta Environment  
Monitoring Division  
11<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 415-9356 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7958

- Alberta Environment has six regional offices for different areas of the province. These regions are responsible for enforcement and monitoring matters at the regional level, and carry out the department's source monitoring program. The regions have staff designated to deal with enforcement and monitoring. To determine the region in which your community is located, contact the regional office closest to your community. The contact information for the regions is listed below, and is also available on the Internet through <<http://www.gov.ab.ca/env/infocentre/contacts.html>>.

Alberta Environment  
Northwest Boreal Region  
2<sup>nd</sup> Floor, Provincial Building  
9621 – 96 Avenue  
Peace River, AB T8S 1T4  
Phone: (780) 624-6330 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 624-6542

Alberta Environment  
Northeast Boreal Region  
111 Twin Atria Building  
4999 - 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 427-7617 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7824

Alberta Environment  
Northern East Slopes Region  
107, 111 – 54 Street  
Edson, AB T7E 1T2  
Phone: (780) 723-8357 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 723-8386

Alberta Environment  
Parkland Region  
3<sup>rd</sup> Floor, Provincial Building  
4920 – 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-7052 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5022

Alberta Environment  
Bow Region  
3<sup>rd</sup> Floor, 2938 – 11 Street NE  
Calgary, AB T2E 7L7  
Phone: (403) 297-7948 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-6069

Alberta Environment  
Prairie Region  
2<sup>nd</sup> Floor Provincial Building  
200 – 5<sup>th</sup> Avenue South  
Lethbridge, AB T1J 4C7  
Phone: (403) 382-5512 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 382-4428

- Please note that information on how to access copies of legislation and some guidelines is available in the Basic Legal Requirements fact sheet *Resource List for Legal Matters*, from *Community Action on Air Quality - Background Materials for Community Involvement in Air Quality Monitoring and Enforcement*.
- *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3.

This Act sets out broad requirements for reporting releases into the environment, including releases of air pollutants. It also provides for the public disclosure of monitoring data and the supporting information necessary to interpret it. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Substance Release Regulation*, A.R. 124/93

This regulation provides limits for specified air emissions and sets out requirements related to visible emissions readings and certification of visible emissions observers. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Alberta Stack Sampling Code*, Publication Number REF. 89, ISBN 0773214062

This code, published by Alberta Environment, sets out procedures for sampling and analysis of air emissions from industrial sources in Alberta, namely stacks. It includes general requirements for stack sampling and analysis of samples, and specifies a number of methods

## AIR QUALITY MONITORING Source monitoring

for sampling and analysis in relation to different types of emissions and circumstances. This code can be purchased for \$49.95 from the Queen's Printer bookstores, listed below, or through the Queen's Printer site on the Internet at <<http://www.qp.gov.ab.ca>>.

Queen's Printer Bookstore  
10611 - 98 Avenue  
Main Floor, Park Plaza  
Edmonton, AB T5K-2P7  
Phone: (780) 427-4952 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 452-0668

Queen's Printer Bookstore  
Main Floor, McDougall Centre  
455 – 6 Street S.W.  
Calgary, AB T2P 4E8  
Phone: (403) 297-6251 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-8450

This code can also be accessed at:

Alberta Environment  
Library  
6<sup>th</sup> Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 427-5870 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0170  
E-mail: [env.library@gov.ab.ca](mailto:env.library@gov.ab.ca)  
<<http://www.augustana.ab.ca/neos/neosevp>>

- *Continuous Emission Monitoring System Code*

This code, published by Alberta Environment, deals with all major elements of continuous emission monitoring systems, and sets criteria for these systems for design, installation, operations, performance, and quality assurance and control. This code can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/Cemscode-98.pdf>>. This code can be obtained in print from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

The code can also be ordered through the Internet at <<http://www.gov.ab.ca/env/info/infocentre/publications/order.html>>. When ordering, quote order number 758-F.

- *Air Monitoring Directive*

This guideline, published by Alberta Environment, sets out requirements for carrying out source and ambient air monitoring and reporting monitoring results, and includes specific requirements for a number of different industries. There are requirements for both continuous and static ambient monitoring. The guideline also establishes requirements for monthly and annual reports, contravention reports, and release reporting. This guideline can be accessed at Alberta Environment's library (contact information above).

- *Manual for Training and Certification of Observers and Evaluation of Visible Emissions*, Publication VEE-2/77

This document, published by Alberta Environment, is the manual specified by the *Substance Release Regulation* for training and certification of visible emissions observers who may determine the opacity of visible emissions. Observers use this manual, together with a training course, to train in making field evaluations of the opacity of visible emissions and in observing and properly recording all relevant information. The manual also establishes the requirements for certification of observers.

- <<http://www.gov.ab.ca/env/air/airqual/monitor.html>>

This Internet site provides general information about air quality monitoring activities carried out by Alberta Environment.

- <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/compuls.html>>

This Internet site gives access to the fact sheet *The Role of Compulsory Industry Monitoring in Alberta's Environmental Regulatory Program*. This fact sheet discusses monitoring that industry is required to carry out under the *Environmental Protection and Enhancement Act* and related legislation, including air quality monitoring.



# Air Quality Monitoring

---

## Ambient Monitoring

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### Basics of ambient monitoring

Ambient monitoring involves monitoring of the ambient air for pollutant levels and for other conditions that may affect air quality. Ambient air is the air within the atmosphere; thus ambient monitoring does not involve the sampling of particular emission sources. The quality of ambient air can be affected by emissions from a variety of sources and also by weather-related factors such as wind speed and direction, temperature and humidity levels.

There are two different types of ambient monitoring:

- continuous monitoring; and
- intermittent monitoring.

### Continuous monitoring

Continuous monitoring involves monitoring the ambient air on an ongoing basis. This form of monitoring can be used to measure the levels or concentrations of any of a number of pollutants in the atmosphere. Continuous ambient monitoring is also used to measure certain weather conditions that may be relevant to pollutant levels or concentrations, such as wind speed and wind direction.

### Intermittent monitoring

Intermittent monitoring involves taking periodic samples of the ambient air. This form of monitoring measures pollutant levels or concentrations at a particular time or over a set period of time.

### Requirements for monitoring

Requirements for carrying out both continuous and intermittent ambient monitoring are set out in the *Air Monitoring Directive*, an Alberta Environment guideline. This includes criteria for:

- selection of monitoring locations;
- sampling procedures and analysis;
- calibration of monitoring equipment; and
- validation and reporting of monitoring data.

## Purposes of ambient monitoring

Ambient air monitoring can be carried out to serve a number of purposes. This includes:

- assessment of air quality on a regional basis, and
- providing data to assist in the establishment of specific source emission requirements.

### Regional assessment of air quality

Ambient monitoring can be used to assess air quality on an airshed or ecosystem basis. Such data has a number of uses, including determining necessary action for ecosystem protection and determining the state of the regional environment. For example, the Ambient Monitoring Project being carried out through the Clean Air Strategic Alliance (see <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/AMOSC.asp](http://www.casahome.org/for_stakeholders/issue_teams/AMOSC.asp)> for further details) seeks to develop an integrated air monitoring system throughout Alberta. It seeks to meet objectives related to ambient air quality monitoring in four main categories:

- human health;
- ecological health;
- transport of air contaminants over provincial boundaries; and
- visibility.

### Development of specific source emission requirements

Once air quality has been determined for a region, the ambient monitoring data can be used to assist regulators in setting source emission requirements for particular facilities or activities within that region. Usually, the specific source emission requirements will be incorporated as part of the terms and conditions contained in a facility's approval issued under the *Environmental Protection and Enhancement Act*. As well, source emission requirements can be set in regulations.

## Can ambient air requirements be enforced?

Currently, ambient air requirements in Alberta are set out in two different formats. The *Alberta Ambient Air Quality Guidelines* set permissible levels for a number of different substances that may be found in the air in Alberta. These levels are intended to represent the amounts of substances that would cause the lowest observable effect on sensitive receptors (those exposed to the substances in the air). However, guidelines are not always legally enforceable documents, and the *Alberta Ambient Air Quality Guidelines* are not enforceable on their own. The Basic Legal Requirements fact sheet *Introduction to the Canadian Legal System*, from the background materials, discusses the legal effect of guidelines and other policy documents in greater detail.

Ambient air requirements may also be found in approvals issued to operators of facilities or activities that are regulated under the *Environmental Protection and Enhancement Act*. Often approvals may require operators to carry out ambient monitoring and to report the results of that monitoring to Alberta Environment. Approvals are legally enforceable documents, and enforcement action can be taken by Alberta Environment against operators that do not comply with all terms and conditions of their approvals. Further information about approvals can be found in the Basic Legal Requirements fact sheet *Registrations and Approvals*, and more details about enforcement can be found in the Enforcement and Community Involvement fact sheet *Enforcement of the Environmental Protection and Enhancement Act*, both from the background materials.

## Who does ambient monitoring in Alberta?

In Alberta, ambient monitoring is carried out by industrial operators, Alberta Environment and other parties with interests in air quality matters.

### Industrial ambient monitoring

In some instances, industrial operators must carry out ambient monitoring to meet requirements set out in approvals issued under the *Environmental Protection and Enhancement Act*. Operators may also carry out ambient monitoring in addition to that legally required under their approvals. Operators will often do this to obtain data about ambient air quality in the surrounding area. The Air Quality Monitoring fact sheet *Reporting of Monitoring Data*, from the background materials, discusses industry requirements to report monitoring data and the availability of that data to the public.

### Government ambient monitoring

#### Continuous monitoring

Alberta Environment carries out ambient air quality monitoring throughout the province. It operates a number of monitoring stations, which carry out continuous monitoring for the following substances in the ambient air:

## AIR QUALITY MONITORING Ambient monitoring

- carbon monoxide;
- dust and smoke (referred to as “coefficient of haze”);
- nitrogen oxides;
- nitrogen dioxide;
- nitric oxide;
- ozone;
- total hydrocarbons;
- hydrogen sulfide;
- sulfur dioxide;
- carbon dioxide;
- ammonia; and
- inhalable particulates.

Concentrations of each pollutant that is continuously monitored are averaged over one-hour time intervals for recording purposes.

### **Intermittent monitoring**

Alberta Environment also carries out intermittent monitoring at its monitoring stations for the following substances:

- total suspended particulates;
- sulfate;
- nitrate; and
- polycyclic aromatic hydrocarbons.

As well, some of its monitoring stations in urban areas monitor intermittently for inhalable particulates and volatile organic compounds.

### **Mobile monitoring**

Alberta Environment also has a Mobile Air Monitoring Laboratory (MAML), which is a large motor home that has been adapted to measure air quality. The MAML can monitor the ambient air while it is in motion. The following substances can be monitored by the MAML:

- ammonia;
- carbon monoxide;
- ozone;
- total hydrocarbons;
- reactive hydrocarbons;
- methane;
- nitric oxide;
- nitrogen dioxide;
- total nitrogen oxides;
- sulfur dioxide;
- total reduced sulfur;
- hydrogen sulfide;
- suspended particulates; and
- polycyclic aromatic hydrocarbons.

The MAML also monitors wind speed, wind direction, temperature and relative humidity. More information about the MAML can be found on the Internet at <<http://www.gov.ab.ca/env/air/maml/flash.html>>

### **Availability of government monitoring data**

Some of Alberta Environment's air monitoring data is available through different sources. The Air Quality Monitoring fact sheet *Reporting of Monitoring Data*, from the background materials, provides further information on accessing government data.

## Other ambient monitoring

The Clean Air Strategic Alliance (CASA) is a non-profit, multi-stakeholder body that carries out strategic management of air quality in Alberta. CASA developed a strategic plan for ambient air quality monitoring in Alberta that was adopted in 1995, and is being implemented in three phases. This plan calls for a network of air quality monitors throughout Alberta, with emphasis on areas where people live. The network is intended to provide information that will relate to human and ecosystem health, transport of air pollutants over provincial boundaries, and visibility. More detail about the CASA Ambient Monitoring Project can be found on the Internet at <<http://www.casahome.org/> for\_stakeholders/issue\_teams/AMOSC.asp>.

A number of organizations contribute monitoring stations to the province-wide monitoring network, including Alberta Environment, Environment Canada, industrial associations, and the airshed management zones established under CASA. Data produced by this network is collected, verified and then logged into a central data warehouse, called the Alberta Ambient Air Data Management System (AAADMS). All monitoring information contained in the AAADMS is accessible to stakeholders and the public in a variety of formats through the Internet, at <<http://www.casadata.org>>.

## For more information

For further information about ambient monitoring, check the following sources.

- The Enforcement and Monitoring Division of Alberta Environment deals with monitoring matters on a province-wide basis, and coordinates the department's activities related to source and ambient air monitoring. This division can be contacted at:

Alberta Environment  
Monitoring Division  
11<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 415-9356 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7958

- Alberta Environment maintains telephone numbers in Edmonton and Calgary through which it provides current information on air quality conditions. In Edmonton, call 427-7273 and in Calgary, call 250-2099. Both numbers can be reached toll-free within Alberta by calling 310-0000.
- The Clean Air Strategic Alliance (CASA) is a non-profit, multi-stakeholder body that carries out strategic management of air quality in Alberta. It is made up of a Board of Directors representing various stakeholders and project teams that address specific air quality issues. CASA has a wide range of information on air quality matters specific to Alberta, including monitoring information. CASA can be contacted at:

Clean Air Strategic Alliance  
9<sup>th</sup> Floor, 9940 – 106 Street  
Edmonton, AB T5K 2N2  
Phone: (780) 427-9793  
Fax: (780) 422-3127  
E-mail: [casa@casahome.org](mailto:casa@casahome.org)  
<http://www.casahome.org>

- CASA's website, at <<http://www.casahome.org>>, is a good source of information about Alberta air quality, including monitoring. The site provides information about CASA's projects, including information on the Ambient Monitoring Project at <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/AMOSC.asp](http://www.casahome.org/for_stakeholders/issue_teams/AMOSC.asp)>. Print information on the Ambient Monitoring Project can also be obtained from CASA.
- The Fall 1997 issue of the CASA newsletter *Clean Air Views* (Vol. 6, Issue 2) contains a number of articles related to air quality monitoring in Alberta, including articles about the ambient air monitoring network in Alberta and Alberta Environment's Mobile Air Monitoring Laboratory.
- CASA maintains a second website that provides air quality and ecological data for Alberta, known as the Alberta Ambient Air Data Management System (AAADMS). Air monitoring data from the provincial ambient air monitoring network is directed to this location and can be accessed in a number of different formats. This user-friendly site can be accessed at <<http://www.casadata.org>> or through the "Air Quality Data" link on the main CASA website at <<http://www.casahome.org>>.
- There are four existing airshed management zones that have been established under CASA. Airshed management zones are established to deal with air quality issues in a specific region. This includes carrying out air quality monitoring for the region. The existing airshed management zones are the West Central Airshed Society, which covers west central Alberta, the Parkland Airshed Management Zone, which covers central Alberta directly south of the West Central zone, the Wood Buffalo zone, which covers the northeastern area of Alberta, including the Fort McMurray and Fort McKay areas and the Fort Air Partnership Zone, which covers the Fort Saskatchewan region. Information about the monitoring activities and data of these zones can be obtained through the CASA website at <[http://www.casahome.org/airshed\\_zones/Index.asp](http://www.casahome.org/airshed_zones/Index.asp)>, the Alberta Ambient Air Data Management System website at <<http://www.casadata.org/Airsheds22j.htm>>, or by contacting the zones directly as follows:

West Central Airshed Society  
P.O. Box 6360  
Drayton Valley, AB T7A 1R8  
Phone: (780) 514-3533  
Fax: (780) 514-3563  
<http://www.casadata.org/wcas/indexj.htm>

Parkland Airshed Management Zone  
P.O. Box 1020  
Sundre, AB T0X 1X0  
Phone: (403) 238-6640  
Fax: (403) 238-6604  
E-mail: amarok@telusplanet.net  
<<http://www.casadata.org/pamz/indexj.htm>>  
<[http://www.casahome.org/airshed\\_zones/10pamz.htm](http://www.casahome.org/airshed_zones/10pamz.htm)>

Wood Buffalo Zone  
c/o Wood Buffalo Environmental Association  
Box 5567  
Fort McMurray, AB T9H 3G5  
Phone: (780) 799-4420  
Fax: (780) 715-2016  
E-mail: wbea@home.com  
<<http://www.wbea.org>>  
<<http://www.casadata.org/wbea/indexj.htm>>

- Fort Air Partnership Association  
8534 - 100 Avenue  
Fort Saskatchewan, AB T8L 3B5  
Phone: (780) 998-5238  
E-mail: fortair@home.com
- Please note that information on how to access copies of legislation and some guidelines is available in the Basic Legal Requirements fact sheet *Resource List for Legal Matters*, from the background materials.
- *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3.

This Act sets out broad requirements for reporting releases into the environment, including releases of air pollutants. It also provides for the public disclosure of monitoring data and the supporting information necessary to interpret it. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Air Monitoring Directive*

This guideline, published by Alberta Environment, sets out requirements for carrying out source and ambient air monitoring and reporting monitoring results, and includes specific requirements for a number of different industries. There are requirements for both continuous and static ambient monitoring. The guideline also establishes requirements for monthly and annual reports, contravention reports, and release reporting. This guideline can be accessed at:

Alberta Environment  
Library  
6<sup>th</sup> Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 427-5870 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0170  
E-mail: env.library@gov.ab.ca  
<<http://www.augustana.ab.ca/neos/neosevp>>

Print copies of the guideline, which is over 300 pages long, can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

- *Alberta Ambient Air Quality Guidelines*

These guidelines, published by Alberta Environment, set levels for a number of substances for the ambient air in Alberta, including:

- sulfur dioxide;
- hydrogen sulfide;
- nitrogen dioxide;
- carbon monoxide;
- ground level ozone;
- suspended particulates;
- dustfall;
- coefficient of haze (dust and smoke);
- static total sulfation;
- static hydrogen sulfide;
- static fluorides; and

## AIR QUALITY MONITORING Ambient monitoring

- 25 different substances classed as air toxic substances.

A fact sheet on these guidelines can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/ABAmbientAirQuality.pdf>>.

- <<http://www3.gov.ab.ca/env/air/maml/mamlmap.html>>

This Internet site provides information about and the locations of various air quality monitoring stations in Alberta.

- <<http://www.gov.ab.ca/env/air/airqual/IQUAfactsheet.pdf>>

This Internet site provides access to an Alberta Environment fact sheet about the Index of Quality of Air, a means of measuring ambient air quality in Alberta.

- <<http://www.gov.ab.ca/env/air/airqual/MAMLfactsheet.pdf>>

This Internet site provides access to a fact sheet about Alberta Environment's Mobile Air Monitoring Laboratory.

- <<http://www.gov.ab.ca/env/air/maml/flash.html>>

This Internet site provides access to an Alberta Environment home page with detailed information about the department's Mobile Air Monitoring Laboratory.

- <<http://www.gov.ab.ca/env/air/airqual/quart.html>>

This Internet site provides access to quarterly reports on ambient air monitoring carried out by Alberta Environment. The earliest reporting time period that is accessible at this site is January-March 1998.

- <<http://www.gov.ab.ca/env/air/airqual/annual.html>>

This Internet site provides access to annual reports on ambient air quality monitoring carried out by Alberta Environment. Currently, reports for 1994-1996 are available. Print copies of these reports can be obtained from Alberta Environment's Information Centre (contact information above). Print copies of these reports can also be ordered through the Internet; see <<http://www.gov.ab.ca/env/infocentre/publications/airquality.html>> for order numbers for specific reports and for access to the electronic order form.

- <<http://www.gov.ab.ca/env/air/airqual/special.html>>

This Internet site provides access to reports on special air quality surveys carried out by Alberta Environment. These are air monitoring activities carried out by the department in addition to its regular monitoring activities.

# Air Quality Monitoring

---

## Reporting of Monitoring Data

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

Various parties carry out air quality monitoring in Alberta. A number of these parties may be required by law to report their monitoring data, and others voluntarily make their monitoring data publicly available.

### Industrial reporting

#### Reporting under approvals

Industrial operators carry out much of their air monitoring activities to comply with requirements imposed by approvals granted to them under the *Environmental Protection and Enhancement Act*. These approvals also require operators to report their monitoring results to Alberta Environment. Generally, approvals require operators to submit monthly and annual air monitoring reports. The format for these reports is prescribed by the *Air Monitoring Directive*, an Alberta Environment guideline.

As well, approvals generally require industrial operators to report any contravention of the approval or the *Environmental Protection and Enhancement Act* to Alberta Environment. Operators must provide the details of any contravention as part of such a report, which may include relevant monitoring data.

#### Accessibility of monitoring data

Monitoring information submitted to Alberta Environment in compliance with approval requirements can be obtained and reviewed by the public, as provided for in section 33 of the *Environmental Protection and Enhancement Act* and the *Disclosure of Information Regulation*. Section 33 requires that monitoring data provided under an approval and the processing information necessary to interpret that data be made publicly available. The *Disclosure of Information Regulation* requires persons seeking information under section 33 to request the information from the approval holder (industrial operator) first. If the information cannot be obtained from the approval holder, a request for the monitoring information can be made to Alberta Environment.

## Release reporting

Industrial operators, as well as others, are also required to report information related to releases of substances into the environment that cause or may cause an adverse effect. This can include releases of air pollutants. These requirements are imposed by the *Environmental Protection and Enhancement Act* and the *Release Reporting Regulation*, and apply regardless of whether or not there is an approval in effect.

Persons who cause such releases, or have control of the substance that is released, are required to make an immediate oral report about the release to Alberta Environment. Other parties that must be informed of a release include:

- the owner or person having control of the released substance;
- a supervisor or other person whom the person reporting the release reports to in an employment relationship; and
- anyone who may be directly affected by the release.

A subsequent written report is also required under the Act and the *Release Reporting Regulation*. The regulation also provides further details about the types of releases that are to be reported and the content and procedure for submitting written release reports.

## Alberta Environment

Alberta Environment carries out both source and ambient monitoring activities. Section 33 of the *Environmental Protection and Enhancement Act* requires that Alberta Environment make monitoring data created by it under the Act and processing information necessary to interpret that data publicly available.

Some of the Department's air monitoring data is available on the Internet through its home page at <<http://www.gov.ab.ca/env>>. This information is also available in the Departmental library. It is also possible to obtain copies of monitoring information by contacting the Department directly. The Air Quality Monitoring fact sheet *Resource List for Air Quality Monitoring*, from the background materials, provides information on how to contact these sources.

## Other sources

Much of the ambient air monitoring data collected in Alberta is compiled within a central data warehouse operated by the Clean Air Strategic Alliance (CASA). This includes monitoring information provided by Alberta Environment, Environment Canada, industrial associations and the airshed management zones operating under CASA. This central data warehouse is referred to as the Alberta Ambient Air Data Management System (AAADMS). The monitoring information contained in AAADMS is publicly available through the Internet at <<http://www.casadata.org>> and can be accessed in a number of formats.

Airshed monitoring zones under CASA deal with air quality for their specific region and carry out air monitoring within the region. Monitoring data from the zones is directed to the AAADMS; however, it should also be available directly from the zones. Further information on contacting the zones is available in the Air Quality Monitoring fact sheet *Resource List for Air Quality Monitoring*, from the background materials.

## For more information

For further information about the reporting of air quality monitoring data in Alberta, check the following sources.

- The Monitoring Division of Alberta Environment deals with environmental enforcement and monitoring matters on a province-wide basis, and coordinates the department's activities related to source and ambient air monitoring. This division can be contacted at:

Alberta Environment  
Monitoring Division  
11<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 415-9356 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7958

- Alberta Environment has six regional offices for different areas of the province. These regions are responsible for enforcement and monitoring matters at the regional level, and carry out the department's source monitoring program. The regions have staff designated to deal with enforcement and monitoring. To determine the region in which your community is located, contact the regional office closest to your community. The contact information for the regions is listed below, and is also available on the Internet through <<http://www.gov.ab.ca/env/regions.html>>.

Alberta Environment  
Northwest Boreal Region  
2<sup>nd</sup> Floor, Provincial Building  
9621 – 96 Avenue  
Peace River, AB T8S 1T4  
Phone: (780) 624-6330 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 624-6542

Alberta Environment  
Northeast Boreal Region  
111 Twin Atria Building  
4999 - 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 427-7617 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7824

AIR QUALITY MONITORING Reporting of monitoring data

Alberta Environment  
Northern East Slopes Region  
107, 111 – 54 Street  
Edson, AB T7E 1T2  
Phone: (780) 723-8357 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 723-8386

Alberta Environment  
Parkland Region  
3<sup>rd</sup> Floor, Provincial Building  
4920 – 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-7052 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5022

Alberta Environment  
Bow Region  
3<sup>rd</sup> Floor, 2938 – 11 Street NE  
Calgary, AB T2E 7L7  
Phone: (403) 297-7948 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-6069

Alberta Environment  
Prairie Region  
2<sup>nd</sup> Floor Provincial Building  
200 – 5<sup>th</sup> Avenue South  
Lethbridge, AB T1J 4C7  
Phone: (403) 382-5512 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 382-4428

- Alberta Environment maintains telephone numbers in Edmonton and Calgary through which it provides current information on air quality conditions. In Edmonton, call 427-7273 and in Calgary, call 250-2099. Both numbers can be reached toll-free within Alberta by calling 310-0000.
- The Clean Air Strategic Alliance (CASA) maintains a website that provides air quality and ecological data for Alberta, known as the Alberta Ambient Air Data Management System (AAADMS). Air monitoring data from the provincial ambient air monitoring network is directed to this location and can be accessed in a number of different formats. This user-friendly site can be accessed at <<http://www.casadata.org>> or through the “Air Quality Data” link on the main CASA website at <<http://www.casa.home.org>>.
- There are four existing airshed management zones that have been established under CASA. Airshed management zones are established to deal with air quality issues in a specific region. This includes carrying out air quality monitoring for the region. The existing airshed management zones are the West Central Airshed Society, which covers west central Alberta,

the Parkland Airshed Management Zone, which covers central Alberta directly south of the West Central zone, the Wood Buffalo zone, which covers the northeastern area of Alberta, including the Fort McMurray and Fort McKay areas and the Fort Air Partnership Zone, which covers the Fort Saskatchewan region. Information about the monitoring activities and data of these zones can be obtained through the CASA website at <[http://www.casahome.org/airshed\\_zones/Index.asp](http://www.casahome.org/airshed_zones/Index.asp)>, the Alberta Ambient Air Data Management System website at <<http://www.casadata.org/Airsheds22j.htm>>, or by contacting the zones directly as follows:

West Central Airshed Society  
P.O. Box 6360  
Drayton Valley, AB T7A 1R8  
Phone: (780) 514-3533  
Fax: (780) 514-3563  
<<http://www.casadata.org/wcas/indexj.htm>>

Parkland Airshed Management Zone  
P.O. Box 1020  
Sundre, AB T0X 1X0  
Phone: (403) 238-6640  
Fax: (403) 238-6604  
E-mail: amarok@telusplanet.net  
<<http://www.casadata.org/pamz/indexj.htm>>  
<[http://www.casahome.org/airshed\\_zones/10pamz.htm](http://www.casahome.org/airshed_zones/10pamz.htm)>

Wood Buffalo Zone  
c/o Wood Buffalo Environmental Association  
Box 5567  
Fort McMurray, AB T9H 3G5  
Phone: (780) 799-4420  
Fax: (780) 715-2016  
E-mail: wbea@home.com  
<<http://www.wbea.org>>  
<<http://www.casadata.org/wbea/indexj.htm>>

Fort Air Partnership Association  
8534 - 100 Avenue  
Fort Saskatchewan, AB T8L 3B5  
Phone: (780) 998-5238  
E-mail: fortair@home.com

- Please note that information on how to access copies of legislation and some guidelines is available in the Basic Legal Requirements fact sheet *Resource List for Legal Matters*, from the background materials.

