

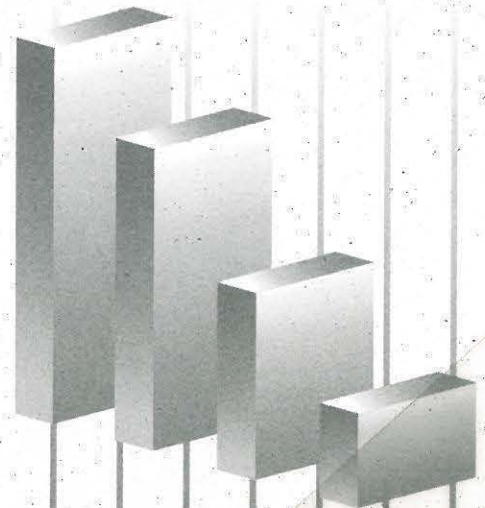
Environmental Leaders



**Voluntary
Action on
Toxic Substances**



Update



Environmental Leaders 2 Update
Accelerated Reduction/Elimination of Toxics (ARET)
Progress Report

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Environmental Leaders



**Voluntary
Action on
Toxic Substances**

Update

January 1998

ARET



Accelerated Reduction/ Elimination of Toxics

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ARET (Accelerated Reduction/Elimination of Toxics) is a voluntary, non-regulatory initiative that targets 117 toxic substances including 30 that persist in the environment and bioaccumulate in living organisms. Launched in 1994 by a multi-stakeholder committee consisting of representatives from industry, health and professional associations and government, ARET continues to achieve progress in reducing emissions of the worst toxic substances, thus reducing overall risk to human health and the environment. Voluntary approaches like ARET complement regulatory requirements to help secure a healthier future for all Canadians.

ARET OBJECTIVE

ARET seeks to reduce the adverse impact of toxic substances on human health and the environment as quickly as possible through the accelerated reduction or elimination of emissions selected toxic substance. To achieve this, participants are asked to develop action plans to achieve significant results by the year 2000, with priority given to those substances that are persistent, bioaccumulative and toxic.

PRINCIPLES

The development of the ARET initiative was based upon the following six principles:

- sound science and common sense
- pollution prevention
- life-cycle management
- multi-media
- sustainable development
- open, transparent, consultative approach

Chapter I OVERVIEW

WHO PARTICIPATES IN ARET?

ARET participants include both industry and government organizations. Participants submit detailed action plans outlining their ARET goals and emission reduction/elimination strategies. By the end of 1995, 278 facilities from 143 companies across Canada were actively involved in ARET.

Since then, one company has added a facility, and 10 new companies representing 13 facilities have filed action plans in which they commit to reduce a total of 195 tonnes of toxic substance emissions. In addition, five companies have filed letters of intent to submit action plans. ARET participants are listed in Appendix 4 of this report.

In addition to these active ARET participants, another 115 companies and government organizations with nil or negligible ARET emissions have declared support for the program. Appendix 5 lists ARET supporters.

VISION

In the long term, ARET seeks:

- virtual elimination of emission of persistent, bioaccumulative and toxic substances
- reduction of other toxic emissions to levels insufficient to cause harm

TARGETS & SCHEDULE

By 2000, ARET aims to reduce emissions by:

- 90% for persistent, bioaccumulative and toxic substances on the ARET list
- 50% for all other ARET toxic substances

ARET STAKEHOLDERS

- ◆ Canadian Chemical Producers' Association
- ◆ Canadian Electricity Association
- ◆ Canadian Manufacturers of Chemical Specialties
- ◆ Canadian Petroleum Products Institute
- ◆ Canadian Pulp and Paper Association
- ◆ Canadian Steel Environmental Association
- ◆ Chemical Institute of Canada
- ◆ Comité de santé environnementale du Québec
- ◆ Mining Association of Canada
- ◆ The Alliance of Manufacturers and Exporters Canada
- ◆ British Columbia Ministry of Environment, Lands and Parks
- ◆ Nova Scotia Department of Environment
- ◆ Ontario Ministry of Environment and Energy
- ◆ Health Canada
- ◆ Industry Canada
- ◆ Environment Canada

Participants in ARET include companies and organizations from these sectors:

- pulp and paper
- mining and smelting
- chemical manufacturing
- chemical specialties
- electrical utilities
- oil, gas, and petroleum products
- steel
- aluminum
- other manufacturing
- federal government

THE ARET SUBSTANCES

There are 117 toxic substances on the ARET list (see Appendix 1). This list, which includes 30 substances that are persistent, bioaccumulative and toxic (PBT), is the result of screening some 2000 substances. The substances were scientifically assessed by a panel of toxicology experts from industry, health and government organizations. ARET substances are categorized into five groups:

LIST A-1 (30 substances) meet PBT criteria (target is 90% reduction by 2000).

LIST A-2 (2 substances) Consensus was not reached on whether these substances meet PBT criteria (target is 'best effort' reduction by 2000).