## AIR QUALITY MONITORING Reporting of monitoring data

- *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3.

This Act sets out broad requirements for reporting releases into the environment, including releases of air pollutants. It also provides for the public disclosure of monitoring data and the supporting information necessary to interpret it. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Release Reporting Regulation*, A.R. 117/93

This regulation provides the details about the types of releases that must be reported under the *Environmental Protection and Enhancement Act* and the requirements for providing written release reports. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Release Reporting Guideline*

This guideline, published by Alberta Environment, elaborates on the *Release Reporting Regulation* by providing greater detail on the types of releases and amounts of released substances that are reportable under that regulation. This guideline can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/RelRep Guideline.pdf>>.

- *Air Monitoring Directive*

This guideline, published by Alberta Environment, sets out requirements for carrying out source and ambient air monitoring and reporting monitoring results, and includes specific requirements for a number of different industries. There are requirements for both continuous and static ambient monitoring. The guideline also establishes requirements for monthly and annual reports, contravention reports, and release reporting. This guideline can be accessed at:

Alberta Environment  
Library  
6<sup>th</sup> Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 427-5870 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0170  
E-mail: [env.library@gov.ab.ca](mailto:env.library@gov.ab.ca)  
<<http://www.augustana.ab.ca/neos/neosevp>>

Copies of the guideline, which is over 300 pages long, can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 - 108 Street  
Edmonton, AB T5K 2M6  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <<http://www.gov.ab.ca/env/air/airqual/IQUAfactsheet.pdf>>

This Internet site provides access to an Alberta Environment fact sheet about the Index of Quality of Air, a means of measuring ambient air quality in Alberta.

- <<http://www.gov.ab.ca/env/air/airqual/quart.html>>

This Internet site provides access to quarterly reports on ambient air monitoring carried out by Alberta Environment. The earliest reporting time period that is accessible at this site is January-March 1998.

- <<http://www.gov.ab.ca/env/air/airqual/annual.html>>

This Internet site provides access to annual reports on ambient air quality monitoring carried out by Alberta Environment. Currently, reports for 1994-1996 are available. Print copies of these reports can be obtained from Alberta Environment's Information Centre (contact information above). Print copies of these reports can also be ordered through the Internet; see <<http://www.gov.ab.ca/env/info/infocentre/publications/air quality.html>> for order numbers for specific reports and for access to the electronic order form.

- <<http://www.gov.ab.ca/env/air/airqual/special.html>>

This Internet site provides access to reports on special air quality surveys carried out by Alberta Environment. These are air monitoring activities carried out by the department in addition to its regular monitoring activities.



# Air Quality Monitoring

---

## Resource List for Air Quality Monitoring

***NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").***

For more information about air quality monitoring, check the following sources.

### *Alberta Environment*

- The Monitoring Division of Alberta Environment deals with environmental enforcement and monitoring matters on a province-wide basis, and coordinates the department's activities related to source and ambient air monitoring. This division can be contacted at:

Alberta Environment  
Monitoring Division  
11<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 415-9356 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7958

- Alberta Environment has six regional offices for different areas of the province. These regions are responsible for enforcement and monitoring matters at the regional level, and carry out the department's source monitoring program. The regions have staff designated to deal with enforcement and monitoring. To determine the region in which your community is located, contact the regional office closest to your community. The contact information for the regions is listed below, and is also available on the Internet through <<http://www.gov.ab.ca/env/regions.html>>.

Alberta Environment  
Northwest Boreal Region  
2<sup>nd</sup> Floor, Provincial Building  
9621 – 96 Avenue  
Peace River, AB T8S 1T4  
Phone: (780) 624-6330 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 624-6542

AIR QUALITY MONITORING Resource list for air quality monitoring

Alberta Environment  
Northeast Boreal Region  
111 Twin Atria Building  
4999 - 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 427-7617 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7824

Alberta Environment  
Northern East Slopes Region  
107, 111 – 54 Street  
Edson, AB T7E 1T2  
Phone: (780) 723-8357 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 723-8386

Alberta Environment  
Parkland Region  
3<sup>rd</sup> Floor, Provincial Building  
4920 – 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-7052 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5022

Alberta Environment  
Bow Region  
3<sup>rd</sup> Floor, 2938 – 11 Street NE  
Calgary, AB T2E 7L7  
Phone: (403) 297-7948 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-6069

Alberta Environment  
Prairie Region  
2<sup>nd</sup> Floor Provincial Building  
200 – 5<sup>th</sup> Avenue South  
Lethbridge, AB T1J 4C7  
Phone: (403) 382-5512 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 382-4428

- Alberta Environment maintains telephone numbers in Edmonton and Calgary through which it provides current information on air quality conditions. In Edmonton, call 427-7273 and in Calgary, call 250-2099. Both numbers can be reached toll-free within Alberta by calling 310-0000.

*Clean Air Strategic Alliance (CASA)*

- CASA is a non-profit, multi-stakeholder body that carries out strategic management of air quality in Alberta. It is made up of a Board of Directors representing various stakeholders and project teams that address specific air quality issues. CASA has a wide range of information on air quality matters specific to Alberta, including monitoring information. CASA can be contacted at:

9<sup>th</sup> Floor, 9940 – 106 Street  
Edmonton, AB T5K 2N2  
Phone: (780) 427-9793  
Fax: (780) 422-3127  
E-mail: [casa@casahome.org](mailto:casa@casahome.org)  
<<http://www.casahome.org>>

- CASA's website, at <<http://www.casahome.org>>, is a good source of information about Alberta air quality, including monitoring. The site provides information about CASA's projects, including information on the Ambient Monitoring Project at <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/AMOSC.asp](http://www.casahome.org/for_stakeholders/issue_teams/AMOSC.asp)>. Print information on the Ambient Monitoring Project can also be obtained from CASA.
- The Fall 1997 issue of the CASA newsletter *Clean Air Views* (Vol. 6, Issue 2) contains a number of articles related to air quality monitoring in Alberta, including articles about the ambient air monitoring network in Alberta and Alberta Environment's Mobile Air Monitoring Laboratory.
- CASA maintains a second website that provides air quality and ecological data for Alberta, known as the Alberta Ambient Air Data Management System (AAADMS). Air monitoring data from the provincial ambient air monitoring network is directed to this location and can be accessed in a number of different formats. This user-friendly site can be accessed at <<http://www.casadata.org>> or through the "Air Quality Data" link on the main CASA website at <<http://www.casahome.org>>.
- There are four existing airshed management zones that have been established under CASA. Airshed management zones are established to deal with air quality issues in a specific region. This includes carrying out air quality monitoring for the region. The existing airshed management zones are the West Central Airshed Society, which covers west central Alberta, the Parkland Airshed Management Zone, which covers central Alberta directly south of the West Central zone, the Wood Buffalo zone, which covers the northeastern area of Alberta, including the Fort McMurray and Fort McKay areas and the Fort Air Partnership Zone, which covers the Fort Saskatchewan region. Information about the monitoring activities and data of these zones can be obtained through the CASA website at <[http://www.casahome.org/airshed\\_zones/Index.asp](http://www.casahome.org/airshed_zones/Index.asp)>, the Alberta Ambient Air Data Management System website at <<http://www.casadata.org/Airsheds22j.htm>>, or by contacting the zones directly as follows:

AIR QUALITY MONITORING Resource list for air quality monitoring

West Central Airshed Society  
P.O. Box 6360  
Drayton Valley, AB T7A 1R8  
Phone: (780) 514-3533  
Fax: (780) 514-3563  
[<http://www.casadata.org/wcas/indexj.htm>](http://www.casadata.org/wcas/indexj.htm)

Parkland Airshed Management Zone  
P.O. Box 1020  
Sundre, AB T0X 1X0  
Phone: (403) 238-6640  
Fax: (403) 238-6604  
E-mail: amarok@telusplanet.net  
[<http://www.casadata.org/pamz/indexj.htm>](http://www.casadata.org/pamz/indexj.htm)  
[<http://www.casahome.org/airshed\\_zones/10pamz.htm>](http://www.casahome.org/airshed_zones/10pamz.htm)

Wood Buffalo Zone  
c/o Wood Buffalo Environmental Association  
Box 5567  
Fort McMurray, AB T9H 3G5  
Phone: (780) 799-4420  
Fax: (780) 715-2016  
E-mail: wbea@home.com  
[<http://www.wbea.org>](http://www.wbea.org)  
[<http://www.casadata.org/wbea/indexj.htm>](http://www.casadata.org/wbea/indexj.htm)

Fort Air Partnership Association  
8534 - 100 Avenue  
Fort Saskatchewan, AB T8L 3B5  
Phone: (780) 998-5238  
E-mail: fortair@home.com

*Legislation and guidelines*

- Please note that information on how to access copies of legislation and some guidelines is available in the Basic Legal Requirements fact sheet *Resource List for Legal Matters*, from the background materials.
- *Environmental Protection and Enhancement Act, S.A. 1992, c.E-13.3.*

This Act sets out broad requirements for reporting releases into the environment, including releases of air pollutants. It also provides for the public disclosure of monitoring data and the supporting information necessary to interpret it. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Release Reporting Regulation*, A.R. 117/93

This regulation provides the details about the types of releases that must be reported under the *Environmental Protection and Enhancement Act* and the requirements for providing written release reports. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Release Reporting Guideline*

This guideline, published by Alberta Environment, elaborates on the *Release Reporting Regulation* by providing greater detail on the types of releases and amounts of released substances that are reportable under that regulation. This guideline can be accessed on the Internet at <[http://www.gov.ab.ca/env/protenf/publications/RelRep\\_Guideline.pdf](http://www.gov.ab.ca/env/protenf/publications/RelRep_Guideline.pdf)>.

- *Disclosure of Information Regulation*, A.R. 116/93

This regulation sets out the process for accessing information that is publicly available under the *Environmental Protection and Enhancement Act*, including monitoring data and supporting information. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Substance Release Regulation*, A.R. 124/93

This regulation provides limits for specified air emissions and sets out requirements related to visible emissions readings and certification of visible emissions observers. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Alberta Stack Sampling Code*, Publication Number REF. 89, ISBN 0773214062

This code, published by Alberta Environment, sets out procedures for sampling and analysis of air emissions from industrial sources in Alberta, namely stacks. It includes general requirements for stack sampling and analysis of samples, and specifies a number of methods for sampling and analysis in relation to different types of emissions and circumstances. This code can be purchased for \$49.95 from the Queen's Printer bookstores, listed below, or through the Queen's Printer site on the Internet at <<http://www.qp.gov.ab.ca>>.

Queen's Printer Bookstore  
10611 - 98 Avenue  
Main Floor, Park Plaza  
Edmonton, AB T5K-2P7  
Phone: (780) 427-4952 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 452-0668

Queen's Printer Bookstore  
Main Floor, McDougall Centre  
455 – 6 Street S.W.  
Calgary, AB T2P 4E8  
Phone: (403) 297-6251 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-8450

This code can also be accessed at:

Alberta Environment  
Library  
6<sup>th</sup> Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 427-5870 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0170  
E-mail: env.library@gov.ab.ca  
<<http://www.augustana.ab.ca/neos/neosevp>>

- *Continuous Emission Monitoring System Code*

This code, published by Alberta Environment, deals with all major elements of continuous emission monitoring systems, and sets criteria for these systems for design, installation, operations, performance, and quality assurance and control. This code can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/Cems code-98.pdf>>. This code can be obtained in print from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M6  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

It can also be ordered through the Internet at <<http://www.gov.ab.ca/env/info/infocentre/publications/order.html>>. When ordering, quote order number 758-F.

- *Air Monitoring Directive*

This guideline, published by Alberta Environment, sets out requirements for carrying out source and ambient air monitoring and reporting monitoring results, and includes specific requirements for a number of different industries. There are requirements for both continuous and static ambient monitoring. The guideline also establishes requirements for monthly and annual reports, contravention reports, and release reporting. This guideline can be accessed at Alberta Environment's library (contact information above). Print copies of the guideline, which is over 300 pages long, can be obtained from Alberta Environment's Information Centre (contact information above).

- *Manual for Training and Certification of Observers and Evaluation of Visible Emissions, Publication VEE-2/77*

This document, published by Alberta Environment, is the manual specified by the *Substance Release Regulation* for training and certification of visible emissions observers who may

determine the opacity of visible emissions. Observers use this manual, together with a training course, to train in making field evaluations of the opacity of visible emissions and in observing and properly recording all relevant information. The manual also establishes the requirements for certification of observers.

- *Alberta Ambient Air Quality Guidelines*

These guidelines, published by Alberta Environment, set levels for a number of substances for the ambient air in Alberta, including:

- sulfur dioxide;
- hydrogen sulfide;
- nitrogen dioxide;
- carbon monoxide;
- ground level ozone;
- suspended particulates;
- dustfall;
- coefficient of haze (dust and smoke);
- static total sulfation;
- static hydrogen sulfide;
- static fluorides; and
- 25 different substances classed as air toxic substances.

A fact sheet on these guidelines can be accessed on the Internet at <<http://www.gov.ab.ca/env/protnf/approvals/factsheets/ABAmbientAirQuality.pdf>>.

*Internet sites*

- <<http://www.gov.ab.ca/env/air/airqual/monitor.html>>

This site provides general information about air quality monitoring activities carried out by Alberta Environment.

**AIR QUALITY MONITORING** Resource list for air quality monitoring

- <<http://www3.gov.ab.ca/env/air/maml/mamlmap.html>>

This site provides information about air monitoring stations in Alberta.

- <<http://www.gov.ab.ca/env/air/airqual/IQUAfactsheet.pdf>>

This site provides access to an Alberta Environment fact sheet about the Index of Quality of Air, a means of measuring ambient air quality in Alberta.

- <<http://www.gov.ab.ca/env/air/airqual/MAMLfactsheet.pdf>>

This Internet site provides access to a fact sheet about Alberta Environment's Mobile Air Monitoring Laboratory.

- <<http://www.gov.ab.ca/env/air/maml/flash.html>>

This Internet site provides access to an Alberta Environment home page with detailed information about the department's Mobile Air Monitoring Laboratory.

- <<http://www.gov.ab.ca/env/air/airqual/quart.html>>

This site provides access to quarterly reports on ambient air monitoring carried out by Alberta Environment. The earliest reporting time period that is accessible at this site is January-March 1998.

- <<http://www.gov.ab.ca/env/air/airqual/annual.html>>

This site provides access to annual reports on ambient air quality monitoring carried out by Alberta Environment. Currently, reports for 1994-1996 are available. Print copies of these reports can be obtained from Alberta Environment's Information Centre (contact information above). Print copies of these reports can also be ordered through the Internet; see <<http://www.gov.ab.ca/env/info/infocentre/publications/air quality.html>> for order numbers for specific reports and for access to the electronic order form.

- <<http://www.gov.ab.ca/env/air/airqual/special.html>>

This site provides access to reports on special air quality surveys carried out by Alberta Environment. These are air monitoring activities carried out by the department in addition to its regular monitoring activities.

- <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/compuls.html>>

This site gives access to the fact sheet *The Role of Compulsory Industry Monitoring in Alberta's Environmental Regulatory Program*. This fact sheet discusses monitoring that industry is required to carry out under the *Environmental Protection and Enhancement Act* and related legislation, including air quality monitoring.

# Water Quality Monitoring



# Water Quality Monitoring

---

## Introduction to Water Quality Monitoring

**NOTE:** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### The purpose of water quality monitoring

Water quality monitoring may be conducted for several purposes. The main purposes of monitoring are:

- to identify changes or trends in water quality over time;
- to identify specific existing or emerging water quality problems;
- to gather information to design specific pollution prevention or remediation programs, and to determine whether those program goals are being met; and
- to respond to emergencies.

It is important to determine the purpose of your water quality monitoring program. Knowing the purpose of your water quality monitoring program will help to design an appropriate monitoring regime. As well, this determination will help narrow down the water quality parameters that you want to monitor.

### Types of monitoring

To a large extent, the purpose of the water quality monitoring program will determine the appropriate frequency of testing.

#### Fixed station monitoring

This type of monitoring consists of continual monitoring at regular sites. This type of monitoring is especially suited for the identification of changes or trends in water quality over time, and the identification of specific existing or emerging water quality problems. It also assists in determining whether specific pollution prevention or remediation program goals are being met.

## Periodic monitoring

Monitoring may be done on a periodic, rather than continual, basis. Water quality monitoring may be conducted on a seasonal basis, an emergency basis, or to answer specific questions.

## Monitoring parameters

There is no single measure of water quality. Water quality is defined by reference to the physical, chemical and biological content of the water. Water quality varies with season, location and the intended use of the water. A monitoring program should look at physical, chemical and biological factors to obtain a fairly complete picture of the health of the water body.

### Physical parameters

Physical characteristics can be crudely evaluated by using the five senses. Commonly considered physical characteristics are temperature, taste, colour, odour and turbidity of the water. Turbidity is a measurement of the clarity of water; higher turbidity means water is less clear. More accurate measurements of physical characteristics can be made using specialized equipment.

Physical characteristics of the water body itself – such as the condition of the banks and shores, water body width and depth, and bottom materials – should also be monitored. Monitoring of these physical characteristics is important to create a context for the study of the chemical and biological water quality parameters.

### Chemical parameters

Since every substance dissolved in water can be considered a chemical water quality parameter, there are numerous chemical parameters that could be potentially monitored. These chemical water quality parameters include dissolved oxygen, suspended sediments, nutrients, metals, oils and pesticides. The most commonly monitored chemical water quality parameters are pH, alkalinity, dissolved oxygen, phosphorus, nitrates and conductivity.

Direct measurement of toxic substances in water bodies is often expensive. As such, if pollution with toxic substances is a particular concern, the monitoring program should be designed to test for a relevant chemical compound. As well, the location where the compound is likely to accumulate should be identified. This may include the water, sediment, fish tissue or some other location.

### Biological parameters

The biological water quality parameters measure the variety of living organisms that occur in and around the water body. The abundance and variety of organisms can be considered. As well, the ability of organisms to survive in sample water can be considered. The presence of phytoplankton, zooplankton, invertebrates, plants, fish and other organisms may be monitored.

In addition, given the concern associated with infectious organisms in water, a commonly tested biological water quality parameter is *coliform* bacteria. Although not usually dangerous in itself, the presence of *coliform* bacteria can indicate fecal contamination that can be accompanied by infectious organisms.

When designing your water quality monitoring program, consider the overall purpose of monitoring. Knowing the purpose of your water quality monitoring program will help to design an appropriate monitoring regime and to narrow down the water quality parameters that you want to monitor.

In addition, when designing your water quality monitoring program, determine whether there is existing data and information available about the water body you are interested in. By finding this data and information, your water quality monitoring program will avoid duplication and be more effective.

## For more information

For further information about water quality monitoring, check the following sources:

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/water%20Quality.pdf>>

This Internet website provides access to Alberta Environment's document *Focus on Water Quality*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <<http://www.gov.ab.ca/env/water/legislation/index.html>>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

- <<http://www.pnr-rpn.ec.ca/water/science/index.en.html>>

This Internet website, produced by Environment Canada, provides information about water monitoring, science and research.

## **WATER QUALITY MONITORING** Introduction to water quality monitoring

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

- <<http://www.epa.gov/owow/monitoring/index.html>>

This Internet website, produced by the Environmental Protection Agency in the United States, provides information on water quality and water quality monitoring.

- <<http://www.eqb-dqe.cciw.ca>>

This Internet website consists of the Ecological Monitoring and Assessment Network database. The database is currently being established and looks like a promising resource.

- <<http://www.utoronto.ca/envstudy/cew>>

This Internet website, produced by the Citizen's Environment Watch, has a general focus on water quality. It is educational in nature.

# Water Quality Monitoring

---

## Monitoring of Biological Water Quality Parameters

**NOTE:** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### **What are biological water quality parameters?**

Biological water quality parameters measure the variety of living organisms that occur in and around the water body. These parameters consider the abundance and diversity of living organisms. As well, the ability of organisms to survive in sample water is considered. The presence of infectious organisms, phytoplankton, zooplankton, invertebrates, plants, fish and other organisms may be monitored.

Generally, greater species diversity and abundance indicates higher water quality. Changes in water quality will be reflected by changes in the composition, diversity and abundance of species.

### **Benthic invertebrate surveys**

Most water quality monitoring programs include surveys of benthic invertebrates. Benthic invertebrates are aquatic organisms that inhabit the bottom surface or bed of a water body for at least part of their life cycle. Because of their sensitivity to habitat changes, these organisms are used as biological indicators of the physical, chemical and biological conditions of a water body.

A benthic invertebrate survey is conducted by taking samples from the water body. Diversity and abundance is determined by noting the absence or presence of different types of invertibrates at the order level of classification. Alternatively, the number of different types of invertibrates collected at the family level of classification may be noted.

### **Fish surveys**

The concept of fish surveys is similar to that of benthic invertebrate surveys. The abundance and diversity of fish species provides an indication of the quality of water as fish habitat. Generally speaking, a greater level of diversity and abundance of species indicates a higher level of water quality.

## **Plant surveys**

The distribution of plants within a water body provides an indication of water quality. There are five strata of aquatic plant types:

- tall stemmed emergents (emergents are plants that have their roots in shallow water with the stems and leaves above the water);
- short stemmed emergents;
- floating leaved aquatics;
- submersed aquatics; and
- floating plants.

The higher the strata diversity and abundance of aquatic plants, the higher the water quality.

The growth of aquatic plants tends to fall into zonation patterns. The impact or dead zone is characterized by the absence of plants. The primary recovery zone is characterized by the presence of pollution tolerant species, usually tall stemmed emergents. The secondary recovery zone is characterized by the presence of short stemmed emergents. Finally, the tertiary recovery zone is characterized by the presence of submersed aquatic plants.

Direct, visual observation of the zonation patterns along a water body can indicate exposure to pollution. However, caution must be exercised when using this type of monitoring. Several factors, aside from exposure to pollution, can affect the growth of aquatic vegetation. Basic knowledge of typical aquatic vegetation and its tolerance to pollution is required.

Another aspect of aquatic vegetation that should be monitored is the presence of eutrophication. Eutrophication is an excessive growth of aquatic vegetation which choke healthy, productive water bodies and clog waterways. Please refer to *Introduction to Water Matters: Eutrophication* for more information about eutrophication.

## **Chlorophyll a**

The presence of chlorophyll a is sometimes monitored in slow flowing water bodies. Chlorophyll a provides an indication of photosynthetic activity and phytoplankton abundance. Since this analysis requires lab work, it is an expensive biological water quality parameter to monitor.

## **Bacteria**

Given the concern associated with infectious organisms in water, a commonly tested biological water quality parameter is *coliform* bacteria. Although not usually dangerous in themselves, the presence of *coliform* bacteria indicates fecal contamination of the water body. Often, infectious

organisms accompany fecal contamination. Special monitoring equipment is required to test for the presence of *coliform* bacteria.

## For more information

For further information about water quality monitoring, check the following sources:

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <http://www.gov.ab.ca/env/resedu/edu/focuson/water%20Quality.pdf>

This Internet website provides access to Alberta Environment's document *Focus on Water Quality*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <http://www.gov.ab.ca/env/water/legislation/index.html>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

- <<http://www.pnr-rpn.ec.ca/water/science/index.en.html>>

This Internet website, produced by Environment Canada, provides information about water monitoring, science and research.

- <<http://www.pyr.ec.gc.ca/ec/frap/pdf/9709.pdf>>

This Internet website, produced by Environment Canada, provides access to a document entitled *Volunteer-Based Monitoring Program for the Salmon River Basin: Using Benthic Indicators to Assess Stream Ecosystem Health* by J.M. Culp, K.J. Cash and D.B. Halliwell. This document provides information about water quality monitoring using benthic indicators as a biological parameter.

**WATER QUALITY MONITORING** Monitoring of biological water quality parameters

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

- <<http://www.epa.gov/owow/monitoring/index.html>>

This Internet website, produced by the Environmental Protection Agency in the United States, provides information on water quality and water quality monitoring.

- <<http://eqb-dqe.cciw.ca>>

This Internet website consists of the Ecological Monitoring and Assessment Network database. The database is currently being established and looks like a promising resource.

- <<http://www.utoronto.ca/envstudy/cew>>

This Internet website, produced by the Citizen's Environment Watch, has a general focus on water quality. It is educational in nature.

# Water Quality Monitoring

---

## Monitoring of Chemical Parameters

**NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").

### What are chemical water quality parameters?

Since every substance dissolved in water can be considered a chemical water quality parameter, there are numerous chemical parameters that could be potentially monitored. These chemical water quality parameters include suspended sediments, nutrients, metals, oils and pesticides. The most commonly monitored chemical water quality parameters are pH, dissolved oxygen, nitrogen, phosphorus and dissolved solids.

#### pH

The acidity or alkalinity of substances is measured using the pH scale. The scale starts at pH 0 (very acidic) and ends at pH 14 (very alkaline/basic). Neutral substances measure at pH 7. As pH decreases, acidity increases. As pH increases, alkalinity increases.

The pH of a water body is important for several aspects of the aquatic ecosystem. Extreme pH, at either end of the scale, can reduce the water body's ability to support life. As well, changes in pH can affect the drinking quality of water. The acceptable pH for drinking water ranges from 6.5 to 8.5.

The pH of a water body can be easily measured using a litmus paper test. Litmus paper is dipped into a sample of water. The litmus paper turns different colours in accordance with different pH levels.

#### Acidity

Water bodies with a pH less than 7.0 is acidic. Acidic conditions in a water body can have several negative effects on the water quality. Firstly, as water bodies become more acidic the drinking quality and habitat quality of the water is affected. This can reduce the water body's ability to support life and thereby reduce biodiversity.

Secondly, high levels of acidity can attract metals from the surrounding soil and sediment into the water body. Many of these metals are toxic and accumulate in the food chain.

Finally, recent studies suggest that as water bodies acidify and become more transparent, the water bodies become more susceptible to harmful ultraviolet radiation. The radiation can penetrate deeper and harm more species.

## **Alkalinity**

Water with a pH greater than 7.0 is alkaline. Alkalinity provides a measure of the capacity of a water body to neutralize acidic inputs. The alkalinity of a water body corresponds to the concentration of basic ions in the water and is determined by chemical titration.

A water body with high alkalinity is able to buffer the effects of acidic inputs. Conversely, a water body with low alkalinity is very sensitive to acidic inputs. This means that low alkaline water bodies experience great pH fluctuations that disrupt aquatic life.

In general, the Alberta soil and bedrock is alkaline and, therefore, can neutralize the effects of acidic pollutants. However, some areas of Northern Alberta are more sensitive to acidic inputs.

## **Dissolved oxygen**

The level of dissolved oxygen in water bodies is a commonly monitored chemical water quality parameter. This is an especially important measurement in deep, slow-flowing water bodies.

The levels of dissolved oxygen in drinking water have no direct effects on human health. However, dissolved oxygen is an important factor for the quality of water as habitat for aquatic organisms. Low oxygen conditions can kill fish and other species resulting in a change in species composition of the water body.

The level of dissolved oxygen in a water body is dependent upon several factors. This include temperature, salinity, turbulence and atmospheric pressure (which decreases with increased altitude). As well, the presence of water pollution may also result in lower levels of dissolved oxygen. For instance, the levels of dissolved oxygen can be affected by thermal pollution (see *Introduction to Water Matters, Thermal Pollution*) or by eutrophication (see *Introduction to Water Matters, Eutrophication*).

The concept of biological oxygen demand (BOD) is relevant to the low levels of dissolved oxygen in polluted water bodies. BOD is a measure of the amount of dissolved oxygen required by bacteria to decompose organic matter in water. The BOD of a substance must be tested in a laboratory. A water sample is saturated with oxygen and left to sit for five days. A more polluted sample will have a higher BOD and will use more dissolved oxygen.

## **Nitrogen**

Nitrogen can be present in water bodies in several forms - nitrite, nitrate or ammonia. The presence of high levels of nitrogen can indicate contamination by fertilizers, animal wastes or human sewage. Since nitrogen is a limiting nutrient for plant growth in many water bodies, the

input of nitrogen can cause eutrophication of the water body (see *Introduction to Water Matters, Eutrophication*).

The concentration of nitrites and nitrates can be measured in the field by using colour comparators and field colourimeters. Alternatively, filtered samples can be sent to a laboratory for more precise analysis.

The concentration of ammonia can be measured with field tests using Nesslerization. Nesslerization is a testing technique which uses a prepared compound called Nessler's Reagent. Nessler's Reagent forms a coloured complex with ammonia present in a water sample. The complex is detected by a change in the water sample's colour. Alternatively, filtered samples can be sent to a laboratory for more precise analysis.

## **Phosphorus**

The presence of high levels of phosphorus can indicate contamination by fertilizers, animal wastes or sewage. Since phosphorus is a limiting nutrient for plant growth in many water bodies, the input of phosphorus can cause eutrophication of the water body (see *Introduction to Water Matters, Eutrophication*). The presence of phosphorus can be measured using field tests or by sending samples to a laboratory.

## **Dissolved solids**

There are three measurements that relate to the level of dissolved solids in a water body. These are conductivity, salinity and hardness.

### **Conductivity**

Conductivity measures the ability of water to conduct an electrical current. The conductivity of water indicates the presence of dissolved salts. As the concentration of dissolved salts increases, the conductivity of the water increases.

Conductivity specifically indicates the presence of chloride, nitrate, sulfate, phosphate, sodium, magnesium, calcium and iron ions. A water body with high conductivity may have an excessive level of any of these substances.

### **Salinity**

In freshwater areas, moderately saline water bodies have been associated with an enhanced risk of botulism and cholera in birds. While there is no clear causal link between these diseases and salinity, there is a long-standing association between the two.

The salinity of a water body can be measured using a hydrometer or a conductivity meter. As well - since an increased concentration of chloride ions means excessive salinity in freshwater - tests for the presence of chloride may be used. The presence of chloride can be measured with

potassium chromate titration or mercuric nitrate titration. Titration is an experimental technique in which a certain volume of a compound solution is added to a water sample until a colour change is observed.

## Hardness

Hardness is a measure of the amount of calcium and magnesium ions dissolved in a body of water. Hardness is an important chemical water quality parameter because of its buffering effects on water toxics. For example, a water body with high hardness is less susceptible to the effects of heavy metals and acid deposition.

The hardness of a water body is measured by using ethylenediaminetetraacetic acid (“EDTA”) titration. EDTA forms coloured complexes with many metals.

## Water Toxics

Direct measurement of toxic substances in water bodies is often expensive. As such, if pollution with toxic substances is a particular concern, the monitoring program should be designed to test for a relevant chemical compound. As well, the location where the compound is likely to accumulate should be identified. This may include the water, sediment, fish tissue or some other location.

The methods used for detecting and measuring toxic substances are varied. The appropriate method will depend upon the toxic substance of concern and upon the organism reaction of concern. A possible method for detecting and measuring toxic substance is to use bioassays. A bioassay is a test in which the strength or concentration of a toxic substance is determined by a living organism’s reaction. For example, the LC50 may be calculated. The LC50 is the concentration of a substance that is lethal for 50% of the exposed individuals.

## For more information

For further information about water quality monitoring, check the following sources:

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/water%20Quality.pdf>>

This Internet website provides access to Alberta Environment’s document *Focus on Water Quality*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

- <<http://www.gov.ab.ca/env/water/legislation/index.html>>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

- <<http://www.pnr-rpn.ec.ca/water/science/index.en.html>>

This Internet website, produced by Environment Canada, provides information about water monitoring, science and research.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

- <<http://www.epa.gov/owow/monitoring/index.html>>

This Internet website, produced by the Environmental Protection Agency in the United States, provides information on water quality and water quality monitoring.

- <<http://eqb-dge.cciw.ca>>

This Internet website consists of the Ecological Monitoring and Assessment Network database. The database is currently being established and looks like a promising resource.

- <http://www.utoronto.ca/envstudy/cew>

This Internet website, produced by the Citizen's Environment Watch, has a general focus on water quality. It is educational in nature.



# Water Quality Monitoring

---

## Monitoring of Physical Water Quality Parameters

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### What are physical water quality parameters?

Physical characteristics can be crudely evaluated by using the five senses. Commonly considered physical characteristics are temperature, taste, colour, odour and turbidity of the water. More accurate measurements of physical characteristics can be made using specialized equipment.

Physical characteristics of the water body itself – such as the condition of the banks and shores, water body width and depth, and bottom materials – should also be monitored. Monitoring of these physical characteristics is important to create a context for the study of the chemical and biological water quality parameters.

There are several physical water quality parameters that are commonly used in monitoring programs:

- watershed monitoring;
- water depth;
- flow rate;
- temperature;
- colour; and
- turbidity.

### Watershed monitoring

A watershed is the area of land that catches precipitation and that drains or seeps into a marsh, stream, river, lake or groundwater. In other words, it is the region that drains into a water body. Watershed monitoring consists of careful observation of the region surrounding the particular water body of interest to you.

## **WATER QUALITY MONITORING** Monitoring of physical water quality parameters

Watershed monitoring is used to assess the general status of the water body. Physical characteristics of the water body itself – such as the condition of the banks and shores, water body width and depth, and bottom materials – are monitored.

In addition, potential sources of pollution along the water body are monitored. This may include an inventory of feedlots, construction sites, industrial effluent discharge sites, sewage discharge sites and so forth.

The process of watershed monitoring provides a context for the monitoring of physical, chemical and biological water quality parameters. In addition, it can provide information about potential sources of pollution aside from the industrial facility that might be of particular concern.

### **Water depth**

Water depth can be determined easily and inexpensively by using a secchi disk. The secchi disk is lowered into the water body using a pre-measured rope. Depth is noted at the point when the secchi disk disappears from sight.

Again, this information helps to create the context for monitoring of water quality parameters. In particular, the water depth is relevant to submerged aquatic vegetation habitat and to sediment impacts.

### **Rainfall**

Rainfall can be monitored with a rain gauge and historical data. Alternatively, information regarding rainfall is collected by Alberta Environment in its hydrometeorological database which is accessible on the Internet.

Information about rainfall can be used to identify storm events that may cause temporary changes in water quality. As well, alterations in water quality may be associated with seasonal changes in rainfall.

### **Flow rate**

The flow rate of a water body is the amount of water flowing in a creek, stream, ravine or river per unit of time. The flow rate depends upon several factors including precipitation, watershed size, watershed soil type and groundwater discharge. Information about flow rates for certain water bodies is collected by Alberta Environment in its hydrometeorological database which is accessible on the Internet.

The flow rate of a water body is associated with its ability to cleanse itself of pollutants. In rivers and streams, the flow rate is high allowing the water to cleanse itself. This purging effect is useless, however, if the supply of pollutants is constant or spread evenly along the banks of the water body. A standing system, such as a lake, does not have the same capacity to cleanse itself. The water does not flow quickly and, as such, replacement of the water can take many years.

## **Temperature**

Temperature of the water and surrounding air is a suitable parameter for all monitoring programs. Water temperature is an important factor affecting the quality of water as habitat for aquatic organisms. The growth and activity of aquatic organisms are greatly affected by water temperature.

## **Colour**

In considering water quality monitoring, there are two types of colour measurements:

- true colour is a measure of dissolved coloring compounds in the water; and
- apparent colour is influenced by suspended material in the water.

Colour is not generally considered a serious environmental concern. However, the colour of water may limit its usefulness for domestic, industrial and recreational purposes. As well, colour may interfere with the passage of light through the water body. As a result, photosynthesis by aquatic plants may be reduced resulting in a less productive water body.

## **Turbidity**

Turbidity is a measure of the clarity of water – the higher the turbidity, the less clear the water. Turbidity is created by the presence of suspended solids such as clay, salt, organic matter, plankton and microscopic organisms in water. Suspended solids can be introduced into a water body by natural erosion, runoff and algal blooms.

Because clarity determines the extent to which light penetrates a water body, excessive turbidity can create problems. Reduced light penetration results in reduced photosynthetic activity that, in turn, may reduce the growth of fish and other aquatic organisms. As well, reduced light penetration may result in reduced water temperature that can negatively affect aquatic organisms. A high concentration of suspended solids may limit the usefulness of water for consumption.

## **For more information**

For further information about water quality monitoring, check the following sources:

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/water%20Quality.pdf>>

This Internet website provides access to Alberta Environment's document *Focus on Water Quality*. Print copies of this document can be obtained from:

**WATER QUALITY MONITORING** Monitoring of physical water quality parameters

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

- <<http://www.gov.ab.ca/env/water/legislation/index.html>>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

- <<http://www.pnr-rpn.ec.ca/water/science/index.en.html>>

This Internet website, produced by Environment Canada, provides information about water monitoring, science and research.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

- <<http://www.epa.gov/owow/monitoring/index.html>>

This Internet website, produced by the Environmental Protection Agency in the United States, provides information on water quality and water quality monitoring.

- <<http://www.eqb-dqe.cciw.ca>>

This Internet website consists of the Ecological Monitoring and Assessment Network database. The database is currently being established and looks like a promising resource.

- <<http://www.utoronto.ca/envstudy/cew>>

This Internet website, produced by the Citizen's Environment Watch, has a general focus on water quality. It is educational in nature.

- D.D. Chiras, *Environmental Science: Action for a Sustainable Future*, 4<sup>th</sup> ed. (1994: Benjamin/Cummings Publishing Company, Inc.)

Chapter 17 of this textbook provides an overview of the common types of water pollution.



# Water Quality Monitoring

---

## Reporting of Monitoring Data

**NOTE:** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

## Who does water quality monitoring in Alberta?

In Alberta, water quality monitoring is conducted by industrial facilities and by the Alberta government. Often the water quality monitoring conducted by the Alberta government is done in co-operation with other governments or other organizations.

In addition, there may be volunteer organizations that conduct water quality monitoring in your region (see *Background Materials, Your Involvement in Air and Water Quality Monitoring and Enforcement* ).

## Water quality monitoring by industrial facilities

Monitoring by industrial facilities - including water quality monitoring - is a key element of Alberta's environmental regulatory regime. Industrial facilities are required to conduct monitoring either by the terms of their approvals or by applicable codes of practice issued pursuant to the *Environmental Protection and Enhancement Act*. Enforcement actions are used by the provincial government to ensure compliance with these monitoring requirements.

With respect to water quality, an industrial facility may be required to conduct several types of monitoring. These may include:

- wastewater and stormwater releases;
- groundwater quality;
- drinking water quality;
- surface water quality; and
- general environmental effects.

## WATER QUALITY MONITORING Reporting of monitoring data

The monitoring requirements are tailored for each industrial operation based on the emissions generated by that operation. The ultimate intent is to require monitoring of all emission sources of environmental significance, and of the components of the environment that may be impacted by the industrial facility.

Both approvals and codes of practice specify many aspects of the monitoring requirements. These may include:

- monitoring or sampling locations;
- frequency of monitoring or sampling;
- parameters to be measured;
- monitoring methods;
- sampling methods;
- analytical methods; and
- recording, record-keeping and reporting of monitoring data.

The extent and frequency of monitoring that must be done by an industrial facility varies. Several factors are considered when incorporating these requirements into an approval. These factors include:

- type of treatment process;
- retention time;
- environmental significance and nature of the substance;
- need for baseline river information;
- cost and benefit of monitoring relative to the operator's capabilities; and
- compliance history.

The frequency of monitoring may be reduced or eliminated once there is sufficient data to establish and characterize a database with a high degree of confidence. Conversely, as a result of new environmental findings or deteriorating performance, the frequency of monitoring may be increased or additional substances may be subject to monitoring.

Reliable monitoring data must be provided by industrial facilities to ensure compliance with performance requirements and to verify the general environmental performance of an industrial

operation. As such, the Alberta government has developed specific monitoring protocols to ensure that the monitoring conducted by industrial facilities is reliable. There are many examples of these quality control and quality assurance protocols including:

- *Guidelines for Conducting Toxicity Testing on Wastewaters*; and
- *Interim Guidelines and Specifications for Preparing On-Site Quality Assurance/Quality Control Plans for Alberta Industry Sampling and Analysis*.

Generally, monitoring data is generated by industrial facilities to meet their legal requirements. Section 33 of the *Environmental Protection and Enhancement Act* provides that information generated under the act is publicly available. This includes monitoring data submitted to Alberta Environment by industrial facilities. If necessary, the *Freedom of Information and Protection of Privacy Act* provides a means for citizens to obtain information that is held by the provincial government.

## **Water quality monitoring by the Alberta government**

In addition to the mandatory monitoring conducted by industrial facilities pursuant to their approvals, water monitoring is conducted by Alberta Environment. Water monitoring data is collected to support Alberta Environment's regulatory, water management and environmental assessment functions.

Alberta Environment, often in co-operation with other governments or other organizations, conducts many water monitoring programs. There are two types of water monitoring conducted by Alberta Environment:

- hydrometeorological data collection; and
- water quality monitoring.

### **Hydrometeorological data collection**

Alberta Environment's hydrometeorological data is collected by a hydrometric network and by a meteorological network. The hydrometric network measures streamflow, lake levels and sediment data. The hydrometric network consists of a long-term network of over 500 recording stations and a short-term network of about 300 recording stations.

The meteorological network collects climate data such as precipitation, temperature, wind speed and solar radiation. This network consists of over 100 climate stations. In addition, this network is supplemented by a snow survey network to measure the depth and water content of snow cover. As well, Alberta Environment has a high water-mark data collection program which supplements streamflow measurements during a flood and provides a record of the extent of flooding.

## WATER QUALITY MONITORING Reporting of monitoring data

The hydrometeorological data collected by Alberta Environment may be accessed on the Internet at <<http://www.gov.ab.ca/env/water/legislation/index.html>> or by contacting Alberta Environment's Information Centre.

### Water quality monitoring

Alberta Environment also has several programs for monitoring water quality in Alberta. These include the AESA Stream Survey, Long-Term River Network, Medium-Term River Network and Provincial Park Lakes Sampling Program.

The AESA (Alberta Environmentally Sustainable Agriculture) Stream Survey Program was initiated in 1997. This program is sponsored by several partners: Alberta Agriculture, Alberta Environment, Alberta Health and Wellness and the Prairie Farm Rehabilitation Administration. The program is directed by the AESA Council, a broad-based group composed of many stakeholders.

The objective of the AESA Program is to track trends in water quality as agricultural practices change. The AESA Program involves long-term monitoring of 23 small, agricultural streams that represent a variety of agricultural intensity, runoff potential and ecoregions. Several water quality parameters are monitored including nutrient levels, fecal coliform and *e. coli* bacteria and about 40 pesticides. Data regarding topography and land cover is also being collected in the AESA program.

The data collected by the AESA Program is kept by the Water Sciences Branch of Alberta Environment and can be obtained by contacting Alberta Environment's Information Centre.

Information generated by the AESA Program - which is more user-friendly than raw data - can be obtained by contacting Alberta Agriculture. The information generated by the AESA Program includes technical reports, five year summary reports, annual summary reports and water quality index scores.

Another water quality monitoring program, the Long-Term River Network (LTRN), is designed to obtain ongoing data on major rivers in Alberta. The data collected is used to document existing conditions, to assess long-term trends and to assess impacts on the water basin. The LTRN consists of 23 stations that are sampled at monthly intervals. Various water quality parameters, including the presence of pesticides, are monitored.

The Medium-Term River Network (MTRN) has the same purpose as the LTRN. However, it was established more recently in response to specific needs and issues.

The purpose of the Provincial Park Lakes Sampling Program (PPLSP) is to obtain long-term monitoring or baseline data for important recreational lakes. The PPLSP involves 30 to 35 lake basins sampled approximately monthly. Several water quality parameters, including nitrogen and chlorophyll a, are monitored by this program.

There are many other water quality monitoring programs conducted by Alberta Environment in particular water bodies or in response to particular concerns. Information about water quality programs and the data collected can be obtained by contacting Alberta Environment's Information Centre.

In addition, numerous water quality reports have been completed by the Water Sciences Branch of Alberta Environment. These also can be obtained by contacting Alberta Environment's Information Centre.

## **For more information**

To obtain water quality monitoring data from Alberta Environment, check the following sources:

- Information about water quality programs and the data collected can be obtained by contacting Alberta Environment's Information Centre. In addition, numerous water quality reports have been completed by the Water Sciences Branch of Alberta Environment. These also can be obtained by contacting Alberta Environment's Information Centre.

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

- For information about the Alberta Environmentally Sustainable Agriculture (AES) Stream Survey Program, contact Alberta Agriculture. The information generated by the AESA Program includes technical reports, five year summary reports, annual summary reports and water quality index scores.

Sustainable Agriculture, Conservation & Development Branch  
Alberta Agriculture, Food and Rural Development  
206, 7000 - 113 Street  
Edmonton, AB T6H 5T6  
Phone: (780) 422-4385  
Fax: (780) 422-0474

- <<http://www.gov.ab.ca/env/water/legislation/index.html>>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

## WATER QUALITY MONITORING Reporting of monitoring data

For further information about water quality monitoring, check the following sources:

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/water%20Quality.pdf>>

This Internet website provides access to Alberta Environment's document *Focus on Water Quality*. Print copies of this document can be obtained from Alberta Environment's Information Centre (contact information above).

- <<http://www.gov.ab.ca/env/info/infocentre/publisting.cfm>>

This Internet website, produced by Alberta Environment, provides access to publications relating to industrial wastewater. The *Guidelines for Conducting Toxicity Testing on Wastewaters and Interim Guidelines and Specifications for Preparing On-Site Quality Assurance/Quality Control Plans for Alberta Industry Sampling and Analysis* can be viewed at this site. Print copies can be obtained from:

Alberta Environment

Information Centre

Main Floor, 9920-108 Street

Edmonton, AB T5K 2M4

Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)

Fax: (780) 427-4407

E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <<http://www.gov.ab.ca/env/protenf/standards/index.html>>

This Internet website, produced by Alberta Environment, provides access to guidelines relating to environmental protection and enforcement of the *Environmental Protection and Enhancement Act*. It includes access to documents such as the *Water Quality Based Effluent Limits Procedures Manuals*. Print copies of these publications can be obtained from Alberta Environment's Information Centre (contact information above).

- <<http://www.pnr-rpn.ec.ca/water/science/index.en.html>>

This Internet website, produced by Environment Canada, provides information about water monitoring, science and research.

- <<http://eqb-dqe.cciw.ca>>

This is the Internet website of the Ecological Monitoring and Assessment Network (“EMAN”). EMAN is a national alliance of government, academic and private sector biologists, ecologists, soil scientists, hydrologists, climatologists and citizen volunteers.

EMAN was established in 1994 by Environment Canada. It intends to foster information sharing and collaboration among disciplines and jurisdictions involved in long-term ecological monitoring.

- <<http://www.geocities.com/RainForest/Vines/4301/links.html>>

This is the Internet website for the Waterose Aquatic Ecology of Links Index Page. There are links to organizations and biological stations, general aquatic information sites, general biology and ecology sites, and other sites.



# Water Quality Monitoring

---

## Resource List for Water Quality Monitoring

***NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").***

### *Water Quality Monitoring Data*

Information about water quality programs and the data collected can be obtained by contacting Alberta Environment's Information Centre. In addition, numerous water quality reports have been completed by the Water Sciences Branch of Alberta Environment. These also can be obtained by contacting Alberta Environment's Information Centre.

- Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

For information about the Alberta Environmentally Sustainable Agriculture (AES) Stream Survey Program, contact Alberta Agriculture. The information generated by the AES Program includes technical reports, five year summary reports, annual summary reports and water quality index scores.

- Sustainable Agriculture, Conservation and Development Branch  
Alberta Agriculture, Food and Rural Development  
206, 7000 - 113 Street  
Edmonton, AB T6H 5T6  
Phone: (780) 422-4385 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0474
- <http://www.gov.ab.ca/env/water/legislation/index.html>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

## WATER QUALITY MONITORING Resource list for water quality monitoring

### *Water Quality Monitoring*

- <<http://www.gov.ab.ca/env/water.html>>

This Internet website, produced by Alberta Environment, provides general background information about water.

- <<http://www.gov.ab.ca/env/resedu/edu/focuson/water%20Quality.pdf>>

This Internet website provides access to Alberta Environment's document *Focus on Water Quality*. Print copies of this document can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- <<http://www.pnr-rpn.ec.ca/water/science/index.en.html>>

This Internet website, produced by Environment Canada, provides information about water monitoring, science and research.

- <<http://www.pyr.ec.gc.ca/ec/frap/pdf/9709.pdf>>

This Internet website, produced by Environment Canada, provides access to a document entitled *Volunteer-Based Monitoring Program for the Salmon River Basin: Using Benthic Indicators to Assess Stream Ecosystem Health* by J.M. Culp, K.J. Cash and D.B. Halliwell. This document provides information about water quality monitoring using benthic indicators as a biological parameter.

- <[http://www.ec.gc.ca/envpriorities/cleanwater\\_e.htm](http://www.ec.gc.ca/envpriorities/cleanwater_e.htm)>

This Internet website, produced by Environment Canada, provides general background information about water.

- <<http://www.ec.gc.ca/water/index.htm>>

This Internet website, produced by Environment Canada, provides general background information about water and water pollution.

- <<http://www.cciw.ca/nwri/intro.html>>

This is the National Water Research Institute (Canada) Internet website. This contains technical and scientific publications about water.

- <<http://www.epa.gov/owow/monitoring/index.html>>

This Internet website, produced by the Environmental Protection Agency in the United States, provides information on water quality and water quality monitoring.

- <<http://eqb.dqe.cciw.ca>>

This is the Internet website of the Ecological Monitoring and Assessment Network (“EMAN”). EMAN is a national alliance of government, academic and private sector biologists, ecologists, soil scientists, hydrologists, climatologists and citizen volunteers. EMAN was established in 1994 by Environment Canada. It intends to foster information sharing and collaboration among disciplines and jurisdictions involved in long-term ecological monitoring.

- <<http://www.utoronto.ca/envstudy/cew>>

This Internet website, produced by the Citizen’s Environment Watch, has a general focus on water quality. It is educational in nature.

- *Save our Streams Monitors’ Guide to Aquatic Macroinvertebrates*

This document, written by L. Larkin Kellogg in 1994, can be ordered by contacting:

Save our Streams Program  
Catalog Orders  
Izaak Walton League of America  
707 Conservation Lane  
Guithersburg, MD 20878  
Phone: (800) 284-4952  
<<http://www.iwla.org/iwlastore/index.htm>>



# Air and Water Quality Monitoring



# Air and Water Quality Monitoring

---

## Tips on Reading and Understanding Monitoring Information

***NOTE:*** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

As you may have determined from the materials in this package, there are a number of sources for obtaining monitoring information. The following notes provide you with some suggestions to assist you in reading and understanding air monitoring information.

### **Measurement matters**

One of the first things you will want to check in reviewing monitoring data is the various units of measurement related to the data. This may include a time element; for example, continuous monitoring data may be presented in a chart showing the levels or concentrations on an hourly basis for the 24-hour clock. For continuous monitoring, the figures provided may be the result of averaging readings over a particular time period, such as one, eight or twenty-four hour periods.

The unit of measurement used in relation to the monitoring data is very relevant. This is often parts per million ("ppm") of a substance, and should be indicated as part of the data report or summary. If you are comparing monitoring data with regulated levels or concentrations, be sure that you are looking at the same unit of measurement for both. If the units of measurement used differ, find out what the conversion factor is and adjust the data, or ask for help in doing so.

### **Notes and other helpful stuff**

You should carefully review the monitoring information and the report or other format in which it is presented. It may include notes or other information that will be helpful to you in understanding the monitoring data. Examples of this include explanations of abbreviations used in the data or descriptions of the method for calculating data figures. There may also be information about the amount of time the monitoring equipment was operational during the monitoring period, which can be relevant in determining what weight to give the monitoring results.

Some sources of monitoring information include information that may assist you in reviewing and understanding the data. For example, the Alberta Ambient Air Data Management System (AAADMS) site provides options to access ambient air monitoring data in a variety of formats.

Visitors to this Internet site at <<http://www.casadata.org>> can also view samples of different information formats available on the site.

Alberta Environment provides its air monitoring information in straightforward formats in its quarterly reports, including a summary of the information highlights, and charts and tables related to concentrations, instances where limits were exceeded and the index of the quality of air.

## **So what does it all mean?**

One way that you can try to put the monitoring data you are reviewing into context is to compare the monitoring results to the regulated limits. As mentioned above, if you are doing this, be sure that the figures you are comparing are based on the same units of measurement.

You can find regulated limits that relate to source monitoring data in approvals issued under the *Environmental Protection and Enhancement Act* and in the *Substance Release Regulation*. Copies of approvals can be obtained from Alberta Environment's Regulatory Approval Centre in Edmonton. Limits related to ambient monitoring data can be found in the *Alberta Ambient Air Quality Guidelines*, which are published by Alberta Environment.