LIST B-1 (8 substances) meet toxicity and bioaccumulation criteria (target is 50% reduction by 2000).

LIST B-2 (33 substances) meet persistence and toxicity criteria (target is 50% reduction by 2000).

LIST B-3 (44 substances) meet toxicity criteria (target is 50% reduction by 2000).

CURRENT RESULTS

ARET participants continue to make progress towards their year 2000 targets. As of December 1996, participants had reduced their emissions by a total of 21,499 tonnes. This represents a 61 per cent overall reduction from base-year levels of 35,175 tonnes. Reduction targets for all ARET categories except List A-1 were achieved or surpassed four years prior to the year 2000.

In 1996, total emissions decreased by 5,064 tonnes. Notable reductions were reported for hydrogen sulphide (4,816 tonnes), nickel (308 tonnes), formaldehyde (275 tonnes), benzene (122 tonnes), ethanol (100 tonnes), 1,3 butadiene (98 tonnes), chloroform (79 tonnes), 1,1,2,2-tetrachloroethylene (24 tonnes), chromium (14 tonnes), and 1,4-dichlorobenzene (3 tonnes).

KEY ARET ACHIEVEMENTS TO 1996

- Achieved overall annual emissions reduction of 21,499 tonnes (61 per cent from base-year levels)
- 152 companies have submitted and are actively implementing action plans
- 100 facilities have met or exceeded ARET year 2000 targets in all substance categories for which they report
- Year 2000 targets have been met or exceeded for 54 per cent of ARET substances being reported
- Year 2000 targets have been exceeded for three of the five substance categories: B-1, B-2, B-3
- 70 per cent of ARET stakeholder industry association members participate in ARET

Even though there was a net decrease in emissions in 1996, individual emissions in categories A-1, A-2, B-1 and B-2 increased by a total of 197 tonnes during 1996. These increases were due to increased production, upsets in manufacturing processes, and changes in analytical and emission estimation methods. Participants who experienced temporary emission increases have confirmed that the causes of these upsets have been resolved, and that emission reductions are expected to continue as planned.

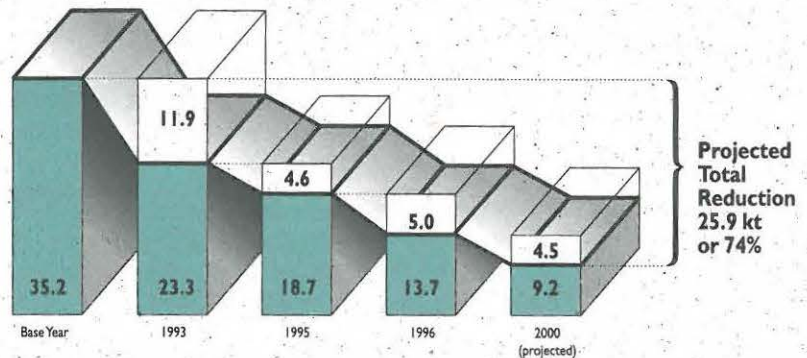
Emissions of polycyclic aromatic hydrocarbons (PAHs) increased by 64 tonnes in 1996 due to increased aluminum production. Emission increases of zinc (289 tonnes), copper (90 tonnes), lead (80 tonnes), arsenic (49 tonnes) and cadmium (6 tonnes) resulted from temporary problems with emission-control systems and technology transition at two companies in the mining and smelting sector.

Emission increases in phenol (39 tonnes) and acetaldehyde (29 tonnes) were due to the application of previously unavailable emission factors. Emissions of chlorine dioxide rose by 95 tonnes because pulp and paper companies increased their use of this bleaching agent, which is a substitute for chlorine gas. This substitution allows pulp mills to reduce chlorinated organic emissions such as dioxins and furans in their pulp bleaching effluents.

Despite these increases, ARET participants have already achieved the 50 per cent short-term goal for four of the substances showing increases: lead, arsenic, zinc and chlorine dioxide.

ARET participants will continue to update their action plans annually, monitor and evaluate their emission reduction efforts, and report progress towards achieving their commitments.

Actual and Projected Emission Reduction Progress from Base Year to 2000 (kilotonnes)



EMISSION ESTIMATION TECHNIQUES

In 1996, participants were asked what methods they used to estimate or calculate their ARET emissions. Here is what participants reported:

1. Data on water emissions are primarily obtained using direct monitoring or measurement of substance concentrations. As liquid effluents tend to be point-source emissions, they are relatively easy to measure. In addition, discharges to water have been more heavily scrutinized in the past, resulting in a highly developed protocol for measuring effluent parameters.
2. Sixty-five per cent of air emissions data are obtained using engineering estimates, emission factors and mass-balance calculations, as opposed to direct monitoring. In many cases, air emissions coming from storage or handling, fugitive losses, spills and other non-point sources are difficult to collect and measure. Total emissions from point sources including stacks, vents, ducts, pipes, or other confined process streams, can be measured by direct monitoring, but not all facilities have such monitoring.