## **For more information**

For further information check the following sources.

- The Monitoring Division of Alberta Environment deals with monitoring matters on a province-wide basis, and coordinates the department's activities related to source and ambient air monitoring. This division can be contacted at:

Alberta Environment  
Monitoring Division  
11<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 415-9356 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7958

- Alberta Environment has six regional offices for different areas of the province. These regions are responsible for enforcement and monitoring matters at the regional level, and carry out the department's source monitoring program. The regions have staff designated to deal with enforcement and monitoring. To determine the region in which your community is located, contact the regional office closest to your community. The contact information for the regions is listed below, and is also available on the Internet through <<http://www.gov.ab.ca/env/regions.html>>.

Alberta Environment  
Northwest Boreal Region  
2<sup>nd</sup> Floor, Provincial Building  
9621 – 96 Avenue  
Peace River, AB T8S 1T4  
Phone: (780) 624-6330 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 624-6542

Alberta Environment  
Northeast Boreal Region  
111 Twin Atria Building  
4999 - 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 427-7617 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7824

Alberta Environment  
Northern East Slopes Region  
107, 111 – 54 Street  
Edson, AB T7E 1T2  
Phone: (780) 723-8357 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 723-8386

Alberta Environment  
Parkland Region  
3<sup>rd</sup> Floor, Provincial Building  
4920 – 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-7052 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5022

Alberta Environment  
Bow Region  
3<sup>rd</sup> Floor, 2938 – 11 Street NE  
Calgary, AB T2E 7L7  
Phone: (403) 297-7948 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-6069

Alberta Environment  
Prairie Region  
2<sup>nd</sup> Floor Provincial Building  
200 – 5<sup>th</sup> Avenue South  
Lethbridge, AB T1J 4C7  
Phone: (403) 382-5512 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 382-4428

- Information about water quality programs and the data collected can be obtained by contacting Alberta Environment's Information Centre. In addition, numerous water quality reports have been completed by the Water Sciences Branch of Alberta Environment. These also can be obtained by contacting Alberta Environment's Information Centre.

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: env.infocent@gov.ab.ca

- For information about the Alberta Environmentally Sustainable Agriculture (AES) Stream Survey Program, contact Alberta Agriculture. The information generated by the AESA Program includes technical reports, five year summary reports, annual summary reports and water quality index scores.

Sustainable Agriculture, Conservation & Development Branch  
Alberta Agriculture, Food and Rural Development  
206, 7000 - 113 Street  
Edmonton, AB T6H 5T6  
Phone: (780) 422-4385  
Fax: (780) 422-0474

- The Clean Air Strategic Alliance (CASA) maintains a website that provides air quality and ecological data for Alberta, known as the Alberta Ambient Air Data Management System (AAADMS). Air monitoring data from the provincial ambient air monitoring network is directed to this location and can be accessed in a number of different formats. The site will let you look at samples of the different formats to help you decide what format you need (see "Data Reports" and then "Report Description" on the website). This user-friendly site can be accessed at <<http://www.casadata.org>> or through the "Air Quality Data" link on the main CASA website at <<http://www.casa.home.org>>.
- Please note that information on how to access copies of legislation and some guidelines is available in the Basic Legal Requirements fact sheet *Resource List for Legal Matters*, from the background materials.
- *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3.

This Act sets out broad requirements for reporting releases into the environment, including releases of air pollutants. It also provides for the public disclosure of monitoring data and the supporting information necessary to interpret it. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Substance Release Regulation*, A.R. 124/93

This regulation provides limits for specified air emissions and sets out requirements related to visible emissions readings and certification of visible emissions observers. It can be accessed on the Internet at <<http://www.qp.gov.ab.ca>>.

- *Alberta Ambient Air Quality Guidelines*

These guidelines, published by Alberta Environment, set levels for a number of substances for the ambient air in Alberta, including:

- sulfur dioxide;
- hydrogen sulfide;
- nitrogen dioxide;
- carbon monoxide;
- ground level ozone;
- suspended particulates;
- dustfall;
- coefficient of haze (dust and smoke);
- static total sulfation;
- static hydrogen sulfide;
- static fluorides; and
- 25 different substances classed as air toxic substances.

A fact sheet on these guidelines can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/ABAmbientAirQuality.pdf>>.

- <<http://www.gov.ab.ca/env/air/airqual/IQUAfactsheet.pdf>>

This Internet site provides access to an Alberta Environment fact sheet about the Index of Quality of Air, a means of measuring ambient air quality in Alberta.

- <<http://www.gov.ab.ca/env/air/airqual/quart.html>>

This Internet site provides access to quarterly reports on ambient air monitoring carried out by Alberta Environment. The earliest reporting time period that is accessible at this site is January-March 1998.

- <<http://www.gov.ab.ca/env/air/airqual/annual.html>>

This Internet site provides access to annual reports on ambient air quality monitoring carried out by Alberta Environment. Currently, reports for 1994-1996 are available. Print copies of these reports can be obtained from Alberta Environment's Information Centre (contact information above). Print copies of these reports can also be ordered through the Internet; see <<http://www.gov.ab.ca/env/info/infocentre/publisting.cfm>> for order numbers for specific reports and for access to the electronic order form.

- <<http://www.gov.ab.ca/env/air/airqual/special.html>>

This Internet site provides access to reports on special air quality surveys carried out by Alberta Environment. These are air monitoring activities carried out by the department in addition to its regular monitoring activities.

- <<http://www.gov.ab.ca/env/water/legislation/index.html>>

This Internet site, produced by Alberta Environment, provides access to hydrometeorological data collected by Alberta Environment throughout the province.

# Basic Legal Requirements



# Basic Legal Requirements

---

## Introduction to the Canadian Legal System

**NOTE:** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### Where do our laws come from?

Current Canadian law comes from a number of sources. One way of distinguishing between types of Canadian law is to compare common law, also known as case law, and statute law.

#### Common law

Common law is the case law that is created by judges making decisions in legal matters. Common law originated in England and was made applicable in all areas of Canada, other than Quebec, with the adoption of the English legal system when Canada was formed as a country in 1867. The civil law system, which was adopted from the French model, applies in the province of Quebec.

The concept of precedent is key to understanding the common law. This concept means that Canadian courts are required to follow previous related decisions, referred to as principles, made by a court at the same level or a higher level when reaching a judgment on a matter before it. This concept is intended to ensure consistency in the application of the law by all courts.

Decisions made by courts can modify existing principles established by the common law. However, new principles in law or significant changes to precedent must be made by the enactment of a new law, known as a statute, by the federal Parliament or a provincial legislature.

#### Statute law

Statutes are also known as Acts. Statutes are called primary legislation because they are laws made by the elected representatives in the federal Parliament or a provincial legislature. The federal and provincial governments get their law-making authority from the *Constitution Act, 1867*, which created Canada as a country. The matters that each level of government can regulate by making laws are set out in sections 91 and 92 of that Act. Statutes are often passed to modify, change or reform the common law, or to deal with matters not addressed by the common law. If a statute changes the common law, the common law will no longer apply as law on that subject area.

Statutes establish the framework for regulating a subject area. They set out the basic rules and requirements, as well as the powers of government and its officials in this subject area, including the power to make regulations. Regulations are a subset of statute law and are discussed in greater detail below.

### **How are statutes made?**

#### *Who makes statutes?*

In Canada, both the federal and provincial levels of government make (enact) statutes. Federal laws are made by Parliament, which consists of the House of Commons and the Senate. The House of Commons is made up of all federally elected representatives, also known as Members of Parliament (MP's). The Senate is made up of regional representatives, known as senators, who are appointed by the Prime Minister. Both the House of Commons and the Senate must pass a statute into law, but the legislative process generally begins in the House of Commons.

Provincial laws are made by the legislature of a particular province; for example, in Alberta, the Legislative Assembly makes provincial laws. The Legislative Assembly of Alberta is made up of all provincially elected representatives, also known as Members of the Legislative Assembly (MLA's). The law-making process is similar for both the federal and provincial levels of government; however, all provincial legislatures are made up of only the assembly of elected representatives. There are no provincial senates.

#### *The provincial process*

The provincial process begins with the introduction of a bill, which is a draft version of a proposed law, into the Legislative Assembly. Each bill must pass through three readings, or votes of the members of the Legislative Assembly, before it can become law. First reading usually occurs when the bill is introduced. At the second reading stage, there will be debate and discussion of the bill by the Legislative Assembly as a whole. After second reading, a committee of members of the Legislative Assembly often reviews the bill in detail. This is generally the stage at which amendments, or changes, will be suggested for the bill. At third reading, the bill and any proposed amendments to it are considered by the entire Legislative Assembly.

Once a bill has passed the three readings, it is signed by the Lieutenant Governor. This is referred to as “royal assent” and gives the statute legal effect. Statutes most commonly come into effect at the time of royal assent, but their application can be delayed by including a specific provision in the statute. Such a provision may state a specific future date when the statute will come into effect or state that the statute will come into effect “upon proclamation”, which allows the government to choose when the statute will come into effect.

#### *The federal process*

The federal law-making process is similar to the provincial process. The major difference is that bills must be passed through three readings of both the House of Commons and the Senate before they can be given royal assent. At the federal level, royal assent is given by the Governor

General. While bills generally begin the legislative process in the House of Commons, all bills other than money bills can also originate from the Senate.

### **Regulations**

Regulations provide the details of a legislative scheme and flesh out the framework provided by the statute. The statute will list the powers to make regulations, the person or body who may make the regulations, and the subject areas or topics that can be covered by regulations. Regulations that do not comply with the statute enabling their creation are illegal.

Regulations are called subordinate legislation because they are made by a person or body other than Parliament or the Legislative Assembly; for example, Cabinet or a cabinet minister. Cabinet is the group of elected representatives who have been selected to oversee the administration and operation of government departments. Individual members of Cabinet are referred to as Cabinet Ministers. Regulations are called either Orders in Council, when they are made by Cabinet (federal: Governor General in Council; provincial: Lieutenant Governor in Council), or Ministerial Orders, when made by a cabinet minister. Statutes may also give powers to certain regulatory bodies or agencies (for example, the Energy and Utilities Board) to make regulations.

Regulations are not subject to the same process of scrutiny by the Legislative Assembly or Parliament in their enactment, and are not required to be made public until they have been enacted. In recent years, some government departments have begun to seek public input as part of the regulation-making process; however, this is not mandatory unless required as part of the statute granting the power to make the regulations.

### **Policy**

There are also documents that may resemble statutes or regulations, but that do not have the same legal effect. These are often referred to as guidelines or policy. Other terms that may be used to refer to these types of documents include “standards”, “objectives” or “criteria”. Guidelines are usually written documents that provide further detail beyond that found in a regulation. A guideline may set standards, levels or procedures or deal with other technical matters.

Guidelines are often developed by government (usually civil servants), but may also be developed by other bodies such as technical or scientific groups (for example, the Canadian Standards Association) or policy development groups (for example, the Canadian Council of Ministers of the Environment). Policy that is related to statutes and regulations is usually developed by government, and may or may not be written or documented in some way. Policy can be explained as the details of *how* government will interpret, administer and enforce statutes and regulations.

### **Law versus policy**

A key distinction between statutes and regulations as compared to guidelines and policy is that statutes and regulations are legally enforceable when properly enacted. They are enacted and made publicly available in a prescribed manner, ensuring that the requirements imposed by them can be determined by those being regulated. Guidelines and policy generally are *not* legally

enforceable due to the informal way in which they are created and the lack of consistency regarding public availability and accessibility. Guidelines can be made legally enforceable in certain circumstances by specifically incorporating them as part of a statute or regulation. Guidelines are most commonly incorporated into regulations, and must be referred to in the regulation in a specific manner to ensure that they are legally enforceable.

## **Power to make environmental laws**

As mentioned above, both the federal and provincial governments have powers given to them by the *Constitution Act, 1867* to make laws. The specific matters over which the federal and provincial governments have exclusive law-making authority are set out in sections 91-92 of that Act. In general, the federal government is given power to legislate and regulate matters of national and international scope under section 91, and the provinces are given powers to deal with matters of a local or private nature under section 92.

Given the division of law-making powers under the *Constitution Act, 1867*, it may not be immediately apparent how both the federal and provincial governments may make environmental legislation. However, in 1867 matters of environmental protection and regulation were not a concern, and these matters have only become a concern over the past few decades. As a result, governments seeking to enact environmental laws must look to other subject matters listed in sections 91-92 of the *Constitution Act, 1867* for their authority to enact such legislation. The development of constitutional law related to environmental legislation has resulted in the federal and provincial governments both having power to enact environmental laws, as the environment has proven to be too broad a matter to be contained exclusively in either section 91 or 92.

## **The Canadian court system**

The courts in Canada interpret and determine the application of both statute law and common law to matters that come before them. Dependent on the matter before them, the courts may make orders, direct punishment or the payment of money damages, and make determinations about the rights of parties before them.

There are two court systems in Canada. The provincial court system operates within each province and may vary in structure from province to province. In Alberta, the court system includes, by increasing level of authority, the Provincial Court, the Court of Queen's Bench and the Court of Appeal. Each of these courts may deal with both criminal and civil matters and, subject to the courts' procedural rules, decisions may be appealed from a lower court to the higher courts.

The federal court system includes the Federal Court Trial Division and the Federal Court of Appeal. This court system deals with matters where legal relief or remedies are claimed against the federal government, including federal boards and agencies; for example, income tax matters or challenges to decisions made by a federal cabinet minister. The Supreme Court of Canada is the final court of appeal for both the provincial and federal court systems, and its decisions are binding on all courts in Canada.

## For more information

For further information about the Canadian legal system and the law-making powers of the federal and provincial governments, check the following sources.

- “Natural Resource and Environmental Management: A Jurisdictional Primer”, by Alistair R. Lucas, in *Environmental Protection and the Canadian Constitution* (Environmental Law Centre, Edmonton, 1987), pp.31-43.

This article explains the division of law-making powers between the federal and provincial governments under the *Constitution Act, 1867*, and how both levels of government have authority to make laws related to environmental matters.

The book containing this article can be found at the Environmental Law Centre library (contact information below).

Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099; 1-800-661-4238 (toll-free)  
Fax: (780) 424-5133  
E-mail: elc@elc.ab.ca  
<<http://www.elc.ab.ca>>

- <<http://www.acjnet.org>>

The ACJNet (Access to Justice Network) Internet site is an excellent source for a broad range of legal information. It includes links to a variety of law-related sites.

- <<http://www.law-faqs.org>>

This Internet site, titled Canadian Legal FAQs, provides answers to commonly asked questions about Canadian law and the Canadian legal system. For information about federal and provincial law-making powers under the Canadian constitution, see <<http://www.law-faqs.org/nat/cons.htm>>.



# **Basic Legal Requirements**

---

## **Statutes and Regulations**

***NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").***

### **How to find statutes (Canada and Alberta)**

#### **Print versions**

Statutes are often found in a consolidated version, called revised statutes. Revised statutes update all statutes of the federal government or a province to a particular date (e.g., *Revised Statutes of Canada 1985; Revised Statutes of Alberta 1980*). A statute in a consolidation (revised statutes) replaces all prior versions of the same statute. There are also annual or sessional statutes, which are published in volumes grouped by calendar year or by legislative session.

It is now quite common to find loose-leaf (binder) versions of statutes, which are updated on an ongoing basis. This means that amendments to statutes are incorporated as they are enacted. It should be noted that in Alberta, this is done for convenience, and where a statute is referred to for legal purposes such as litigation, the original statute and any amendments enacted through the annual or sessional volumes should be referred to.

Amendments to federal statutes are listed in the Table of Public Statutes in the *Canada Gazette, Part III*. Amendments to Alberta statutes are listed in the Table of Public Statutes, found in the "Supplement" volume of the loose-leaf version of the *Statutes of Alberta*.

#### **Electronic versions**

Internet versions of statutes are generally similar to loose-leaf versions, as they are updated on an ongoing basis and are "unofficial" (i.e., they cannot be relied on for legal purposes as the official versions can). Federal statutes are available at <<http://laws.justice.gc.ca/en/index.html>>.

Provincial statutes are available at <<http://www.qp.gov.ab.ca>>. Both federal and provincial statutes can also be accessed through database services such as QuickLaw. CD-ROMs that provide access to both sets of statutes are also available. The advantage of these computerized versions is that specific sections or terms can be searched for by the computer, often saving considerable amounts of time.

## How to refer to statutes

In referring to statutes, both federal and Alberta statutes are numbered on an alphanumeric basis, using letters and numbers. The letter in the reference relates to the first word in the short title of the statute, with statutes arranged alphabetically and then numbered consequentially under the particular letter of the alphabet.

Examples:

*Environmental Protection and Enhancement Act*, S.A. 1992, c. E-13.3

- S.A. 1992 stands for *Statutes of Alberta, 1992* (you may also see R.S.A. in a statute reference, which stands for Revised Statutes of Alberta)
- c. stands for chapter
- E-13.3 is the chapter number

*Fisheries Act*, R.S.C. 1985, c. F-14

- R.S.C. 1985 stands for *Revised Statutes of Canada, 1985*
- c. F-14 means chapter F-14

## How to find regulations (Canada and Alberta)

### Print versions

Regulations are enacted under the authority of a particular statute, and are sometimes referred to as subordinate legislation. Federal regulations were last consolidated in the *Consolidated Regulations of Canada 1978* (CRC 1978). Regulations that have been enacted since that time can be found in the *Canada Gazette, Part II*. The *Canada Gazette, Part II* also includes a quarterly index of statutory instruments (regulations).

There is no consolidation of Alberta regulations. Regulations are published in the *Alberta Gazette*. They are also compiled into volumes on an annual basis, and these volumes include a table listing amendments to regulations.

### Electronic versions

Computerized versions of regulations are also available on the Internet or CD-ROM, and are generally updated to include amendments on an ongoing or regular basis. As with statutes, the computerized versions of regulations are more efficient for search purposes, but are also unofficial unless stated otherwise. Regulations are available through the Internet at the sites provided above.

## How to refer to regulations

Federal and Alberta regulations are referred to and numbered in a similar manner. The numbering of federal regulations includes the year the regulation was enacted and a regulation number.

Example:

*Vinyl Chloride Release Regulations, 1992, SOR/92-631*

- SOR means statutory orders and regulations, and indicates that this document is a federal regulation.
- 92 refers to the year the regulation was enacted (1992).
- 631 is the regulation number assigned to that regulation when it was enacted.

The numbering of Alberta regulations also includes the year the regulation was enacted and the regulation number.

Example:

*Substance Release Regulation, Alta. Reg. 124/93*

- Alta. Reg. means Alberta Regulation
- 124 is the regulation number assigned to that regulation when it was enacted.
- 93 refers to the year the regulation was enacted (1993).

## Tips on how to read statutes and regulations

### Helpful tools

Be sure to use the tools that may be included for assistance, such as tables of contents, headings and marginal notes. Tables of contents are not included in all statutes and regulations. However, where they are included, they may be of assistance in finding a particular section or subject area. Headings will often be used to indicate the subject matter of different parts of a statute or regulation. Marginal notes are found in small print in the margin next to the start of a section, and indicate the subject matter of that section. Keep in mind that schedules to statutes and regulations are part of that legislation, and may be relevant to your interests and research.

### Definitions

Definitions are an important part of any statute or regulation. Words or phrases that have a commonly understood meaning in everyday language may be given a totally different meaning in a

statute or regulation. Generally, definitions of terms that are used throughout a statute or regulation are found in the early sections of the legislation, often in section 1 or 2. However, definitions that apply to a particular part or sections of a statute or regulation may be found in the early sections of that part or group of sections instead.

## Enabling powers

The powers given in a statute to make regulations are referred to as enabling powers. These may be found in sections near the end of the statute or at the end of particular parts of a statute. Sections setting out enabling powers are generally worded: "The Minister/Governor in Council/Lieutenant Governor in Council may make regulations prescribing/related to...".

## Offences

Statutes and regulations may also contain sections creating offences under the legislation. Often these sections are located near the end of the statute or regulation, or at the end of a particular part of a statute or regulation. Offence provisions usually are worded to indicate *who* might commit the offence ("a person who..." or "any person who..."), and *what action* (or inaction) would constitute the offence ("does/fails to do something is guilty of an offence"). Often offence provisions will also indicate the penalty attached to the offence. Penalty provisions may also follow the offences in a separate section, particularly if the offence section contains a lengthy list of offences.

## Interpretation of statutes and regulations

Statutes are often worded using broad terms that can sometimes be subject to different interpretations. What often happens is that a person may be charged with an offence that could be interpreted in two or more ways, and that person will challenge the charge on that basis. When this happens, it is up to a court to decide the correct meaning of the statute, or to hold it invalid if it is too vague. Courts are often guided in this task by an *Interpretation Act*, as well as by certain long-standing legal rules. Judges can also consider the debates in Parliament or the provincial legislature to get an idea of what the drafters of the statute were trying to achieve. These combined factors can lead to statutes being given a meaning that is not always the most obvious. It is thus important to look up how the statute has been interpreted.

Regulations are not usually subject to the same kind of review by courts, but they are often accompanied by interpretive aids such as guidelines or policy manuals. A good tactic in trying to determine the interpretation of a regulation is to contact the appropriate government department, which will have any interpretive aids that exist or may be able to give an idea of the likely interpretation.

## Where to find statutes and regulations

Statutes and regulations are public documents, and as such are available from a number of sources, such as:

- the Environmental Law Centre;
- provincial courthouses (arrangements may have to be made beforehand in some smaller centres);
- law school libraries (Universities of Alberta and Calgary);
- the Legislature library in Edmonton;
- the Alberta Environment library;
- the Internet; and
- public libraries (although sometimes these are not as current as they could be).

The Queen's Printer, a provincial government office, also offers copies of individual provincial acts or regulations for sale. You may also be able to purchase or order statutes or regulations from your local bookstore.

No matter where you decide to go for information, don't be afraid to ask the librarians for some direction if you are stuck. Some libraries employ research librarians who may be able to help you or lead you to the right source.

## **For more information**

For further information about locating statutes and regulations, check the following sources.

### *Libraries*

- Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099; 1-800-661-4238  
Fax: (780) 424-5133  
E-mail: elc@elc.ab.ca  
<<http://www.elc.ab.ca>>

The Centre will fax and mail materials outside of Edmonton.

- Alberta Environment Library  
6<sup>th</sup> Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 422-5870 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0170  
E-mail: env.library@gov.ab.ca  
<<http://www.augustana.ab.ca/neos/neosevp>>

**BASIC LEGAL REQUIREMENTS** Statutes and regulations

This library has Alberta statutes and regulations, and guidelines related to environmental legislation.

- University of Alberta, Faculty of Law  
John A. Weir Memorial Law Library  
2<sup>nd</sup> Floor, Law Centre  
University of Alberta  
Edmonton, AB T6G 2H5  
Phone: (780) 492-5598  
[<http://www.library.ualberta.ca/subject/law/index.cfm>](http://www.library.ualberta.ca/subject/law/index.cfm)
- University of Calgary, Faculty of Law  
Law Library  
2<sup>nd</sup> Floor, Murray Fraser Hall  
2500 University Drive NW  
Calgary, AB T2N 1N4  
Phone: (403) 220-3727 (general information/circulation);  
Phone: (403) 220-7274 (reference assistance)  
Fax: (403) 282-3000  
[<http://www.ucalgary.ca/library/law>](http://www.ucalgary.ca/library/law)
- Legislature Library  
216 Legislature Building  
10800 – 97 Avenue  
Edmonton, AB T5K 2B6  
Phone: (780) 427-2473 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-6016  
E-mail: [library@assembly.ab.ca](mailto:library@assembly.ab.ca)
- Law Society Library  
2<sup>nd</sup> Floor, Law Courts  
1A Sir Winston Churchill Square  
Edmonton, AB T5J 0R2  
Phone: (780) 415-8585
- Law Society Library  
7<sup>th</sup> Floor, Court House  
611 – 4 Street SW  
Calgary, AB T2P 1T5  
Phone: (403) 297-6148
- Law Society Library  
Court House  
320 – 4 Street S.  
Lethbridge, AB T1J 4C7  
Phone: (403) 381-5639

- Law Society Library  
Court House  
4909 – 48 Avenue  
Red Deer, AB T4N 3T5  
Phone: (403) 340-5499
- Law Society Library  
Court House  
Box 759  
511 Third Avenue West  
Drumheller, AB T0J 0Y0  
Phone: (403) 823-1721
- Law Society Library  
Court House  
224 Chief Red Crown Blvd.  
Fort Macleod, AB T0L 0Z0  
Phone: (403) 823-1721
- Law Society Library  
Court House  
10260 - 99 Street  
Grande Prairie, AB T8V 6J4  
Phone: (780) 538-8928
- Law Society Library  
460 First Street SE  
Medicine Hat, AB T1A 0A8  
Phone: (403) 529-8936
- Law Society Library  
Court House  
9905 - 97 Avenue  
Peace River, AB T8S 1S4  
Phone: (780) 624-6418
- Law Society Library  
Law Courts Building  
4605 - 51 Street  
Wetaskiwin, AB T9A 1K7  
Phone: (780) 361-1320
- Note: smaller centres with provincial courthouses may have small libraries; check the provincial government telephone listings in your local area.

## **BASIC LEGAL REQUIREMENTS** Statutes and regulations

### *Stores*

- The Queen's Printer Bookstores sell copies of Alberta statutes and regulations and also codes of practice made under the *Environmental Protection and Enhancement Act*. If you are located outside of Edmonton or Calgary, you may be able to buy copies of statutes and regulations through your local bookstore. You can order statutes and regulations, as well as some government publications, from the Queen's Printer Bookstores by fax or mail, or on-line through the Queen's Printer Internet site at <<http://www.qp.gov.ab.ca>>. The contact information for the Queen's Printer Bookstores is below:

Queen's Printer Bookstore  
10611 - 98 Avenue  
Main Floor, Park Plaza  
Edmonton, AB T5K-2P7  
Phone: (780) 427-4952 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 452-0668

Queen's Printer Bookstore  
Main Floor, McDougall Centre  
455 – Sixth Street SW  
Calgary, AB T2P 4E8  
Phone: (403) 297-6251 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-8450

### *Internet sources*

- <<http://www.qp.gov.ab.ca>>

This is the site for the Alberta Queen's Printer. At this location, you can obtain access to Alberta statutes and regulations by clicking on "legislation" within the text. You can then choose to find statutes or regulations.

- <<http://laws.justice.gc.ca/en/index.html>>

This location provides access to federal statutes and regulations through the federal Department of Justice.

# **Basic Legal Requirements**

---

## **Provincial Legislation Applicable to Air and Water Quality**

***NOTE:*** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### **Overview of Alberta legislation**

#### ***Environmental Protection and Enhancement Act***

The main piece of environmental legislation in Alberta is the *Environmental Protection and Enhancement Act* (EPEA). This Act is intended to regulate matters that affect the environment, including substance releases, "activities" and all aspects of the environment related to those activities. The Schedule of Activities, found at the end of the Act, lists activities that may be regulated under the Act. These activities may be subject to the environmental assessment process and may require an approval under the Act.

#### **Approvals and registrations**

EPEA creates prohibitions against commencing or continuing an activity requiring an approval or registration without such an approval or registration. An approval is a document issued by the province allowing an operator to carry out a specific activity subject to certain operating conditions that are set out in the approval. A registration enables an operator to carry out a specific activity in accordance with the requirements of the relevant code of practice published by Alberta Environment.

The *Activities Designation Regulation* lists all activities required to obtain an approval or registration under EPEA. This regulation includes more specific descriptions of activities requiring approvals or registrations. In some instances, a large industrial operation may fall under the description of more than one activity listed in the regulation. However, only one approval will be issued for the entire operation. The Director, a government official, may issue an approval subject to any terms or conditions that the Director considers appropriate.

#### **Substance releases**

Part 4, Division 1 of EPEA deals with substance releases, including those related to air and water quality matters. Section 97 prohibits substance releases in amounts, concentrations or levels in

excess of those *expressly* set out by an approval or the regulations. If there is a conflict between an approval and the regulations regarding prescribed amounts, levels or concentrations, the strictest requirement applies. This prohibition is most relevant to regulated activities.

Section 98 of EPEA prohibits substance releases that cause or may cause a significant adverse effect, where there is no applicable approval or regulations. It should be noted that this section provides that there may not be a conviction for releases that are authorized by another Alberta or federal law. Terms such as “substance”, “environment” and “adverse effect” are all defined in EPEA. Each of these terms is defined quite broadly to cover a wide range of circumstances. However, “significant adverse effect” is not defined in EPEA. Section 101 imposes a duty on the person responsible for the released substance to undertake remedial action and restore the environment. The term “person responsible” is defined in EPEA and has a very broad application.

### **Release reporting**

EPEA creates a duty to report substance releases that are causing, have caused or may cause an adverse effect. Persons who cause releases, those who own or have control of released substances, and police officers and employees of local or other public authorities all have duties to report releases to the Director. Reporting must be done immediately upon discovery of the release. EPEA also sets out the details of reporting, including how it must be done and the information that must be provided. A written report may be required in addition to the oral report.

The *Release Reporting Regulation* sets out details about release reporting. It provides for exemptions and limitations on types of releases to be reported, some of which relate to classifications under the federal *Transportation of Dangerous Goods Regulation*. As well, the regulation provides greater details about written release reports, including timing of reports and information to be included. Alberta Environment has also developed a *Release Reporting Guideline*, which provides helpful details on reporting requirements.

### **Air-related releases - general**

The *Substance Release Regulation* deals with substance releases into the environment, and focuses mainly on air-related releases. Part 1 deals with the maximum permissible opacity of visible emissions that are not covered by an approval, and sets out the requirements for determining the opacity of visible emissions. Generally, the maximum permissible opacity is 40% over a 6 minute time period. Part 2 regulates particulate releases to the environment and prescribes maximum concentrations of particulates in effluent streams from a variety of industrial and other sources to the ambient air. This Part also sets specific limits for particulate releases from secondary lead smelters.

Part 3 regulates gaseous emissions from vinyl chloride and polyvinyl chloride plants. These requirements mirror the requirements of the federal *Vinyl Chloride Release Regulations, 1992* regarding maximum concentrations of vinyl chloride that may be released from vinyl chloride and polyvinyl chloride plants. This Part also requires sampling and analysis to meet the same

standard referred to in the federal regulation. As well, the Regulation sets out detailed requirements related to the control of fugitive emissions of vinyl chloride, and for source and ambient monitoring for vinyl chloride.

The Regulation also provides that the Director may, by written notice to an operator of an activity, require reports on a release of substances into the ambient air from an activity, and may specify requirements for sampling, monitoring, analysis, recording and reporting. Anything required by such a notice would be in addition to similar requirements set out in the operator's approval.

### **Specific air-related releases**

The *Ozone-Depleting Substances and Halocarbons Regulation* establishes a number of restrictions in relation to those ozone-depleting substances and halocarbons that are listed in its schedules. Section 2 prohibits the release of ozone-depleting substances and halocarbons into the environment, with limited exceptions. Section 4 prohibits the manufacture and sale of things containing ozone-depleting substances, again with limited exceptions. Sections 5 to 7 regulate the servicing of equipment containing ozone-depleting substances and halocarbons, and the training of service persons.

Similar to the *Substance Release Regulation*, the Director is given the power to require a person responsible for an ozone-depleting substance or halocarbon to provide reports and to undertake sampling, analysis, recording and reporting in relation to a release of an ozone-depleting substance or halocarbon. The Director must do this by written notice to the person, and these requirements are in addition to any similar requirements set out in an approval.

### **Water quality requirements - potable water**

Part 7 of EPEA sets standards for the quality of potable water. Potable water refers to water supplied by a waterworks system for the purposes of drinking, cooking, bathing, dishwashing and other domestic purposes. A waterworks system may provide potable water to a municipality, industrial development, private development or private utility.

EPEA prohibits the release of a substance into a waterworks system that may cause the potable water supplied by that waterworks system to be unfit for any of its intended purposes. Also prohibited is the release of a substance into a waterworks system that may cause the potable water supplied by that waterworks system to exceed substance concentration limits set by its approval or by regulation.

The specific standards for the physical, chemical and radiological characteristics of potable water are set by the *Potable Water Regulation*. This Regulation applies to waterworks systems that serve hamlets, municipal developments, industrial developments and other entities designated by the Regulation.

At a minimum, potable water quality must meet the health related concentration limits for substances listed in the latest edition of *Guidelines for Canadian Drinking Water Quality* as published by Health Canada. Additional limits relating to potable water quality may be set in an approval for a waterworks system.

The Regulation sets standards for the treatment of potable water. Treatment must meet the requirements set by Alberta Environment in the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems* or the requirements set by the Director. As well, the Regulation sets conditions on the use of chemicals for the treatment of potable water, for disinfection and for fluoridation.

The Regulation also sets standards for the design and operation of waterworks systems (also in the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems* or set by the Director). Requirements for certification of waterworks system operators, sampling and reporting are also established by the Regulation.

### **Water quality requirements - wastewater and storm drainage**

Water quality requirements for wastewater and storm drainage are governed by the *Wastewater and Storm Drainage Regulation*. There are two kinds of wastewater: industrial and domestic. Industrial wastewater is the composite of liquid and water-carried waste from an industrial facility. Domestic wastewater is the composite of liquid and water-carried waste associated with use of water for drinking, cooking, cleaning, washing, hygiene, sanitation or other domestic purposes. Storm drainage is storm drainage, that may include industrial runoff, resulting from precipitation in a hamlet, municipality, municipal development, privately owned development or a Metis settlement area. The Regulation does not apply to a storm drainage system that only collects, stores or disposes of storm drainage from agricultural land or land on which farms are located.

The Regulation prohibits the use or disposal of a substance into a wastewater system or storm drainage system that may:

- impair the integrity of the wastewater collection system;
- impair the integrity of the storm drainage collection system;
- impair the operation or performance of the wastewater collection system; or
- impair the operation or performance of the storm drainage collection system unless the use or disposal is authorized by an approval.

In addition, the use of substances or chemicals for the collection, treatment or disposal of wastewater or storm drainage not listed in an approval cannot be used without the prior written authorization of the Director. If a substance or chemical is authorized for use, then it must be used in accordance with the latest edition of the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems* or in a manner acceptable to the Director.

The *Wastewater and Storm Drainage (Ministerial) Regulation* sets requirements for certification of wastewater and storm collection systems operators. This Regulation also establishes sampling and reporting requirements for wastewater and storm collection systems.

In addition to the requirements set by regulation, Alberta Environment has developed several guidelines that relate to industrial and domestic wastewater. The *Surface Water Quality Guidelines for Use in Alberta* are used to set approval limits for wastewater discharges. In addition, guidelines that relate to the wastewater generated by specific industries have been developed by Alberta Environment.

### **Water Act**

In Alberta, the issues of water quality and water quantity are regulated by different pieces of legislation. The issue of water quality is regulated by EPEA (as discussed above) whereas the issue of water quantity - that is, the use and management of water resources - is regulated by the *Water Act*. While the *Water Act* does not specifically address the issue of water quality, it is relevant because changes in water quantity can affect water quality.

The *Water Act* prohibits the commencement or continuation of an activity except pursuant to an approval. “Activity” is broadly defined and includes maintaining, removing or disturbing ground, vegetation or other material, or carrying out any undertaking in or on any land, water or water body that:

- may alter the flow or level of water; or
- may cause an effect on the aquatic environment.

The *Water (Ministerial) Regulation* further defines activity for the purposes of the *Water Act* as anything that causes or may cause a significant adverse effect on the aquatic environment, human health, property or public safety.

In addition, the *Water Act* requires that a license be obtained prior to diverting or using groundwater or surface water. A license identifies the source of water supply, the location of the diversion site, the allocation of water to be diverted, the priority of the right to divert or use water and the conditions under which the diversion and use of the water must take place.

### **Legislation glossary**

- “activity”: anything designated as an activity under the Schedule of Activities to the *Environmental Protection and Enhancement Act*. Listed activities may be subject to the environmental assessment process and may be required to obtain approvals or registrations under the Act.
- “ambient monitoring”: monitoring of outdoor air for levels of air emissions that cannot be attributed to a particular source.

- “approval”: a document issued by Alberta Environment under the *Environmental Protection and Enhancement Act* to facilities or operations regulated under the Act. An approval sets out operating terms and conditions that must be met by the approval holder.
- “Director”: an official of Alberta Environment appointed under the *Environmental Protection and Enhancement Act* to carry out specific duties under the Act.
- “EPEA”: the *Environmental Protection and Enhancement Act*.
- “fugitive emissions”: air emissions that are not caught by the designed capture systems in an industrial process.
- “opacity”: the degree to which visible air emissions obstruct the passage of light.
- “particulates”: fine liquid or solid particles found in air or emissions.
- “registration”: a form of authorization given under the *Environmental Protection and Enhancement Act* that allows registered facilities or operations regulated under the Act to operate in accordance with the requirements of the relevant code of practice published by Alberta Environment.
- “source monitoring”: monitoring of specific sources of air emissions, such as stacks, for levels of specified substances.

## For more information

For further information about Alberta legislation related to air quality, check the following sources.

### *References for legislation*

- For information on how to access legislation and regulations, please see the Basic Legal Requirements fact sheet *Statutes and Regulations*, from the background materials.
- *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3
- *Activities Designation Regulation*, Alta. Reg. 211/96
- *Potable Water Regulation*, Alta. Reg. 122/93
- *Release Reporting Regulation*, Alta. Reg. 117/93
- *Substance Release Regulation*, Alta. Reg. 124/93
- *Ozone-Depleting Substances and Halocarbons Regulation*, Alta. Reg. 181/2000

- *Wastewater and Storm Drainage Regulation*, Alta. Reg. 119/93
- *Wastewater and Storm Drainage (Ministerial) Regulation*, Alta. Reg. 120/93
- *Water Act*, R.S.A. 1995, W-3.5
- *Water (Ministerial) Regulation*, Alta. Reg. 205/98

*Other written material*

- *Release Reporting Guideline*

This guideline, published by Alberta Environment, elaborates on the *Release Reporting Regulation* by providing greater detail on the types of releases and amounts of released substances that are reportable under that regulation. This guideline can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/RelRep Guideline.pdf>>. Print copies can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M6  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

Alberta Environment Regulatory Approvals Centre  
Main Floor  
9820 - 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-6311 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0154

- *Surface Water Quality Guidelines for Use in Alberta.*

This guideline, published by Alberta Environment, establishes guidelines for surface water quality in Alberta. This guideline can be accessed on the Internet at <<http://www3.gov.ab.ca/env/protenf/publications/SurfWtrQual-Nov99.pdf>>. Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

*Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*

This guideline, published by Alberta Environment, sets standards and establishes guidelines for the design, operation and treatment requirements of municipal systems for potable water and storm drainage. This guideline can be accessed at

## **BASIC LEGAL REQUIREMENTS** Provincial legislation applicable to air and water quality

<<http://www.gov.ab.ca/env/info/infocentre/publistng.cfm>>. Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

- *Alberta Industrial Wastewater Guidelines*

This guideline, published by Alberta Environment, sets standards and establishes guidelines for the design, operation and treatment requirements of industrial wastewater systems. This guideline can be accessed at [<http://www.gov.ab.ca/env/info/infocentre/publistng.cfm>](http://www.gov.ab.ca/env/info/infocentre/publistng.cfm). Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

- *Water Quality Based Effluent Limits Procedures Manual*

This manual, published by Alberta Environment, describes the procedures used to set water quality based effluent limits for industrial and municipal discharges in Alberta. This manual can be accessed at <<http://www.gov.ab.ca/env/info/infocentre/publisting.cfm>>. Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

- *Guidelines for Canadian Drinking Water Quality*

This guideline, published by Health Canada, sets standards for Canadian drinking water. These guidelines have been adopted as standards in Alberta by the *Potable Water Regulation*. A description of this guideline can be accessed at <[http://www.hc-sc.gc.ca/ehp/ehd/catalogue/bch\\_pubs/dwsixth.htm](http://www.hc-sc.gc.ca/ehp/ehd/catalogue/bch_pubs/dwsixth.htm)>. Print copies can be obtained from:

Canadian Government Publishing  
Public Works and Government Services Canada  
Ottawa, ON K1A 0S9  
Phone: (800) 635-7943  
<<http://publications.pwgsc.gc.ca/publishing/order/orderform-e.html>>

### *Internet sources*

- <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/facttc.html>>

This site provides access to Alberta Environment fact sheets about the *Environmental Protection and Enhancement Act* and some air and water quality matters regulated under it.

- <<http://www.gov.ab.ca/env/protenf.html>>

This Internet website has information about enforcement and protection activities conducted by Alberta Environment.

- <<http://www.gov.ab.ca/env/water/legislation/index.html>>

This Internet website, produced by Alberta Environment, contains fact sheets about the *Water Act*. This Internet website also provides access to *Water Act Codes of Practice*.

# Basic Legal Requirements

---

## Federal Legislation Applicable to Air and Water Quality

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### Overview of federal legislation

#### *Canadian Environmental Protection Act, 1999*

The *Canadian Environmental Protection Act, 1999* (CEPA 1999) deals with a number of environmental matters. The part of CEPA 1999 that is most relevant to the regulation of air and water quality is Part 5 which covers toxic substances. Prior to the coming into force of CEPA 1999, these matters were regulated by the *Canadian Environmental Protection Act, 1988* (CEPA 1988).

#### **National Pollutants Release Inventory**

Environment Canada compiles the National Pollutants Release Inventory (NPRI) on an annual basis. The NPRI is a yearly inventory of releases and transfers of certain substances within Canada. CEPA 1999 gives the Minister of Environment powers to require persons to provide information on potentially toxic substances. Since 1993, the Minister has used this authority to require industrial operators to provide the information that makes up the annual NPRI. Environment Canada compiles the NPRI information it receives, and publicly releases it in an annual NPRI summary report. NPRI information is also accessible on the Internet at <<http://www.ec.gc.ca/pdb/npri>>.

It is important to note that there are certain thresholds that apply to the size of the operator who must report and the amounts of substances reportable under NPRI. Thus NPRI information is not a picture of all releases of particular substances in Canada over the course of a year. For example, the 1997 NPRI notice published by the Minister of Environment restricted reporting to "facilit[ies] where, during 1997, employees worked a total of 20,000 hours or more, and manufactured, processed or otherwise used 10 tonnes or more of any substance listed in (the notice) at concentrations greater than or equal to one percent by weight." As well, the 1997 NPRI notice provides that substances in amounts less than 10 tonnes are not required to be reported.

### **Regulation of toxic substances**

CEPA 1999 gives the federal government powers to designate substances as toxic substances and develop regulations regarding those toxic substances. Designated toxic substances are listed in Schedule I to CEPA 1999. Various regulations have been developed to regulate specific toxic substances; for example, there are regulations dealing with vinyl chloride, a toxic substance that affects air quality.

CEPA 1999 gives the federal government powers to enter into agreements with provinces addressing provincial laws that may be deemed equivalent to the toxic substances regulations made under CEPA. As well, the federal government may make regulations declaring that regulations made under CEPA 1999 that deal with toxic substances are inapplicable in provinces that have equivalent laws. This has occurred with respect to the application of Alberta laws to toxic substances, and will be discussed in further detail below.

### **Release of toxic substances**

Part 5 of CEPA 1999 deals with the release of toxic substances into the environment. In particular, it requires the reporting of releases or likely releases of toxic substances into the environment. Persons who own or have control of released toxic substances and persons who cause or contribute to releases or increase the likelihood of a release must

- report the release or likely release to an enforcement officer;
- take measures to prevent the release or to remedy and reduce any danger to the environment or human health; and
- notify persons who may be adversely affected by the release or likely release.

Enforcement officers are given the power to take steps to deal with releases where the persons who are required take these steps fail to do so. The government is also given the power to recover costs incurred by it in taking these measures.

### **Example of CEPA regulation of toxic air substances: *Vinyl Chloride Release Regulations, 1992***

This regulation was enacted under CEPA 1988 and is continued under CEPA 1999 to regulate releases of vinyl chloride from vinyl chloride and polyvinyl chloride plants. Vinyl chloride is designated as a toxic substance in Schedule I to CEPA 1999. The regulation sets out maximum amounts of vinyl chloride that may be released into the atmosphere at certain stages of the industrial process. The maximum amounts are generally measured as a proportion of product produced.

The regulation imposes certain monitoring and reporting requirements on operators of vinyl chloride and polyvinyl chloride plants. Operators must also develop, submit to Environment Canada and implement plans for the control of fugitive emissions and the prevention of accidental releases. The regulation requires operators to keep copies of all plans and reports at the plant for a three year period and to make these documents available to an enforcement officer upon request.

This regulation also creates an exemption for operators in relation to release reporting that is otherwise required under CEPA 1999. Operators are not required to report when releases are under a specified quantity (generally 100 kilograms per day). However, where an operator must report under CEPA 1999 (i.e., if a release is above the specified quantity), a written report must also be provided to Environment Canada. As well, the regulation requires operators to carry out sampling and analysis in accordance with a specified Environment Canada guideline.

**Example of CEPA regulation of toxic water substances: *Phosphorus Concentration Regulations***

This regulation was enacted under CEPA 1988 and is continued under CEPA 1999 to regulate the concentration of phosphorus in laundry detergents. The purpose of this regulation is to control water pollution that is caused by the loading of nutrients (such as phosphorus) in water bodies. As such, the regulation sets a limit on the concentration of phosphorus in laundry detergents.

The regulation designates phosphorus and all its compounds as nutrients under Part 7 of CEPA 1999. Part 7 prohibits the manufacture or importation of a cleaning product that exceeds the allowable concentration of a prescribed nutrient. If a person manufactures or imports a cleaning product that exceeds the allowable concentration of phosphorus, the Minister may order the person to take remedial measures. These measures may include providing public notice of the contravention, replacement of the cleaning product with one that meets the required standards, or measures to protect the environment or human health.

***An Agreement on the Equivalency of Federal and Alberta Regulations for the Control of Toxic Substances in Alberta***

This agreement is an agreement between the federal and Alberta governments declaring Alberta laws, and especially the *Environmental Protection and Enhancement Act*, to be equivalent to specified CEPA regulations that are listed in Annex 1 to the agreement. Included in Annex 1 are:

- the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*;
- specific sections of the *Pulp and Paper Mill Defoamer and Wood Chips Regulations*;
- the *Secondary Lead Smelter Release Regulations*; and
- the *Vinyl Chloride Release Regulations*.

## **BASIC LEGAL REQUIREMENTS** Federal legislation applicable to air and water quality

The agreement provides that equivalent standards, similar provisions related to citizens' requests for investigations, and equivalent penalties and enforcement policies indicate equivalency between the CEPA regulations and Alberta laws.

Under the agreement, Alberta agrees that provisions of the *Environmental Protection and Enhancement Act*, and approvals issued under that Act, will not contain lesser standards, measurements and testing methods than those provided for in the CEPA regulations. The agreement also provides for information sharing between the two governments, and specifies that Alberta will provide Canada with copies of approvals issued that contain standards relevant to the CEPA regulations. The agreement provides that either Canada or Alberta may terminate it with 6 months' notice.

### *Alberta Equivalency Order*

The *Alberta Equivalency Order* is a regulation that was made by the federal government after the equivalency agreement was signed. This Order provides that the CEPA regulations covered by the Canada-Alberta equivalency agreement, mentioned above, do not apply in Alberta.

### *Fisheries Act*

The *Fisheries Act* prohibits any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat. Any water that provides the spawning grounds and nursery, rearing, food supply or migration areas on which fish depend to carry out their life processes is considered fish habitat. Permission to commence an undertaking that alters, disrupts or destroys fish habitat may be obtained from the Minister of Fisheries and Oceans.

In addition, the *Fisheries Act* prohibits the deposition of a deleterious substance in water frequented by fish or in any place where the deleterious substance might enter such water. A deleterious substance is any substance that would alter or degrade the quality of water so that it is, or is likely to be, rendered deleterious to fish, fish habitat or to the use by people of fish that frequent the water. The Minister of Fisheries and Oceans may grant permission to deposit a deleterious substance into water frequented by fish.

There have been several regulations promulgated under the *Fisheries Act* which declare specific substances to be deleterious and regulate their release into water. These include *Pulp and Paper Effluent Regulations*, *Chlor-Alkali Mercury Liquid Effluent Regulations*, *Metal Mining Liquid Effluent Regulations*, *Meat and Poultry Products Plant Liquid Effluent Regulations*, *Petroleum Refinery Liquid Effluent Regulations* and *Potato Processing Plant Liquid Effluent Regulations*.

There is a Canada-Alberta Administrative Agreement for the Control of Deposits of Deleterious Substances under the *Fisheries Act*. This agreement is for the purpose of coordinating and cooperating to minimize overlap and duplication in relation to the protection of fisheries.

### **Legislation glossary**

- “CEPA 1988”: the *Canadian Environmental Protection Act, 1988*.

- “CEPA 1999”: the *Canadian Environmental Protection Act, 1999*.
- “deleterious substance”: any substance that would alter or degrade the quality of water so that it is, or is likely to be, rendered deleterious to fish, fish habitat or to the use by people of fish that frequent the water.
- “equivalency”: a concept under the *Canadian Environmental Protection Act, 1988* and the *Canadian Environmental Protection Act, 1999*, where provincial environmental laws can be deemed to be equivalent to CEPA 1988 or CEPA 1999 regulatory requirements.
- “fish habitat”: any water that provides the spawning grounds and nursery, rearing, food supply or migration areas on which fish depend to carry out their life processes.
- “fugitive emissions”: air emissions that are not caught by the designed capture systems in an industrial process.

## For more information

For further information about federal legislation related to air quality, check the following sources.

### References for legislation

- For information on how to access legislation and regulations, please see the Basic Legal Requirements fact sheet *Statutes and Regulations*, from the background materials.
- *Canadian Environmental Protection Act*, R.S.C. 1985, c.16 (4<sup>th</sup> Supp.)
- *Canadian Environmental Protection Act 1999*, S.C. 1999, c.33
- *Alberta Equivalency Order*, SOR/94-752
- *Phosphorus Concentration Regulations*, SOR/89-501
- *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*, SOR/92-267
- *Pulp and Paper Mill Defoamer and Wood Chips Regulations*, SOR/92-268
- *Secondary Lead Smelter Release Regulations*, SOR/91-155
- *Vinyl Chloride Release Regulations, 1992*, SOR/92-631
- *Fisheries Act*, R.S.C. 1985, F-14
- *Chlor-Alkali Mercury Liquid Effluent Regulations*, C.R.C., c. 811

**BASIC LEGAL REQUIREMENTS** Federal legislation applicable to air and water quality

- *Metal Mining Liquid Effluent Regulations*, C.R.C., c. 819
- *Meat and Poultry Products Plant Liquid Effluent Regulations*, C.R.C., c. 818
- *Petroleum Refinery Liquid Effluent Regulations*, C.R.C., c. 828
- *Potato Processing Plant Liquid Effluent Regulations*, C.R.C., c. 829
- *Pulp and Paper Effluent Regulations*, SOR/92-269

*Internet sources*

- <<http://www.mb.ec.gc.ca/pollution/e00s09.en.html>>

This site provides access to the *Canadian Environmental Protection Act* and federal-provincial agreements related to pollution legislation.

- <<http://www.ec.gc.ca/pdb/npri>>

This site is the home page for the National Pollutants Release Inventory (NPRI), and includes yearly NPRI data.

- <<http://www.ec.gc.ca/CEPARRegistry/>>

This is the CEPA Registry Internet website. This site contains access to much of the information relevant to the *Canadian Environmental Protection Act*.

# **Basic Legal Requirements**

---

## **Registrations and Approvals**

***NOTE:** this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the *Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement* ("A word of caution about your use of this material").*

### **What are registrations and approvals?**

The *Environmental Protection and Enhancement Act* (EPEA) regulates a variety of activities that take place in Alberta with respect to their environmental effects. Registrations and approvals are forms of authorization granted by Alberta Environment (AENV) to operators of regulated activities. The *Activities Designation Regulation* specifies those activities that require either a registration or an approval.

### **Registrations**

Where a regulated activity requires a registration, the operator must register that activity with AENV by filing a registration form containing certain information. If a registration is issued, the operator may then carry out the regulated activity, but must do so in accordance with the requirements of the relevant code of practice published by AENV.

Codes of practice relate to specific activities, such as the operation of asphalt paving plants or compost facilities. Each code of practice establishes specific operating requirements that must be met by registered activities. For some activities, these requirements will relate to air or water quality matters. Copies of codes of practice can be viewed on the Internet or purchased from the provincial Queen's Printer bookstores.

### **Approvals**

#### **Approvals generally**

An approval is an authorization document granted by AENV to the operator of a regulated activity. The approval authorizes an operator to carry out a regulated activity and sets out terms and conditions that apply to that activity.

One of the purposes of EPEA is to regulate the environmental effects of activities. Due to its broad application, EPEA and many of its related regulations are quite general in terms of specific environmental limits or requirements. Many of the specific environmental requirements that are imposed on activities regulated under EPEA are found in the approvals that apply to the specific activities. Note that an approval applies to one particular facility or operation, such as an industrial plant, rather than applying to all facilities carrying out a particular activity. This allows AENV to impose terms and conditions that are specific to the particular facility being regulated by an approval.

## How does an approval relate to air or water quality?

Where an activity may have an effect on air or water quality, its approval will usually include terms and conditions regulating its operations and potential air or water quality effects. Often these terms and conditions will do the following things:

- set specific limits for emissions into air or water from the activity;
- prohibit certain types or levels of emissions into air or water;
- impose specific requirements on the types and frequency of air or water quality monitoring that the operator must carry out; and
- impose requirements for reporting of releases and other incidents in addition to those required by EPEA and the regulations.

If you are looking for specific numerical limits on emissions into air or water for a particular regulated facility, these are most likely to be found in that facility's approval.

## How do I find an approval?

Under EPEA, approvals are available to the public. You can obtain a copy of any approval issued under EPEA by contacting AENV's Regulatory Approvals Centre. You should provide AENV with the name of the operator that is the approval holder and the location of the facility that is the subject of the approval. Some information about approvals and registrations can also be obtained on the Internet through AENV's authorization/approval viewer at <<http://www.gov.ab.ca/env/water/ApprovalViewer.html>>.

## Tips on reading approvals

### **Helpful tools**

Be sure to use the tools that may be included in an approval for assistance, such as a table of contents or headings. Tables of contents are not included in all approvals; however, where they are included, they will help you find particular subject areas. Headings will often be used to indicate the subject matter of different parts of an approval. As well, keep in mind that schedules are part of an approval and may relate to the subjects in which you are interested.

## **Definitions**

Definitions are an important part of any approval. Words or phrases that have a commonly understood meaning in everyday language may be given a totally different meaning in an approval. Generally, definitions of terms that are used throughout an approval are found in the early parts of the approval. However, definitions that apply to a particular part of an approval may be found at the start of that part instead. Often an approval will incorporate definitions used in EPEA and related regulations, unless such terms are defined differently in the approval. If this is the case in an approval that you are reading, it may be necessary to make reference to EPEA or to regulations such as the *Substance Release Regulation* to find the defined meaning of terms used in the approval.

## **Amendments**

You may be reading an approval that has had amendments (changes) made to it. If this is the case, the amendments will not be included as part of the main approval document, but will be attached on separate sheets. The amendments will refer to the sections of the original approval that have been amended, so it will be necessary to refer between the amendments and the approval to fully understand the amendments.

## **References to other documents**

Certain sections of an approval or amendment may require the approval holder to do something in accordance with “the application”. This refers to the approval holder’s (operator’s) application for the approval or amendment that was filed with AENV. In some approvals, the terms and conditions will refer to the application in setting a requirement, rather than repeating the material from the application in the approval itself. Applications for approvals and amendments are publicly available under EPEA, and copies can be obtained from AENV’s Regulatory Approvals Centre.

An approval may refer to particular guidelines, especially in relation to requirements for sampling and analysis. Where an approval makes references to such guidelines by full name and reference number, they have legal effect and can be enforced as if they were part of the approval.

## **Other information**

The dates on which an approval comes into effect and expires are important sections. In newer approvals, these can be found on the approval’s cover sheet. In older approvals, the effective and expiry dates will be found within the main part of the approval. The approval’s cover sheet is a handy source of information, as it includes:

- approval number;
- application number;
- effective date;

- expiry date;
- name and address of the approval holder; and
- a description of the activity regulated by the approval.

In some older approvals, you may find terms such as "licensee", "licence holder", "licence", "air contaminant" and "water contaminant". These terms are not found in EPEA, but relate to the *Clean Air Act* and *Clean Water Act*, statutes that were in effect before EPEA. The *Clean Air Act* and *Clean Water Act* were repealed and replaced by EPEA on September 1, 1993. EPEA provides that licences under the *Clean Air Act*, *Clean Water Act* and other legislation that were in effect when EPEA came into effect are deemed to be approvals under EPEA and continue in force until their expiry.

## For more information

For further information about registrations and approvals, check the following sources.

- Copies of registrations, approvals and applications for registrations and approvals can be obtained at:

Alberta Environment  
Regulatory Approvals Centre  
Main Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-6311 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0154

Information about some registrations and approvals can also be found on the Internet through Alberta Environment's authorization/approval viewer at <<http://www.gov.ab.ca/env/water/ApprovalViewer.html>>.

- Information about approvals and the process for issuing approvals under the *Environmental Protection and Enhancement Act* can be found on the Internet at <<http://www.gov.ab.ca/env/protnf/approvals/factsheets/approv.html>>.
- For information on how to access legislation and regulations, see the Basic Legal Requirements fact sheet *Statutes and Regulations*, from the background materials.
- The *Environmental Protection and Enhancement Act* (S.A. 1992, c.E-13.3) requires approvals or registrations for activities regulated under it. Part 2, Division 2 of the Act sets out general approval and registration requirements. The Schedule of Activities at the end of the Act lists activities that are regulated by the Act and may require an approval or registration.
- The *Activities Designation Regulation* (A.R. 211/96) lists the specific activities that require an approval or registration under the *Environmental Protection and Enhancement Act*.

- The *Approvals and Registrations Procedure Regulation* (A.R. 113/93) sets out the procedures and requirements for operators who must obtain approvals or registrations.
- Codes of practice published by Alberta Environment set out the operating requirements that must be met by operators who must obtain registrations. Each code of practice relates to a specific activity. Copies of the various codes of practice can be purchased from the Queen's Printer Bookstores:

Queen's Printer Bookstore  
10611 - 98 Avenue  
Main Floor, Park Plaza  
Edmonton, AB T5K-2P7  
Phone: (780) 427-4952 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 452-0668

Queen's Printer Bookstore  
Main Floor, McDougall Centre  
455 – 6 Street S.W.  
Calgary, AB T2P 4E8  
Phone: (403) 297-6251 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-8450

Codes of practice can also be viewed or purchased on-line through the Queen's Printer Internet site at <<http://www.qp.gov.ab.ca>>.



# Basic Legal Requirements

---

## Other Administrative Bodies - Alberta

*NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

### **What other administrative bodies play a role in relation to air and water quality?**

As indicated in other fact sheets, Alberta Environment plays the main role in regulating air and water quality as affected by industrial facilities. However, it is not the only Alberta government body that can play a role in these matters. Both the Alberta Energy and Utilities Board (AEUB) and the Alberta Environmental Appeal Board (EAB) may also make decisions or take actions that will have an influence on air and water quality.

#### **The Alberta Energy and Utilities Board (AEUB)**

The AEUB is an independent agency of the Alberta government. It is responsible for regulating the development of Alberta's energy resources, which include oil, natural gas, oil sands, coal, electrical energy, as well as the pipelines and transmission lines that transport these resources. As part of its public interest mandate, the AEUB does deal with some environmental matters, although its main focus is on energy development.

The AEUB performs many functions in relation to its mandate of developing Alberta's energy resources, including:

- processing and reviewing applications for energy and utilities activities. This function includes holding public hearings and making decisions on applications. Hearings and decisions may address environmental matters related to energy and utilities activities under review.
- setting standards and guidelines to be followed by operators in the development of energy resources, which at times address environmental matters such as air or water quality.
- inspection and enforcement of industry compliance with AEUB standards and guidelines.
- public information and education about energy resources and development.

Where the AEUB's activities involve dealing with environmental matters, it generally works closely with Alberta Environment to avoid duplication.

## The Alberta Environmental Appeal Board (EAB)

The EAB is an independent administrative tribunal that is responsible for hearing appeals of various decisions made under the *Environmental Protection and Enhancement Act* and the *Water Act*. This includes appeals of approvals granted to industrial facilities under the *Environmental Protection and Enhancement Act*.

Generally, the EAB has the power to make recommendations to the Minister of Environment on appeals heard by it, with the Minister making the final decision. On appeals of requests for confidentiality and administrative penalties, the EAB makes the final decision.

In appeals of approvals under the *Environmental Protection and Enhancement Act*, persons who are directly affected by the approval may qualify to participate in the appeal or even to initiate an appeal of an approval. Decisions as to the status of directly affected persons are made by the EAB.

## For more information

For more information about the Energy and Utilities Board and the Environmental Appeal Board, check the following sources.

### *Alberta Energy and Utilities Board*

- The Energy and Utilities Board can be contacted at:

Alberta Energy and Utilities Board  
640 - 5 Avenue SW  
Calgary, AB T2P 3G4  
Phone: (403) 297-8311 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-7336  
<<http://www.eub.gov.ab.ca>>

- The Energy and Utilities Board has a number of field centres throughout Alberta. Staff at field centres carry out on-site inspections of energy facilities, are the first point of contact for landowners on energy-related concerns, and respond to oil and gas incidents and emergencies. To determine which field centre serves your community, contact the centre closest to your community. The contact information for the field centres is listed below, and is also available on the Internet at <<http://www.eub.gov.ab.ca/bbs/eubinfo/offices-field.htm>>.

Alberta Energy and Utilities Board  
Bonnyville Field Centre  
PO Box 5169  
Northlands Development Building  
4901 - 50<sup>th</sup> Avenue  
Bonnyville, AB T9N 2G4  
Phone: (780) 826-5352 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 826-2366

Alberta Energy and Utilities Board  
St. Albert Field Centre  
Main Floor, 30 Sir Winston Churchill Avenue  
St. Albert, AB T8N 3A3  
Phone: (780) 460-3800 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 460-3802

Alberta Energy and Utilities Board  
Drayton Valley Field Centre  
Box 7048  
5136 - 51 Avenue  
Drayton Valley, AB T7A 1S3  
Phone: (780) 542-5182 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 542-2540

Alberta Energy and Utilities Board  
Wainwright Field Centre  
801 - 2<sup>nd</sup> Avenue  
Wainwright, AB T9W 1C4  
Phone: (780) 842-7570 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 842-7536

Alberta Energy and Utilities Board  
Grande Prairie Field Centre  
9815 - 115 Street  
Grande Prairie, AB T8V 7R5  
Phone: (780) 538-5138 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 538-5582

Alberta Energy and Utilities Board  
Medicine Hat Field Centre  
Box 909  
#302, 346 - 3 Street SE  
Medicine Hat, AB T1A 0G7  
Phone: (403) 527-3385 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 529-3103

Alberta Energy and Utilities Board  
Red Deer Field Centre  
210 Provincial Building  
4920 - 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-5454 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5136

Alberta Energy and Utilities Board  
Midnapore Field Centre  
320, 295 Midpark Way SE  
Calgary, AB T2X 2A8  
Phone: (403) 297-8303 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-5283

- The Energy and Utilities Board publishes many different resources containing information that may be of interest in relation to air and water quality effects of industrial facilities. These include documents such as guides, which set out requirements that must be met by operators regulated by the EUB, and a regular newsletter. Most EUB publications can be accessed on the Internet at <<http://www.eub.gov.ab.ca/bbs/products/catalog/g1-pubs.htm#guides>> or by contacting the EUB at:

Alberta Energy and Utilities Board  
Information Services  
640 - 5 Avenue SW  
Calgary, AB T2P 3G4  
Phone: (403) 297-8190 (toll free in Alberta by calling 310-0000)  
Fax: (403) 297-7040  
E-mail: [eub.info\\_services@eub.gov.ab.ca](mailto:eub.info_services@eub.gov.ab.ca)

Publications of interest include the following:

*Guide 27 - Hearings:* This guide contains information about the EUB hearing process.

*Guide 50 - Drilling Waste Management:* This guide contains information on sampling requirements, analytical requirements and procedures, disposal criteria and documents related to drilling waste management and disposal.

*Guide 50-1 - A Landowner's Guide to Drilling Waste Disposal from Oil and Gas Wells:* This guide is designed to help landowners understand the regulations on drilling waste disposal and the obligations of drilling companies.

*Guide 58 - Oilfield Waste Management Requirements for the Upstream Petroleum Industry:* This guide outlines regulatory requirements for the handling, treatment and disposal of upstream oilfield waste. It provides an overview of oilfield waste characterization and classification, waste manifesting and tracking, oilfield waste management facilities,

application requirements for oilfield waste management facilities, waste management and disposal options.

*Guide 60 - Upstream Petroleum Industry Flaring Guide:* This guide sets out requirements for upstream flaring in Alberta.

*Guide 62 - Responding to Public Concerns about Oil and Gas in Alberta:* This guide summarizes key concerns expressed by Albertans about the petroleum industry and information provided by the EUB with respect to these concerns. Topics covered include public complaint process, public consultation expectations, dispute resolution, enforcement, flaring reduction and animal health investigation.

*Across the Board:* This is a monthly newsletter published by the EUB. It includes updates on publications, applications and Board hearings, as well as articles about energy and utility related matters.

#### *Alberta Environmental Appeal Board*

- The Environmental Appeal Board can be contacted at:

Environmental Appeal Board  
306, 10011 - 109 Street  
Edmonton, AB T5J 3S8  
Phone: (780) 427-6207 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4693  
[<http://www3.gov.ab.ca/eab>](http://www3.gov.ab.ca/eab)

- Environmental Appeal Board decisions can be accessed on the Internet at <<http://www3.gov.ab.ca/eab/decision.html>>.



# Basic Legal Requirements

---

## Resource List for Legal Matters

**NOTE:** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

For more information about the Canadian legal system and the law-making powers of the federal and provincial governments, check the following sources.

### *Written material*

- “Natural Resource and Environmental Management: A Jurisdictional Primer”, by Alistair R. Lucas, in *Environmental Protection and the Canadian Constitution* (Environmental Law Centre, Edmonton, 1987), pp.31-43.

This article explains the division of law-making powers between the federal and provincial governments under the *Constitution Act, 1867*, and how both levels of government have authority to make laws related to environmental matters.

The book containing this article can be found at the Environmental Law Centre library (contact information below).

Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099; 1-800-661-4238 (toll-free Alberta)  
Fax: (780) 424-5133  
E-mail: [elc@elc.ab.ca](mailto:elc@elc.ab.ca)  
[<http://www.elc.ab.ca>](http://www.elc.ab.ca)

### *Internet sources*

- <<http://www.acjnet.org>>

The ACJNet (Access to Justice Network) site is an excellent source for a broad range of legal information. It includes links to a variety of law-related sites.

- <<http://www.law-faqs.org>>

This site, titled Canadian Legal FAQs, provides answers to commonly asked questions about Canadian law and the Canadian legal system. For information about federal and provincial law-making powers under the Canadian constitution, see <<http://www.law-faqs.org/nat/cons.htm>>.

To locate statutes and regulations, check the following sources.

*Libraries*

- Legislature Library  
216 Legislature Building  
10800 – 97 Avenue  
Edmonton, AB T5K 2B6  
Phone: (780) 427-2473 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-6016  
E-mail: [library@assembly.ab.ca](mailto:library@assembly.ab.ca)
- Law Society Library  
2<sup>nd</sup> Floor, Law Courts  
1A Sir Winston Churchill Square  
Edmonton, AB T5J 0R2  
Phone: (780) 415-8585
- Law Society Library  
7<sup>th</sup> Floor, Court House  
611 – 4 Street SW  
Calgary, AB T2P 1T5  
Phone: (403) 297-6148
- Law Society Library  
Court House  
320 – 4 Street S.  
Lethbridge, AB T1J 4C7  
Phone: (403) 381-5639
- Law Society Library  
Court House  
4909 – 48 Avenue  
Red Deer, AB T4N 3T5  
Phone: (403) 340-5499

- Law Society Library  
Court House  
Box 759  
511 Third Avenue West  
Drumheller, AB T0J 0Y0  
Phone: (403) 823-1721
- Law Society Library  
Court House  
224 Chief Red Crown Blvd.  
Fort Macleod, AB T0L 0Z0  
Phone: (403) 823-1721
- Law Society Library  
Court House  
10260 - 99 Street  
Grande Prairie, AB T8V 6J4  
Phone: (780) 538-8928
- Law Society Library  
460 First Street SE  
Medicine Hat, AB T1A 0A8  
Phone: (403) 529-8936
- Law Society Library  
Court House  
9905 - 97 Avenue  
Peace River, AB T8S 1S4  
Phone: (780) 624-6418
- Law Society Library  
Law Courts Building  
4605 - 51 Street  
Wetaskiwin, AB T9A 1K7  
Phone: (780) 361-1320
- Note: smaller centres with provincial courthouses may have small libraries; check the provincial government telephone listings in your local area.

*Stores*

- Queen's Printer Bookstore  
10611 - 98 Avenue  
Main Floor, Park Plaza  
Edmonton, AB T5K-2P7  
Phone: (780) 427-4952 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 452-0668

Queen's Printer Bookstore  
Main Floor, McDougall Centre  
455 – Sixth Street SW  
Calgary, AB T2P 4E8  
Phone: (403) 297-6251 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-8450

- The Queen's Printer Bookstores sell copies of Alberta statutes and regulations and also codes of practice made under the *Environmental Protection and Enhancement Act*. If you are located outside of Edmonton or Calgary, you may be able to buy copies of statutes and regulations through your local bookstore. You can order statutes and regulations, as well as some government publications, from the Queen's Printer Bookstores by fax or mail, or on-line through the Queen's Printer Internet site at <<http://www.qp.gov.ab.ca>>. The contact information for the Queen's Printer is set out above.

*Internet sources*

- <<http://www.qp.gov.ab.ca>>

This is the site for the Alberta Queen's Printer. At this location, you can obtain access to Alberta statutes and regulations by clicking on "legislation" within the text. You can then choose to find statutes or regulations.

- <<http://laws.justice.gc.ca/en/index.html>>

This location provides access to federal statutes and regulations through the federal Department of Justice home page.

For more information on Alberta and federal legislation related to air and water quality, check the following sources.

*References for legislation*

- See the previous pages for information on accessing legislation.
- *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3
- *Activities Designation Regulation*, Alta. Reg. 211/96
- *Approvals and Registrations Procedure Regulation* Alta. Reg.113/93
- *Potable Water Regulation*, Alta. Reg. 122/93
- *Release Reporting Regulation*, Alta. Reg. 117/93
- *Substance Release Regulation*, Alta. Reg. 124/93

- *Ozone-Depleting Substances and Halocarbons Regulation*, Alta. Reg. 181/2000
- *Wastewater and Storm Drainage Regulation*, Alta. Reg. 119/93
- *Wastewater and Storm Drainage (Ministerial) Regulation*, Alta. Reg. 120/93
- *Canadian Environmental Protection Act*, R.S.C. 1985, c.16 (4<sup>th</sup> Supp.)
- *Canadian Environmental Protection Act 1999*, S.C.1999, c.33
- *Alberta Equivalency Order*, SOR/94-752
- *Phosphorus Concentration Regulations*, SOR/89-501
- *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*, SOR/92-267
- *Pulp and Paper Mill Defoamer and Wood Chips Regulations*, SOR/92-268
- *Secondary Lead Smelter Release Regulations*, SOR/91-155
- *Vinyl Chloride Release Regulations, 1992*, SOR/92-631
- *Water Act*, R.S.A. 1995, W-3.5
- *Water (Ministerial) Regulation*, Alta. Reg. 205/98
- *Fisheries Act*, R.S.C. 1985, F-14
- *Chlor-Alkali Mercury Liquid Effluent Regulations*, C.R.C., c. 811
- *Metal Mining Liquid Effluent Regulations*, C.R.C., c. 819
- *Meat and Poultry Products Plant Liquid Effluent Regulations*, C.R.C., c. 818
- *Petroleum Refinery Liquid Effluent Regulations*, C.R.C., c. 828
- *Potato Processing Plant Liquid Effluent Regulations*, C.R.C., c. 829
- *Pulp and Paper Effluent Regulations*, SOR/92-269

*Other written material*

- *Release Reporting Guideline*

This guideline, published by Alberta Environment, elaborates on the *Release Reporting Regulation* by providing greater detail on the types of releases and amounts of released substances that are reportable under that regulation. This guideline can be accessed on the Internet at <<http://www.gov.ab.ca/env/protenf/publications/RelRep Guideline.pdf>>.

- *Surface Water Quality Guidelines for Use in Alberta*

This guideline, published by Alberta Environment, establishes guidelines for surface water quality in Alberta. This guideline can be accessed on the Internet at <<http://www3.gov.ab.ca/env/protenf/publications/SurfWtrQual-Nov99.pdf>>. Print copies can be obtained from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M6  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*

This guideline, published by Alberta Environment, sets standards and establishes guidelines for the design, operation and treatment requirements of municipal systems for potable water and storm drainage. This guideline can be accessed at <<http://www.gov.ab.ca/env/info/infocentre/publistng.cfm>>. Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

- *Alberta Industrial Wastewater Guidelines*

This guideline, published by Alberta Environment, sets standards and establishes guidelines for the design, operation and treatment requirements of industrial wastewater systems. This guideline can be accessed at <http://www.gov.ab.ca/env/info/infocentre/publistng.cfm>. Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

- *Water Quality Based Effluent Limits Procedures Manual*

This manual, published by Alberta Environment, describes the procedures used to set water quality based effluent limits for industrial and municipal discharges in Alberta. This manual can be accessed at <<http://www.gov.ab.ca/env/info/infocentre/publisting.cfm>>. Print copies can be obtained from Alberta Environment's Information Centre (contact information above).

- *Guidelines for Canadian Drinking Water Quality*

This guideline, published by Health Canada, sets standards for Canadian drinking water. These guidelines have been adopted as standards in Alberta by the *Portable Water Regulation*. Information about this guideline can be accessed at <[http://www.hc-sc.gc.ca/ehp/ehd/catalogue/bch\\_pubs/dwsixth.htm](http://www.hc-sc.gc.ca/ehp/ehd/catalogue/bch_pubs/dwsixth.htm)>. Print copies can be obtained from:

Canadian Government Publishing  
Public Works and Government Services Canada  
Ottawa, ON K1A 0S9  
Phone: (800) 635-7943  
<<http://publications.pwgsc.gc.ca/publishing/order/orderform-e.html>>

*Internet sources*

- <<http://www.mb.ec.gc.ca/pollution/e00s09.en.html>>

This site provides access to the Canadian Environmental Protection Act and federal-provincial agreements related to pollution legislation.

- <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/facttc.html>>

This site provides access to Alberta Environment fact sheets about the *Environmental Protection and Enhancement Act* and some air quality matters regulated under it.

- <<http://www.ec.gc.ca/pdb/npri>>

This site is the home page for the National Pollutants Release Inventory (NPRI), and includes yearly NPRI data.

- <http://www.ec.gc.ca/CEPAREgistry/>

This is the CEPA Registry Internet website. This site contains access to much of the information relevant to the *Canadian Environmental Protection Act*.

For more information about registrations and approvals, check the following sources.

- Copies of registrations, approvals and applications for registrations and approvals can be obtained at:

Alberta Environment  
Regulatory Approvals Centre  
Main Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-6311 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0154

Information about some registrations and approvals can also be found on the Internet through Alberta Environment's authorization/approval viewer at <<http://www.gov.ab.ca/env/water/approvalViewer.html>>.

- Information about approvals and the process for issuing approvals under the *Environmental Protection and Enhancement Act* can be found on the Internet at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/approv.html>>.

For more information about the Alberta Energy and Utilities Board and the Environmental Appeal Board, check the following sources.

*Alberta Energy and Utilities Board*

- The Energy and Utilities Board can be contacted at:

Alberta Energy and Utilities Board  
640 - 5 Avenue SW  
Calgary, AB T2P 3G4  
Phone: (403) 297-8311 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-7336  
<<http://www.eub.gov.ab.ca>>

- The Energy and Utilities Board has a number of field centres throughout Alberta. Staff at field centres carry out on-site inspections of energy facilities, are the first point of contact for landowners on energy-related concerns, and respond to oil and gas incidents and emergencies. To determine which field centre serves your community, contact the centre closest to your community. The contact information for the field centres is listed below, and is also available on the Internet at <<http://www.eub.gov.ab.ca/bbs/eubinfo/offices-field.htm>>.

Alberta Energy and Utilities Board  
Bonnyville Field Centre  
PO Box 5169  
Northlands Development Building  
4901 - 50<sup>th</sup> Avenue  
Bonnyville, AB T9N 2G4  
Phone: (780) 826-5352 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 826-2366

Alberta Energy and Utilities Board  
St. Albert Field Centre  
Main Floor, 30 Sir Winston Churchill Avenue  
St. Albert, AB T8N 3A3  
Phone: (780) 460-3800 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 460-3802

Alberta Energy and Utilities Board  
Drayton Valley Field Centre  
Box 7048  
5136 - 51 Avenue  
Drayton Valley, AB T7A 1S3  
Phone: (780) 542-5182 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 542-2540

Alberta Energy and Utilities Board  
Wainwright Field Centre  
801 - 2<sup>nd</sup> Avenue  
Wainwright, AB T9W 1C4  
Phone: (780) 842-7570 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 842-7536

Alberta Energy and Utilities Board  
Grande Prairie Field Centre  
9815 - 115 Street  
Grande Prairie, AB T8V 7R5  
Phone: (780) 538-5138 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 538-5582

Alberta Energy and Utilities Board  
Medicine Hat Field Centre  
Box 909  
#302, 346 - 3 Street SE  
Medicine Hat, AB T1A 0G7  
Phone: (403) 527-3385 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 529-3103

Alberta Energy and Utilities Board  
Red Deer Field Centre  
210 Provincial Building  
4920 - 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-5454 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5136

Alberta Energy and Utilities Board  
Midnapore Field Centre  
320, 295 Midpark Way SE  
Calgary, AB T2X 2A8  
Phone: (403) 297-8303 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-5283

- The Energy and Utilities Board publishes many different resources containing information that may be of interest in relation to air and water quality effects of industrial facilities. These include documents such as guides, which set out requirements that must be met by operators regulated by the EUB, and a regular newsletter. Most EUB publications can be accessed on the Internet at <<http://www.eub.gov.ab.ca/bbs/products/catalog/g1-pubs.htm#guides>> or by contacting the EUB at:

Alberta Energy and Utilities Board  
Information Services  
640 - 5 Avenue SW  
Calgary, AB T2P 3G4  
Phone: (403) 297-8190 (toll free in Alberta by calling 310-0000)  
Fax: (403) 297-7040  
E-mail: [eub.info\\_services@eub.gov.ab.ca](mailto:eub.info_services@eub.gov.ab.ca)

Publications of interest include the following:

*Guide 27 - Hearings:* This guide contains information about the EUB hearing process.

*Guide 50 - Drilling Waste Management:* This guide contains information on sampling requirements, analytical requirements and procedures, disposal criteria and documents related to drilling waste management and disposal.

*Guide 50-1 - A Landowner's Guide to Drilling Waste Disposal from Oil and Gas Wells:* This guide is designed to help landowners understand the regulations on drilling waste disposal and the obligations of drilling companies.

*Guide 58 - Oilfield Waste Management Requirements for the Upstream Petroleum Industry:* This guide outlines regulatory requirements for the handling, treatment and disposal of upstream oilfield waste. It provides an overview of oilfield waste characterization and classification, waste manifesting and tracking, oilfield waste management facilities, application requirements for oilfield waste management facilities, and waste management and disposal options.

*Guide 60 - Upstream Petroleum Industry Flaring Guide:* This guide sets out requirements for upstream flaring in Alberta.

*Guide 62 - Responding to Public Concerns about Oil and Gas in Alberta:* This guide summarizes key concerns expressed by Albertans about the petroleum industry and information provided by the EUB with respect to these concerns. Topics covered include public complaint process, public consultation expectations, dispute resolution, enforcement, flaring reduction and animal health investigation.

*Across the Board:* This is a monthly newsletter published by the EUB. It includes updates on publications, applications and Board hearings, as well as articles about energy and utility related matters.

*Alberta Environmental Appeal Board*

- The Environmental Appeal Board can be contacted at:

Environmental Appeal Board  
306, 10011 - 109 Street  
Edmonton, AB T5J 3S8  
Phone: (780) 427-6207 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4693  
<<http://www3.gov.ab.ca/eab>>

- Environmental Appeal Board decisions can be accessed on the Internet at <<http://www3.gov.ab.ca/eab/decision.html>>.



# Enforcement and Community Involvement



# **Enforcement and Community Involvement**

---

## **Enforcement of the Environmental Protection and Enhancement Act**

***NOTE:*** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement (“A word of caution about your use of this material”).*

### **Introduction**

Alberta Environment (AENV) is the provincial government department that is mainly responsible for enforcement of environmental legislation in Alberta, including the *Environmental Protection and Enhancement Act* (EPEA). Enforcement of EPEA includes offences

- under the Act;
- related to regulations made under EPEA; and
- related to approvals and registrations issued under EPEA.

Approvals are documents issued under EPEA to regulated facilities or operations that give them permission to operate. These documents set out operating terms and conditions that must be met by approval holders. Registrations are another form of authorization under EPEA that allow certain types of activities to occur in accordance with a specified code of practice.

These materials make reference to terms such as “compliance” and “contravention” or “noncompliance”. In these materials, “compliance” refers to situations where there may not be an offence under EPEA, but the circumstances create a need for action to ensure environmental protection. The terms “contravention” and “noncompliance” can be used interchangeably to refer to circumstances where regulatory requirements under EPEA are not met.

### **Enforcement principles for EPEA**

AENV is the body that has been given responsibility to decide whether to take enforcement action. Other officials, such as municipal police, the RCMP, and municipal bylaw enforcement officers, may also be involved in enforcement of environmental legislation in Alberta. In assessing possible enforcement action, AENV will try to determine if there is noncompliance. AENV will consider various factors, including:

- any evidence of due diligence by the alleged offender (due diligence refers to whether the alleged offender took every reasonable precaution to prevent the situation);
- the elements of any contravention; and
- the quality of evidence available.

AENV carries out its enforcement activities in accordance with the *Enforcement Program for the Environmental Protection and Enhancement Act* and the *Compliance Assurance Principles*. The latter is a policy document describing the manner in which AENV enforces EPEA and the principles governing AENV's enforcement activities. The two governing principles of that document are that enforcement will be firm but fair, and that it will be timely and consistent.

## **What gives rise to an investigation under EPEA?**

In most situations, AENV begins investigations in response to:

- reports by industry of environmental incidents or releases of substances into the environment; or
- public complaints or reports.

### **Industry reports**

EPEA and the *Release Reporting Regulation* require that industry report releases of substances into the environment both orally and in writing to AENV. The *Release Reporting Guideline* provides details about types and amounts of released substances that must be reported. Industries that have approvals under EPEA may also be required to provide reports of releases or other incidents to AENV under the terms of the approval.

### **Public reports**

Members of the public may report environmental incidents or make complaints about environmental matters to AENV by telephone. AENV operates a province-wide toll-free telephone line (1-800-222-6514) to accept reports and complaints 24 hours a day. The following information may assist AENV in responding to an incident or complaint:

- WHO: the name of the person or company apparently responsible for the incident; licence plate numbers; descriptions of persons and vehicles; numbers on Transportation of Dangerous Goods placards.
- WHAT: descriptions of the released substance and the surroundings, including appearance, odour, colour, sheen or scum on water, or presence of any dead aquatic life.

- WHERE: the specific location where the incident was observed; landmarks; sources of the released substance; actual and potential paths of the released substance.
- WHEN: the time of day when the incident occurred; the duration of the incident; any previous occurrences.
- WHY: was the incident accidental or deliberate?
- WEATHER: descriptions of the weather conditions, wind direction and speed.

AENV keeps the identity of callers confidential; however, AENV may contact the caller again for further information or details. The caller may be requested to appear as a witness in a prosecution if an incident requires court action.

### **Initial review**

Every incident reported to AENV is reviewed by an investigator. Investigators are government employees, usually employed by AENV, who are appointed under EPEA to carry out specific investigative duties. The investigator considers the following information:

- frequency of the incident(s);
- magnitude of the incident;
- duration of the incident;
- timeliness and completeness of reporting, particularly by industry; and
- environmental impact of the incident.

### **Investigations under EPEA**

#### **How are investigations started?**

An investigation is used to gather evidence related to an alleged offence. In most instances, AENV will initiate an investigation where it has reasonable belief that an offence has occurred. As well, EPEA provides a means for citizens to initiate investigation of alleged offences. Two Alberta citizens, over the age of 18, can file a sworn declaration of the facts of the alleged offence with AENV. Once the declaration has been filed, AENV is obliged to carry out an investigation of the alleged offence. However, AENV retains discretion to decide whether or not to pursue enforcement action.

## Investigative steps

An investigator gathers a wide range of information to assist AENV in determining whether an investigation is required. The investigator will

- review any approval issued to the alleged offender under EPEA, paying particular attention to any terms related to limits for permitted substance releases, operating requirements for the facility, and reporting requirements;
- review the alleged offender's compliance history, looking for prior incidents, actions taken by the alleged offender to correct past environmental problems, and any past compliance or enforcement action taken by AENV against the alleged offender; and
- make initial contact with the alleged offender to gain a general understanding of the facility's operations, the events leading up to the incident and the actions taken in response to the incident.

At the beginning of an investigation, AENV sends a notice of the investigation to the alleged offender. This notice advises of the investigation, the reasons for it and the possibility of enforcement action.

The investigator will make an on-site visit to interview potential witnesses. These persons may be asked to provide a written statement about the incident under investigation. If the investigator believes, either before or during the interview, that the person being interviewed may be responsible for the incident, the investigator must warn that person of their rights under the Charter of Rights in relation to making statements and obtaining advice from a lawyer. In addition to carrying out interviews, the investigator may request a variety of information from the alleged offender, such as log books, charts, correspondence, procedures, drawings or other documents.

## Purposes of an investigation

The main purposes of an investigation are to

- gather evidence to determine if a contravention has occurred;
- assess whether there is sufficient evidence to support enforcement action;
- examine the intent of the alleged offender in relation to the incident under investigation; and
- carry out an initial assessment of any defences that could be raised to the alleged offence.

One of the major matters considered in investigations under EPEA is that of due diligence, and whether it was exercised by the alleged offender. Due diligence refers to the taking of every reasonable precaution to prevent a contravention. In assessing due diligence, factors that can be considered include matters such as:

- procedures for preventing and dealing with incidents;
- staff training;
- condition of equipment; and
- industry standards related to operations and incident response.

## Outcomes of an investigation

If there is not sufficient evidence to support enforcement action, AENV may either discontinue the investigation or take action to deal with the environmental effects of the incident. Where there is sufficient evidence of a contravention, AENV will review the case in detail to decide what enforcement action to take.

## Enforcement under EPEA

### Selection of enforcement tools

AENV considers the following factors in choosing the enforcement tool that it will use to deal with any particular contravention of EPEA:

- the severity of any adverse or potential adverse effect on the environment due to the incident;
- the intent of the alleged offender;
- the alleged offender's history of compliance or noncompliance with EPEA;
- consistency by AENV in enforcement of similar contravention's under EPEA;
- the duration of the contravention;
- the severity of the contravention in AENV's broad regulatory scheme; and
- the degree of cooperation of the alleged offender with AENV.

### Enforcement tools

AENV has a number of enforcement tools available for dealing with contravention's of EPEA, and may choose to use more than one of these in response to a particular incident. The tools are:

- environmental protection orders;
- warning letters;

- administrative penalties;
- enforcement orders;
- cancellation of an approval, registration or certificate under EPEA;
- court orders;
- tickets; and
- prosecutions.

### **Environmental protection orders**

Environmental protection orders are used to require action to prevent or remedy environmental harm or damage, and can also be used to deal with environmental emergencies. These orders seek to prevent or minimize adverse effects on the environment and can direct specific persons or parties to take a number of actions. AENV can issue these orders in situations where there is no contravention of EPEA, for example, where there is a substance release that is not prohibited under EPEA but may cause an adverse effect.

### **Warning letters**

AENV may send warning letters in situations where there is a minor contravention of EPEA with minimal potential for adverse environmental effect. These letters are intended to be a deterrent, and will only be used by AENV in situations where the offender has a history of compliance with EPEA and has taken steps to remedy or minimize the effects of the incident. A warning letter will only be used in relation to a first offence.

### **Administrative penalties**

A Director may issue an administrative penalty as an alternative to prosecution under EPEA. A Director is an official of AENV appointed to carry out specific duties under EPEA. Administrative penalties are intended to be a deterrent, and are used to deal with minor contravention's that have minimal environmental impact. These penalties are used in situations where there is an ongoing problem that requires evidence-gathering activities beyond the site of the contravention. The maximum administrative penalty that can be assessed for each day of a contravention is \$5,000. The *Administrative Penalty Regulation* sets out procedural details and requirements for the assessment of administrative penalties.

### **Enforcement orders**

These orders may be issued by AENV when there is a contravention of EPEA, the related regulations or an approval. These orders are used to direct an offender to take action or stop action to correct the contravention.

### **Cancellation of an approval or certificate**

Another enforcement tool available to AENV is cancellation of an approval, registration or certificate issued under EPEA. AENV considers this to be its most severe enforcement response, as the offender must then re-apply for a new approval, registration or certificate, usually at significant expense, and cannot operate until the new approval, registration or certificate is obtained. Factors that are considered by AENV in deciding whether to take this action include:

- the potential severity of environmental impact due to the contravention;
- the offender's compliance history;
- the offender's intent to commit the contravention; and
- whether the public interest would be served by the cancellation.

### **Court orders**

AENV may obtain any of a variety of court orders as part of its enforcement strategy, depending on the particular circumstances. Court orders may be obtained to

- require compliance with an enforcement order;
- prevent the commission of an offence;
- prohibit interference with an investigation; or
- hold a party in contempt of court, which can involve monetary penalties or imprisonment.

### **Tickets**

Tickets can be issued for certain offences under EPEA. These offences are listed in the *Procedures Regulation* made under the *Provincial Offences Procedures Act*. It is important to note that tickets are not the same as administrative penalties. Tickets are used to deal with single offences that have minor environmental effect, where evidence can be gathered at the site of the offence. They are usually issued by special constables.

### **Prosecutions**

Another enforcement option is prosecution in the court system. Offences under EPEA that are considered serious in nature and are likely to be prosecuted include:

- failure to report a release that may cause an adverse effect;
- failure to take reasonable emergency measures;

- knowingly providing false information to AENV staff; and
- obstructing an investigation.

AENV, together with prosecutors from the provincial Department of Justice, will consider prosecution when the alleged offender did not take reasonable steps to prevent the offence, evidence of the offence is clear, and there is a need for punishment and deterrence. In successful prosecutions, the highest penalties are assessed for offences involving intent on the part of the alleged offender to commit the offence. The description of such offences in EPEA includes use of the term “knowingly”; for example, “knowingly providing false information”.

## **Appeals**

Many types of enforcement action under EPEA can be appealed by the offender to the Environmental Appeal Board. The Board is an expert tribunal created by EPEA. Its role is to review specific types of decisions made by AENV officials under EPEA. Most enforcement orders and environmental protection orders and all administrative penalties can be appealed to the Board.

## **For more information**

For further information about enforcement of EPEA, check the following sources.

- Alberta Environment maintains a toll-free telephone line at 1-800-222-6514 that is open 24 hours a day to receive reports and complaints from the public and industry about environmental matters.
- The Regulatory Assurance Division of Alberta Environment deals with environmental enforcement matters on a province-wide basis. This division can be contacted at:

Alberta Environment  
Regulatory Assurance  
15<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-2364 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-1594

- Alberta Environment has six regional offices for different areas of the province. These regions are responsible for enforcement and monitoring matters at the regional level, and have staff designated to perform related functions. To determine the region in which your community is located, contact the regional office closest to your community. The contact information for the regions is listed below, and is also available on the Internet through <<http://www.gov.ab.ca/env/regions.html>>.

**ENFORCEMENT AND COMMUNITY INVOLVEMENT** Enforcement of the environmental protection and enhancement act

Alberta Environment  
Northwest Boreal Region  
2<sup>nd</sup> Floor, Provincial Building  
9621 – 96 Avenue  
Peace River, AB T8S 1T4  
Phone: (780) 624-6326 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 624-6542

Alberta Environment  
Northeast Boreal Region  
111 Twin Atria Building  
4999 - 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 427-7617 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7824

Alberta Environment  
Northern East Slopes Region  
107, 111 – 54 Street  
Edson, AB T7E 1T2  
Phone: (780) 723-8357 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 723-8386

Alberta Environment  
Parkland Region  
3<sup>rd</sup> Floor, Provincial Building  
4920 – 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-7052 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5022

Alberta Environment  
Bow Region  
3<sup>rd</sup> Floor, 2938 – 11 Street NE  
Calgary, AB T2E 7L7  
Phone: (403) 297-7948 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-6069

Alberta Environment  
Prairie Region  
2<sup>nd</sup> Floor Provincial Building  
200 – 5<sup>th</sup> Avenue South  
Lethbridge, AB T1J 4C7  
Phone: (403) 382-5512 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 382-4428

- The Compliance Assurance Principles is a policy document that provides details on how Alberta Environment ensures compliance with environmental legislation. This document can be accessed on the Internet at <[http://www3.gov.ab.ca/env/protenf/documents/CAP\\_Final\\_2000.pdf](http://www3.gov.ab.ca/env/protenf/documents/CAP_Final_2000.pdf)>, or can be obtained in print form from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- Basic information about Alberta Environment's enforcement activities is provided on the Internet at <<http://www.gov.ab.ca/env/protenf.html>>. An overview of the Enforcement Program is provided on the Internet at <<http://www.gov.ab.ca/env/protenf/EPEA/enforce.html>>. Note that this is not the *Enforcement Program* policy document referred to in this fact sheet.
- Attached to the Alberta Environment home page on the Internet are various fact sheets about the *Environmental Protection and Enhancement Act* and related matters. These can be found at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/facttc.html>>. Fact sheets of interest include one about enforcement generally, at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/enforce.html>>.
- The Environmental Law Centre, a non-profit charitable organization, provides environmental law information to the public free of charge, including information on enforcement of the *Environmental Protection and Enhancement Act*. For more information about the Centre's services, contact:

Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099; 1-800-661-4238 (Alberta toll-free)  
Fax: (780) 424-5133  
E-mail: [elc@elc.ab.ca](mailto:elc@elc.ab.ca)  
<<http://www.elc.ab.ca>>

- The Environmental Law Centre offers a search service that allows people to search by name for enforcement action taken by Alberta Environment under the *Environmental Protection and Enhancement Act* and legislation that preceded that Act. For more information about the Environmental Enforcement Historical Search Service, contact the Centre (contact information above) or see its home page at <<http://www.elc.ab.ca>>. The fee for a search is \$25.00 plus GST per name search. Searches are provided at no charge to non-profit environmental organizations.

# **Enforcement and Community Involvement**

---

## **Your Involvement in Air and Water Quality Monitoring and Enforcement**

***NOTE:*** *this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").*

Having participated in a community training program, you may be wondering what you, as an individual citizen, can do in relation to air and water quality monitoring and enforcement. While air and water quality monitoring can be complex matters, there are a number of things that you can do to follow up on your interests or concerns about air and water quality monitoring and enforcement.

### **Learn more about what concerns or interests you**

A good first step is to learn more about the air and water quality matters that concern or interest you. This can include finding information about

- the substances or contaminants that are present in your community's air and water;
- how particular substances or air and water contaminants are monitored;
- the laws (statutes and regulations) that apply to those substances; and
- the environmental and health effects that can result from the release or presence of those substances in the air and water.

In taking this first step, you should be prepared to do some research on your own. You may need to ask lots of questions and make use of a wide range of sources to track down the information you want. The resource lists included in these materials can be helpful guides. While librarians and others with access to relevant information are willing to help you, don't expect that the information you are seeking will be handed to you in a nice neat package. You will likely have to do some digging on your own, depending on the information and level of detail you are seeking, and spend some time reviewing and assessing the information that you find.

## **Get involved in industry or government monitoring**

Much of air monitoring and some water monitoring is technically complicated, requiring complex and expensive equipment. However, there are ways that you can become involved in air and water quality monitoring.

### **Seek opportunities for involvement**

Check with the industrial operators in your area that may have an effect on air or water quality. Many industrial facilities, particularly those located near communities or residential areas, have some type of public advisory group to act as a link between themselves and the local community. Some operators will give these groups information about their industrial processes and monitoring activities. This may include monitoring data and reports. If the operators in your area don't have a public advisory group and you feel there is sufficient community interest, lobby them to create one. Be persistent in making the community's interest known, and indicate how such a group could increase local understanding of their activities and improve their profile within the region.

Seek opportunities to participate in local industry's air and water quality monitoring activities. Local operators may be open to citizen participation in monitoring activities such as "riding along" to observe when they do monitoring, or auditing their monitoring results. It may be particularly persuasive if you can provide them with information about other operators that provide these types of opportunities. They may also be willing to provide you with copies of monitoring data and reports that they generate.

### **Review monitoring data**

You can review monitoring data and reports generated by industry and government regarding air and water quality. Keep in mind that industry and government each carry out different types of monitoring and monitor for different substances and purposes, so you may not get the entire air or water quality picture for your community or region by examining one particular data set or report. If you want to obtain copies of industry-generated monitoring data and reports, take the following steps:

- Ask the particular operator(s) for copies of the material that you want. Some operators place copies of monitoring information in the local public library or have other means of making it publicly available.
- If your community falls within an airshed management zone established under the Clean Air Strategic Alliance (CASA), you may be able to obtain air monitoring information through the zone. Often industrial operators within an airshed management zone participate in the zone's monitoring activities. As well, CASA maintains an Internet site at <<http://www.casadata.org>> that provides access to ambient air quality monitoring data gathered from across Alberta.
- Industry generates much of its monitoring information in order to comply with legal requirements. In most instances, operators must provide their monitoring information to government regulators. Section 33 of the *Environmental Protection and Enhancement Act*

lists information generated under the Act that is publicly available. This includes monitoring data that is submitted to Alberta Environment by approval holders and the information that is necessary to interpret it. As well, the *Freedom of Information and Protection of Privacy Act* provides a means for citizens to obtain information held by the provincial government.

With respect to government-generated monitoring data and reports, much of this information is made publicly available as a matter of course. You can also make use of the provincial *Freedom of Information and Protection of Privacy Act* and the federal *Access to Information Act* to gain access to government information.

## **Join a group**

One of the easiest ways for you to take action on your air or water quality concerns or interests is to join a group that deals with air or water quality matters. There are a number of options available to you.

### **Environmental groups**

An obvious place to start is with environmental groups. You may know of environmental groups in your area. Contact them and find out whether they deal with or would be interested in becoming involved in air or water quality matters.

The best resource for information about environmental groups in Alberta is the Alberta Environmental Network (AEN). The AEN is an umbrella organization for environmental groups throughout Alberta, and provides opportunities for these groups to share information and resources and work together in addressing environmental issues. Much of the AEN's cooperative activity takes place through its caucuses, which are groups that focus on specific subject areas. AEN member groups may join as many caucuses as are of interest to them. As part of its services, the AEN maintains a home page on the Internet, and also has a directory of environmental organizations in Alberta.

If you are interested in air or water quality matters on a broader basis, you may want to contact the Canadian Environmental Network (CEN). The CEN performs a similar function to the AEN, but on a national basis.

### **Municipal opportunities**

You should also check with your municipality to find out if there are public participation opportunities related to environmental or air or water quality matters. Some municipalities have environmental advisory committees that include public representation to provide input on local environmental matters to the municipal council and administration. If your municipality does not have such a committee, you may want to lobby it to create one, but keep in mind that the municipality will need to find funds in its budget to do so.

## **Do your own monitoring**

### **What air quality matters do you want to monitor?**

One way to do your own air quality monitoring is to keep notes, videos or other records of local air quality. You can record air quality information on a regular basis, or choose only to record information about incidents of concern to you. You may want to record the following types of information in carrying out your own monitoring.

- Descriptions related to air quality, including any odours, and the appearance of any plume or substance trail (colour, density and size).
- Location information including your location when monitoring, any apparent sources of substances affecting air quality, and the path of any substance released where it can be determined (for example, visible emissions).
- Information about the date and the time of day and, if you are monitoring a specific incident, the duration of the incident.
- Information about any apparent effects caused by substances affecting air quality, including environmental and health-related effects. For example, if you or a family member seeks medical treatment for apparent health-related effects, keep a record of the diagnosis, the medical treatment you received, who provided it, and the duration of your symptoms.
- Descriptions of weather conditions, wind direction and speed.

### **What water quality matters do you want to monitor?**

One way to do your own water quality monitoring is to keep notes, videos or other records of local water quality. You can record water quality information on a regular basis, or choose only to record information about incidents of concern to you. You may want to record the following types of information in carrying out your own monitoring.

- Descriptions related to water quality, including the appearance of any plume or substance trail (colour and size).
- Descriptions and information related to changes in the biological, chemical or physical parameters that are being monitored. For example, note any changes in vegetation or other organisms that surround or live in a water body.
- Location information including your location when monitoring, any apparent sources of substances affecting water quality. Indicate the path of any substance release where it can be determined (for example, a visible plume caused by a substance released into the water).

## **ENFORCEMENT AND COMMUNITY INVOLVEMENT** Your involvement in air and water quality monitoring and enforcement

- Information about the date and the time of day you are monitoring. If you are monitoring a specific incident, provide information about the duration of the incident.
- Information about any apparent effects caused by substances affecting water quality, including environmental and health-related effects. For example, if you or a family member seeks medical treatment for apparent health-related effects, keep a record of the diagnosis, the medical treatment you received, who provided it, and the duration of your symptoms. These effects will probably be noticeable with respect to water you drink, cook with or bathe with.
- Descriptions of weather conditions, especially heavy precipitation or flooding.

### **Be consistent in monitoring**

Where you are doing regular monitoring of air or water quality, consistency is an important consideration. You should try to do your monitoring the same way every time, from the same location. By maintaining the same procedure for carrying out your monitoring activities, you reduce the possibility that your results are affected by different locations or other variables beyond your control. This gives greater strength to your monitoring results.

### **What will you do with your monitoring information?**

If you are planning to do your own air or water quality monitoring, you should consider what you want to do with the information that you will gather. Some options include:

- sharing the information with local industrial operators to discuss or otherwise deal with local air or water quality concerns;
- providing the information to government regulators, either to establish background data about local air or water quality conditions or to initiate investigative or enforcement proceedings; and
- sharing the information with local groups or citizens who have similar interests or concerns about your community's air or water quality.

Chapter 2 of the guidebook contains further information and resources about air and water quality monitoring.

## **Other participation options**

### **Public consultations**

There may be opportunities for you to participate in initiatives related to air and water quality matters. In many instances, government undertakes public consultation when it is thinking of making changes in policy or legislation. Any public consultation on air or water quality matters would be a way for you to become involved by expressing your concerns.

## Clean Air Strategic Alliance

The Clean Air Strategic Alliance (CASA) is a multi-stakeholder initiative that seeks to deal with air quality issues within Alberta. CASA involves a broad range of stakeholders with interests in air quality, including various provincial and federal government departments, industry, environmental groups, health groups and others. CASA maintains a home page on the Internet at <<http://www.casahome.org>> and makes ambient air monitoring data from various regions of Alberta publicly accessible on the Internet at <<http://www.casadata.org>>.

## Airshed monitoring zones

As well, CASA supports the development of airshed monitoring zones, which deal with air quality issues on a regional basis. There are currently four airshed monitoring zones within Alberta. If your community is located within one of these zones, you may wish to contact the zone to find out more about its activities and the opportunities for public participation. If there is not a zone in your area, you may want to contact CASA to find out more about how these zones are established and what would be required to establish a zone in your region.

## Participation in water monitoring

There are many opportunities for public participation in water quality monitoring. For example, the Alberta Lake Management Society (“ALMS”) is active throughout Alberta. This group supports volunteer citizen monitoring of water quality. The primary focus of ALMS is water quality of lakes. However, ALMS also supports assessment of lake shorelines and riparian areas, stream health and watershed health.

There are also many organizations that deal with particular water bodies or watersheds. These organizations often address planning and use concerns, as well as water quality concerns. One such organization is the North Saskatchewan Watershed Alliance (“NSWA”). NSWA is a non-profit society whose sole purpose is to protect and improve water quality and ecosystem functioning in the North Saskatchewan watershed. Their website has an excellent list of organizations that focus on other water bodies or watersheds.

## Start your own group

Should you find that none of the options mentioned above satisfy your desire to take action, and you feel that there is sufficient community interest, you could consider starting your own group to deal with air or water quality issues. There is a wide range of information available on this topic; the resource list indicates a number of sources. Some of the matters you will have to consider include:

- planning, including developing a vision for your group;
- funding for your group and its activities;

- attracting participants and community support for your group; and
- choosing and developing activities for your group.

While starting your own group can require a great deal of time and effort, it may be an effective way for you to take steps to deal with the air or water quality concerns in your community and work with your fellow citizens to take action on these concerns. Chapter 2 of the guidebook focuses on the creation and development of a volunteer group for air or water quality monitoring.

## **What can you do about enforcement?**

### **Reporting**

The provincial environment department, Alberta Environment (AENV), is the agency that is mainly responsible for enforcement of environmental laws related to air and water quality. One of the main ways you can become involved in assisting enforcement is to report incidents or other matters of concern to AENV.

AENV maintains a toll-free, 24-hour telephone line at 1-800-222-6514 for environmental complaints and reports. All calls taken through this line are referred to an AENV investigator for investigation. The identity of callers is kept confidential; however, AENV may contact callers again where they require further information about a report. When making a report on this line, you can indicate to AENV if you would like to receive information about the results of their investigation.

AENV maintains six regional offices that are responsible for regulatory matters in specific regions of Alberta. Each office has staff members that carry out monitoring and enforcement duties. You may choose to provide information or reports to the office for the region covering your community. The resource list contains further information about contacting the different regional offices.

### **Investigations**

Another option available to citizens is to take steps to initiate an investigation of an alleged offence under the *Environmental Protection and Enhancement Act*. The Act provides a procedure where two Alberta citizens over the age of 18 can provide a sworn statement related to the alleged offence, including the information supporting their belief that an offence has occurred. When such a statement is provided to the Director, who is an official within AENV, AENV must then carry out an investigation and report back on its results to the citizens who initiated it. AENV officials retain the discretion to determine whether to take enforcement action based on the investigation.

### **Private prosecutions**

One other option available to citizens is to initiate a prosecution for an offence of regulatory legislation, such as the *Environmental Protection and Enhancement Act*. The common law allows

citizens to bring a private prosecution of an offence. However, it is important to keep in mind that this is often a last resort for individual citizens. It will be necessary to retain a lawyer to act for you in prosecuting the offence, which can become quite costly. However, any fine that may be assessed by the court in a successful prosecution will not be payable to you, but rather to the provincial treasury, similar to other fines. An exception to this occurs under the federal Fisheries Act, which provides that private prosecutors may receive a portion of fines accessed.

As well, the Attorney General has the right at law to intervene in private prosecutions and take over conduct of the proceedings. Once the Attorney General has intervened, he or she may exercise their discretion over the prosecution, which can include deciding to stay the proceedings. A stay of proceedings has the practical effect of ending the prosecution unless action is taken within one year of the stay to resume the prosecution.

Given these difficulties, private prosecution is not an enforcement tool to be lightly pursued. Any person considering commencing a private prosecution should first investigate its requirements and implications in detail.

## **For more information**

For further information about becoming involved in air and water quality monitoring and enforcement, see the Enforcement and Community Involvement fact sheet *Resource List for Enforcement Matters and Community Involvement*, from the background materials.

# **Enforcement and Community Involvement**

---

## **Resource List for Enforcement Matters and Community Involvement**

***NOTE: this material is current to August 2001. Please update your information to the date that these materials are being used. For suggestions on updating these materials, please see the Introduction to Community Action on Industrial Facilities - Background Materials for Community Involvement in Air and Water Quality Monitoring and Enforcement ("A word of caution about your use of this material").***

For more information about enforcement of the *Environmental Protection and Enhancement Act* and about public involvement in air and water quality monitoring and enforcement, check the following sources.

### *Alberta Environment*

- Alberta Environment maintains a toll-free telephone line at 1-800-222-6514 that is open 24 hours a day to receive reports and complaints from the public and industry about environmental matters.
- The Regulatory Assurance Division of Alberta Environment deals with environmental enforcement matters on a province-wide basis. This division can be contacted at:

Alberta Environment  
Regulatory Assurance  
15<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-2364 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-1594

- The Monitoring Division of Alberta Environment deals with environmental enforcement and monitoring matters on a province-wide basis, and coordinates the department's activities related to source and ambient air monitoring. This division can be contacted at:

Alberta Environment  
Monitoring Division  
11<sup>th</sup> Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 415-9356 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7958

- Alberta Environment has six regional offices for different areas of the province. These regions are responsible for enforcement and monitoring matters at the regional level, and have staff designated to perform related functions. To determine the region in which your community is located, contact the regional office closest to your community. The contact information for the regions is listed below, and is also available on the Internet through <<http://www.gov.ab.ca/env/regions.html>>.

Alberta Environment  
Northwest Boreal Region  
2<sup>nd</sup> Floor, Provincial Building  
9621 – 96 Avenue  
Peace River, AB T8S 1T4  
Phone: (780) 624-6326 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 624-6542

Alberta Environment  
Northeast Boreal Region  
111 Twin Atria Building  
4999 - 98 Avenue  
Edmonton, AB T6B 2X3  
Phone: (780) 427-7617 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-7824

Alberta Environment  
Northern East Slopes Region  
107, 111 – 54 Street  
Edson, AB T7E 1T2  
Phone: (780) 723-8357 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 723-8386

Alberta Environment  
Parkland Region  
3<sup>rd</sup> Floor, Provincial Building  
4920 – 51 Street  
Red Deer, AB T4N 6K8  
Phone: (403) 340-7052 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 340-5022

Alberta Environment  
Bow Region  
3<sup>rd</sup> Floor, 2938 – 11 Street NE  
Calgary, AB T2E 7L7  
Phone: (403) 297-7948 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 297-6069

Alberta Environment  
Prairie Region  
2<sup>nd</sup> Floor Provincial Building  
200 – 5<sup>th</sup> Avenue South  
Lethbridge, AB T1J 4C7  
Phone: (403) 382-5512 (toll-free in Alberta by calling 310-0000)  
Fax: (403) 382-4428

- The Compliance Assurance Principles is a policy document that provides details on how Alberta Environment ensures compliance with environmental legislation. This document can be accessed on the Internet at <[http://www3.gov.ab.ca/env/protenf/documents/CAP\\_Final\\_2000.pdf](http://www3.gov.ab.ca/env/protenf/documents/CAP_Final_2000.pdf)>, or can be obtained in print form from:

Alberta Environment  
Information Centre  
Main Floor, 9920 – 108 Street  
Edmonton, AB T5K 2M4  
Phone: (780) 944-0313 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 427-4407  
E-mail: [env.infocent@gov.ab.ca](mailto:env.infocent@gov.ab.ca)

- Alberta Environment's home page on the Internet is at <<http://www.gov.ab.ca/env>>. It provides basic introductory information about the department and its services.
- Basic information about Alberta Environment's enforcement activities is provided on the Internet at <<http://www.gov.ab.ca/env/protenf.html>>. An overview of the Enforcement Program is provided on the Internet at <<http://www.gov.ab.ca/env/protenf/EPEA/enforce.html>>. Note that this is not the *Enforcement Program* policy document referred to in the background materials on enforcement.
- Attached to the Alberta Environment home page on the Internet are various fact sheets about the *Environmental Protection and Enhancement Act* and related matters. These can be found at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/facttc.html>>. Fact sheets of interest include those about the *Release Reporting Regulation*, at <<http://www.gov.ab.ca/env/protenf/legislation/factsheets/release.html>>, and about enforcement generally, at <<http://www.gov.ab.ca/env/protenf/approvals/factsheets/enforce.html>>.
- General information about air quality monitoring that Alberta Environment carries out can be found on the Internet at <<http://www.gov.ab.ca/env/air/airqual/monitor.html>>.
- A list of air quality publications that are available from the Alberta Environment library can be found on the Internet at <<http://www.gov.ab.ca/env/air/airqual/pubs.html>>.
- General information about water monitoring that Alberta Environment carries out can be found on the Internet at <<http://www.gov.ab.ca/env/water.html>>.

- A list of water quality publications that are available from Alberta Environment can be found on the Internet at <<http://www.gov.ab.ca/env/info/infocentre/index.cfm>>.
- Internet access is also available for some quarterly and annual air quality reports and special air quality surveys done by Alberta Environment. The quarterly reports are only available on the Internet starting from the first quarter of 1998 (January – March). The annual reports are available on the Internet for 1994 through 1996.

Quarterly air quality reports: <<http://www.gov.ab.ca/env/air/airqual/quart.html>>

Annual air quality reports: <<http://www.gov.ab.ca/env/air/airqual/annual.html>>

Special air quality reports: <<http://www.gov.ab.ca/env/air/airqual/special.html>>

- The Alberta Environment library maintains a large collection of environmental information, including government documents and reports. This library is open to the public during regular government office hours (Monday – Friday, 8:15 a.m. – 4:30 p.m.) The library is located at:

Alberta Environment Library

6<sup>th</sup> Floor, 9920 – 108 Street

Edmonton, AB T5K 2M4

Phone: (780) 422-5870 (toll-free in Alberta by calling 310-0000)

Fax: (780) 422-0170

E-mail: [env.library@gov.ab.ca](mailto:env.library@gov.ab.ca)

<<http://www.augustana.ab.ca/neos/neosevp>>

The library is part of the NEOS Consortium of libraries, and its catalogue can be accessed on the Internet through the University of Alberta GATE catalogue at <<http://www.library.ualberta.ca>>.

#### *Clean Air Strategic Alliance (CASA)*

- CASA is a non-profit, multi-stakeholder body that carries out strategic management of air quality in Alberta. It is made up of a Board of Directors representing various stakeholders and project teams that address specific air quality issues. CASA can be contacted at:

9<sup>th</sup> Floor, Sterling Place

9940 – 106 Street

Edmonton, AB T5K 2N2

Phone: (780) 427-9793

Fax: (780) 422-3127

E-mail: [casa@casahome.org](mailto:casa@casahome.org)

<<http://www.casahome.org>>

- CASA's website, at <[www.casahome.org](http://www.casahome.org)>, is a good source of information about Alberta air quality. It is possible to access air monitoring data through this site (see information below about the Alberta Ambient Air Data Management System). CASA also maintains information on the site about its projects and initiatives at <[http://www.casahome.org/for\\_stakeholders/issue\\_teams/INDEX.ASP](http://www.casahome.org/for_stakeholders/issue_teams/INDEX.ASP)>.
- The website also contains information about the four existing airshed management zones that have been established under CASA at <<http://www.casahome.org/airshed-zones/index.asp>>. Airshed management zones are established to deal with air quality issues in a specific region. This includes carrying out air quality monitoring for the region. The CASA publication *Zone Air Quality Management Guidelines* provides information about how and when zones are created, and discusses options other than zones that are available. Copies of this document can be obtained from CASA.
- The existing airshed management zones are the West Central Airshed Society, which covers west central Alberta, the Parkland Airshed Management Zone, which covers central Alberta directly south of the West Central zone, the Wood Buffalo zone, which covers the northeastern area of Alberta, including the Fort McMurray and Fort McKay areas and the Fort Air Partnership Zone, which covers the Fort Saskatchewan region. Information about these zones can be obtained through the CASA website at <[http://www.casahome.org/about\\_CASA/directory/airshed\\_direct.asp](http://www.casahome.org/about_CASA/directory/airshed_direct.asp)>, the Alberta Ambient Air Data Management System website at <[http://www.casadata.org/Airsheds\\_22j.htm](http://www.casadata.org/Airsheds_22j.htm)>, or by contacting the zones directly as follows:

West Central Airshed Society  
P.O. Box 6360  
Drayton Valley, AB T7A 1R8  
Phone: (780) 514-3533  
Fax: (780) 514-3563  
<<http://www.casadata.org/wcas/indexj.htm>>

Parkland Airshed Management Zone  
P.O. Box 1020  
Sundre, AB T0X 1X0  
Phone: (403) 238-6640  
Fax: (403) 238-6604  
E-mail: amarok@telusplanet.net  
<<http://www.casadata.org/pamz/indexj.htm>>  
<[http://www.casahome.org/airshed\\_zones/10pamz.htm](http://www.casahome.org/airshed_zones/10pamz.htm)>

Wood Buffalo Zone  
c/o Wood Buffalo Environmental Association  
Box 5567  
Fort McMurray, AB T9H 3G5  
Phone: (780) 799-4420  
Fax: (780) 715-2016  
E-mail: wbea@home.com  
<<http://www.wbea.org>>  
<<http://www.casadata.org/wbea/indexj.htm>>

Fort Air Partnership Association  
8534 - 100 Avenue  
Fort Saskatchewan, AB T8L 3B5  
Phone: (780) 998-5238  
E-mail: fortair@home.com

- CASA also maintains another website that provides air quality and ecological data for Alberta, known as the Alberta Ambient Air Data Management System (AAADMS). This site can be accessed at <<http://www.casadata.org>> or through the “Air Quality Data” link on the main CASA website at <<http://www.casahome.org>>.

*Access to government information*

- The *Disclosure of Information Regulation* (A.R. 116/93) sets out the procedure for accessing information that is publicly available under the *Environmental Protection and Enhancement Act*. To obtain copies of such information, contact

Alberta Environment  
Regulatory Approvals Centre  
Main Floor, 9820 – 106 Street  
Edmonton, AB T5K 2J6  
Phone: (780) 427-6311 (toll-free in Alberta by calling 310-0000)  
Fax: (780) 422-0154

- Information held by the provincial government can also be accessed under the *Freedom of Information and Protection of Privacy Act* (S.A. 1994, c. F-18.5). The government of Alberta maintains a home page for this Act at <<http://www.gov.ab.ca/foip>>. Each provincial government department also has staff designated to deal with information requests under this Act. For Alberta Environment, contact:

Alberta Environment  
FOIP Coordinator  
6<sup>th</sup> Floor, 9915 – 108 Street  
Edmonton, AB T5K 2G8  
Phone: (780) 427-4429 (toll-free by calling 310-0000)  
Fax: (780) 427-9838

- Information held by the federal government can be accessed under the *Access to Information Act* (R.S.C. 1985, c. A-1). The website <<http://infoweb.magi.com/~accessca/brochure.html>> provides basic information about accessing information under this Act.
- The *Guide to Access to Information and Protection of Privacy – Alberta and Canada* is an excellent practical information resource to guide you through the process of accessing information held by either the provincial or federal government. The guide is written and published by the Alberta Civil Liberties Research Centre, and can be purchased from the Centre for \$3.00 plus shipping and handling. The Centre can be contacted at:

Alberta Civil Liberties Research Centre  
University of Calgary  
c/o Faculty of Law  
2500 University Drive N.W.  
Calgary, AB T2N 1N4  
Phone: (403) 220-2505  
Fax: (403) 284-0945  
E-mail: [aclrc@ucalgary.ca](mailto:aclrc@ucalgary.ca)  
<<http://www.aclrc.com>>

*Environmental Law Centre*

- This non-profit charitable organization provides environmental law information to the public free of charge, including information on enforcement of the *Environmental Protection and Enhancement Act*. For more information about the Centre's services, contact:

Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099  
Fax: (780) 424-5133  
Alberta toll-free: 1-800-661-4238  
E-mail: [elc@elc.ab.ca](mailto:elc@elc.ab.ca)  
<<http://www.elc.ab.ca>>
- The Centre maintains a library of environmental information that is accessible to the public free of charge. The library, located at the Centre's office, is open Monday - Friday, 8:30 a.m. – 12:00 noon and 1:00 p.m. – 4:30 p.m. Included in the library collection are various court decisions and the Centre's quarterly newsletter *NewsBrief*, which contains regular information on enforcement in the “Enforcement Briefs” column. For further information about the Centre's library, see <<http://www.elc.ab.ca>>.
- The Centre offers a search service that allows people to search by name for enforcement action taken by Alberta Environment under the *Environmental Protection and Enhancement Act* and legislation that preceded that Act. For more information about the Environmental Enforcement Historical Search Service, contact the Centre or see its home page at <<http://www.elc.ab.ca>>. The fee for a search is \$25.00 plus GST per name search. Searches are provided at no charge to non-profit environmental organizations.
- The *Directory of Environmental Resource Collections in Alberta* is an Environmental Law Centre publication that lists environmental information collections and libraries throughout Alberta. The *Directory* can be purchased from the Centre and is also available for use at the Centre's library. For more information, see <<http://www.elc.ab.ca>>.

*Where Can I Find...? A Research Guide for Groups Interested in Health and Environment Issues*

- This booklet, published jointly by Health Canada and Environment Canada, provides helpful information on carrying out research and information gathering activities. Note that this booklet was prepared in Halifax, and thus contains some specific references to information sources in Atlantic Canada. However, it contains enough general information to be useful to anybody seeking to gather environmental information.
- This booklet can be obtained free of charge from:

EcoAction Community Funding Programs  
Environment Canada  
16<sup>th</sup> Floor, Queen Square  
45 Alderney Drive  
Dartmouth, Nova Scotia B2Y 2N6  
Phone: (902) 426-8521  
Fax: (902) 426-2062  
E-mail: ecoaction2000.mar@ec.gc.ca

- This booklet can also be obtained on the Internet at <<http://www.ns.ec.gc.ca/community/pdf/research.pdf>>

*Alberta Environmental Network*

- The Alberta Environmental Network (AEN) operates as a non-profit grassroots umbrella organization for Alberta environmental organizations. It seeks to facilitate sharing of information and resources among member groups and assists them in taking common action.

- The AEN can be contacted at:

Alberta Environmental Network  
10511 Saskatchewan Drive  
Edmonton, AB T6E 4S1  
Phone: (780) 433-9302  
Fax: (780) 433-9305  
E-mail: [aen@web.ca](mailto:aen@web.ca)  
<<http://www.web.ca/~aen>>

- AEN publications include the *Alberta Environmental Directory*, a listing of environmental groups and other organizations involved in environmental matters, and *AEN Field\*Notes*, the AEN's regular newsletter. See <<http://www.web.ca/~aen/field notes/fieldnotes.htm>> for further information about *Field\*Notes*. For further information about the *Alberta Environmental Directory*, see <<http://www.web.ca/~aen/member/directory.htm>>. Copies of the directory can be purchased for \$31.05 (includes GST and postage) from:

Pembina Institute for Appropriate Development  
Box 7558  
Drayton Valley, AB T7A 1S7  
Phone: (780) 542-6272  
Fax: (780) 542-6464

An Internet searchable version of the directory can be accessed at  
<<http://www.pembina.org/aed.htm>>.

*Canadian Environmental Network*

- The Canadian Environmental Network (CEN) is a national umbrella organization for environmental non-governmental groups. It maintains several groups, known as caucuses, focusing on specific areas of interest and concern. Provincial and territorial networks are affiliated with the CEN. The CEN can be contacted at:

Canadian Environmental Network  
300 – 945 Wellington  
Ottawa, ON K1Y 2X5  
Phone: (613) 728-9810  
Fax: (613) 728-2963  
E-mail: [info@cen.rce.org](mailto:info@cen.rce.org)  
<<http://www.cen-rce.org>>

*Community Action on Air Quality – A Guidebook to Community Involvement in Air Quality Monitoring and Enforcement*

- The guidebook portion of the Community Action on Air Quality package contains chapters on forming a community-based volunteer group to carry out environmental monitoring and enforcement. It also contains helpful information on making contacts, building partnerships and accessing funding.
- The Community Action on Air Quality materials package is published by the Environmental Law Centre. The package, which includes the guidebook, can be purchased in print version by contacting:

Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099  
Fax: (780) 424-5133  
Alberta toll-free: 1-800-661-4238  
E-mail: [elc@elc.ab.ca](mailto:elc@elc.ab.ca)

- The guidebook can also be downloaded from the Internet free of charge at the Centre's home page: <<http://www.elc.ab.ca>>.

*How-To Guide for Millennium Eco-Communities: From Needs Assessment to Evaluation*

- This Environment Canada publication provides a good basic guide to development of community-based environmental projects. It covers assessment of community needs; setting objectives; development of partnerships; finding and keeping volunteers; communications; and project evaluation.
- This publication can be obtained from regional offices for the Environment Canada EcoAction Community Funding Programs. The Alberta and Northwest Territories regional office is:

EcoAction Community Funding Programs  
4999 – 98 Avenue  
Twin Atria #2, Room 200  
Edmonton, AB T6B 2X3  
Phone: (780) 951-8710 or 1-800-567-1570  
Fax: (780) 495-4367  
E-mail: ecoaction.pnr@ec.gc.ca

- This publication can also be obtained on the Internet at <[http://www.ec.gc.ca/eco/guide/entry\\_e.htm](http://www.ec.gc.ca/eco/guide/entry_e.htm)>.

*Green Teacher magazine*

- This Canadian-published magazine is about environmental education, with an emphasis on children and youth. The Spring-Summer 1998 issue (Issue 55) focuses on environmental monitoring, and contains information about various contacts and monitoring programs. Back issues and subscriptions can be purchased.
- Contact the magazine at:

Green Teacher  
95 Robert Street  
Toronto, ON M5S 2K5  
Phone: (416) 960-1244  
Fax: (416) 925-3474  
E-mail: [greentea@web.net](mailto:greentea@web.net)  
<<http://www.greenteacher.com>>

*Sustainable Communities Initiative*

- This initiative is an Alberta-wide program administered by FEESA, an Environmental Education Society. The program seeks to bring together citizens and different sectors within Alberta communities that are interested in improving the health of their communities. Further information can be obtained on the Internet at <<http://www.fessa.ab.ca/sci.htm>> or by contacting:

**FEESA**

#600, 10707 - 100 Avenue  
Edmonton, AB T5J 3M1  
Phone: (780) 421-1497  
Fax: (780) 425-4506  
E-mail: info@feesa.ab.ca  
<<http://www.feesa.ab.ca>>

*Pollution Watch*

- This website, located at <<http://www.pollutionwatch.org>> provides access to information about pollutant releases throughout Canada. Users can enter their postal code to obtain information about pollutants released in their local areas. Data used on this website is gathered from Environment Canada's National Pollutant Reduction Inventory (NPRI) and does not cover every release of every possible pollutant.

*Cleanair.ca*

- This website, located at <<http://www.cleanair.ca>>, is designed to give citizens knowledge and skills to act to protect air quality. The site gives access to a handbook, also titled “*Cleanair.ca*”

*Private prosecutions*

- *Enforcing Environmental Law: A Guide to Private Prosecution* is written by Linda F. Duncan and was published by the Environmental Law Centre in 1990. It provides a layman's guide to private prosecution of environmental offences. The reader is cautioned that the caselaw analysis is not up to date. This book can be found at the Environmental Law Centre library, and can also be purchased from the Environmental Law Centre for \$14.95 (\$6.25 for members of the Canadian Environmental Network and provincial affiliates such as the Alberta Environmental Network).

To purchase this book, contact:

Environmental Law Centre  
204, 10709 Jasper Avenue  
Edmonton, AB T5J 3N3  
Phone: (780) 424-5099 (Alberta toll-free: 1-800-661-4238)  
Fax: (780) 424-5133  
E-mail: [elc@elc.ab.ca](mailto:elc@elc.ab.ca)  
<<http://www.elc.ab.ca>>

- The Environmental Law Centre library carries a range of materials on private prosecution of environmental offences. The library is located at the Environmental Law Centre office at 204, 10709 Jasper Avenue, Edmonton, AB T5J 3N3, and is open to the public Monday through Friday, 8:30 a.m. – 4:30 p.m. (closed 12:00 noon – 1:00 p.m.). For further information, the library can be contacted at:

Phone: (780) 424-5099, (Alberta toll-free: 1-800-661-4238)  
Fax: (780) 424-5133  
E-mail: elc@elc.ab.ca  
<http://www.elc.ab.ca>

*For information about volunteer water quality monitoring programs, check the following sources:*

- <<http://www.biology.ualberta.ca/alms/home.htm>>

This is the Internet website for Alberta Lake Watch, a volunteer monitoring program in Alberta. They conduct programs for lake water quality monitoring, shoreline assessments, stream health and watershed assessments. They can also be contacted at:

Preston McEachern  
ALMS Lake Watch Coordinator  
Alberta Lake Management Society  
University of Alberta  
C/o Department of Biological Sciences  
Edmonton, Alberta T6G 2E9  
Phone: (780) 492-1294  
Fax: (780) 492-9234  
E-mail: [preston@gpu.srv.ualberta.ca](mailto:preston@gpu.srv.ualberta.ca)

- <<http://www.riverwatch.ab.ca>>

This is the Internet website for River Watch which is a monitoring program geared toward high school student students in Alberta. The purpose is primarily educational. However, the data collected provides information about the overall river health and human impact in Alberta.

- <[http://www.ns.ec.gc.ca/community/acap/index\\_e.html](http://www.ns.ec.gc.ca/community/acap/index_e.html)>

This is the Internet website for the Atlantic Coastal Action Program (ACAP). ACAP involves 13 sites across Atlantic Canada and is a community based program that relies on local involvement and support. ACAP helps the communities to define common objectives for environmentally appropriate use of their resources and to develop strategies that will achieve these objectives.

- <<http://fox.nstn.ca/~carp/>>

This is the Internet website of the Clean Annapolis River Program. This is a charitable, community owned corporation created to work with the community and interested organizations to foster the conservation, restoration and sustainable use of the freshwater and marine ecosystems of southwestern Nova Scotia's Annapolis River and its watershed.

- <<http://www3.pei.sympatico.ca/~seaacap/index2.html>>

This is the Internet website of the Southeast Environmental Association, a community monitoring group in the Cardigan Bay Region. This organization is a participant in the Atlantic Coastal Action Program.

- <<http://www.texaswatch.geo.swt.edu>>

This is an American example of a volunteer monitoring program.

- <<http://www-heb.pac.dfo-mpo.gc.ca/pskf/home.htm>>

This is the Internet website of Pacific Streamkeepers Federation, an initiative of the Department of Fisheries and Oceans in Canada. The objectives of the Federation are to provide volunteers with training and support to protect and restore local aquatic habitat. The Federation also seeks to educate about the importance of watershed resources. The Federation has created *The Streamkeepers Handbook and Modules*.

- <<http://www.nswa.ab.ca>>

This is the Internet website of the North Saskatchewan Watershed Alliance. This is a non-profit society whose purpose is to protect and improve water quality and ecosystem functioning in the North Saskatchewan watershed within Alberta. The website also provides a list of ongoing projects relating to water quality in Alberta.

- <[http://www.epa.gov/OWOW/volunteer/vm\\_index.html](http://www.epa.gov/OWOW/volunteer/vm_index.html)>

This Internet website provides access to *The Volunteer Monitor, the National Newsletter of Volunteer Monitoring*. This is a periodical publication produced by the River Network. This publication can also be obtained by contacting:

River Network  
520 SW 6<sup>th</sup> Avenue, Suite 130  
Portland, OR 97204  
Phone: (503) 241-3506  
E-mail: [volmon@rivernetwork.org](mailto:volmon@rivernetwork.org)

- <<http://www.epa.gov/OWOW/wetlands>>

This Internet website provides access to *Volunteer Wetland Monitoring: An Introduction and Resource Guide, EPA 843-B-00-001*. This document can also be obtained by contacting the U.S. Environmental Protection Agency at (800) 832-7828 (phone); (703) 748-1308 (fax).

- <<http://www.epa.gov/OWOW/monitoring/vol.html>>

This Internet website provides access to *Volunteer Stream Monitoring: A Methods Manual, EPA 841-B-97-003*. This document can also be obtained by contacting the National Service Centre for Environmental Publications at (800) 490-9198.

- *Streamkeepers' Field Guide: Watershed Inventory and Stream Monitoring Methods*

This document written by T.B. Murdoch and M. Cheo in 1996 can be ordered by contacting:

Adopt-a-Stream Foundation  
600-128<sup>th</sup> Street SE  
Everett, WA 98208  
Phone: (425)316-8592  
E-mail: [aASF@streamkeeper.org](mailto:aASF@streamkeeper.org)  
<<http://www.streamkeeper.org/tools/catalog.htm>>

#### *Water Watchdog Program*

- This program is a hands-on water monitoring program aimed at children aged 7-14. It can be used by classes, youth groups or even individual families. The project is presented by Partners for the Saskatchewan River Basin. For further information, check the Internet at <<http://www.saskriverbasin.ca/WaterWatchdog>> or contact:

Partners For the Saskatchewan River Basin  
402 Third Avenue South  
Saskatoon, SK S7K 3K5  
Phone: (306) 665-6887 (toll free 800-567-8007)  
Fax: (306) 665-6117  
E-mail: [partners@saskriverbasin.ca](mailto:partners@saskriverbasin.ca)