Even though there was a net decrease in emissions in 1996, individual emissions in categories A-1, A-2, B-1 and B-2 increased by a total of 197 tonnes during 1996. These increases were due to increased production, upsets in manufacturing processes, and changes in analytical and emission estimation methods. Participants who experienced temporary emission increases have confirmed that the causes of these upsets have been resolved, and that emission reductions are expected to continue as planned.

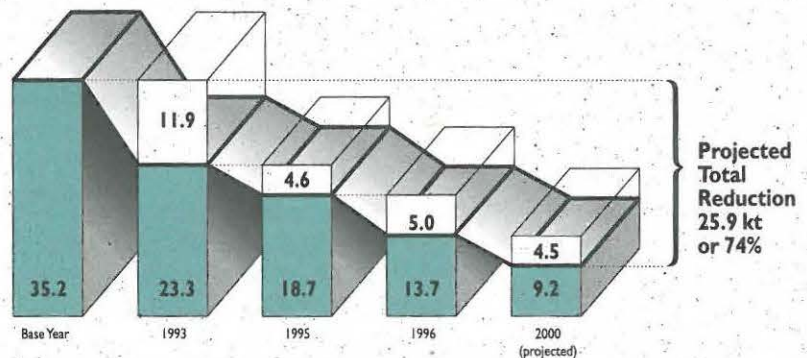
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ARET Letter Campaign Results (November 1997)

- 1 company said **yes** to participation
- 7 companies are considering participation
- 5 companies have not responded at all
- 7 companies said **no** to participation

Responses of companies from the NPRI list to whom letters were sent

Response Codes:
 Y - Yes N - No
 C - Considering participation
 NA - No answer yet

Duo-Fast	Y
ER Carpenter	C
Foamex	C
Owens-Corning	C
Vitafoam	C
Vallefoam/Domfoam	C
Woodbridge Foam	C
Wyeth-Ayerst	C
Amoco	NA
Bauer Industries	NA
Crane Canada	NA
Mirolin	NA
Van Waters & Rogers	NA
Petro-Canada	N
Chevron	N
Novopharm	N
Formica	N
Sidbec-Dosco (Ispat)	N
Suzorite-Mica	N
Uniboard	N

ONGOING PROGRAM CONSIDERATIONS

ARET provides a framework for all participants and stakeholders to demonstrate that voluntary reduction or elimination of toxic substance emissions is a powerful means of reducing contamination of the environment. At the same time, a wide range of emitter and public concerns can be addressed.

The ARET Stakeholders Committee believes that ARET is making a significant contribution to preventing pollution, thus decreasing overall risk to human health and the environment.

Through ARET, voluntary action is proving to be quicker than government regulation, especially where emitters have the flexibility to set and determine how they will achieve performance goals and schedules.

ARET provides emitters with a forum to publicly commit to toxic release reduction, substitution or elimination, and to report on the results of their environmental management policies and practices, including the stewardship of products and processes.

Evaluation

As the new millennium approaches, the Committee has embarked on a multi-stakeholder process to evaluate the ARET program's strengths and weaknesses, and to identify improvements for the future.

It was an industry and nongovernmental organization (the New Directions Group or NDG) that originally recommended the launch of the ARET program to the Minister of the Environment. In September 1997, the NDG reconvened a multi-stakeholder forum to review the voluntary/non-regulatory approach to environmental protection. Their recommendations, and those of the Conference Board of Canada, the International Trade Advisory Committee and others, will help design the future path for ARET.

Issues such as the verification of reported data, broadening participation, increasing the number of substances targeted by participants, and the need to enlarge the ARET Stakeholders committee to include additional industry sectors and environmental non-government organizations, continue to be key priorities for discussion.

INCREASING PARTICIPATION

The ARET Stakeholders Committee continues to broaden participation in ARET as they work with their association members. It is encouraging to report that 70 per cent of the members from eight stakeholder industry associations now participate in ARET. (This number includes association members that have declared nil or negligible emissions of ARET substances but have expressed support for the ARET initiative.) One industry association, the Canadian Chemical Producers' Association, has convinced 100 per cent of its membership to participate in ARET.

Comparison with NPRI

The National Pollutant Release Inventory (NPRI) is a mandatory pollution reporting program targeting 178 toxic substances. Established in 1993, the NPRI provides a national, publicly accessible inventory of pollutant releases and transfers from facilities that meet prescribed reporting thresholds. Like ARET, it was developed under the guidance of a multi-stakeholder committee.

Forty-nine substances are common to the ARET and NPRI lists. A comparison between the ARET participants list and the list of facilities reporting emissions of ARET substances to the NPRI shows that approximately 190 companies are reporting emission of 5,000 tonnes of ARET substances but are not ARET participants.

In July 1997, letters were sent to the presidents or chief executive officers (CEOs) of 20 of the largest emitters of ARET substances identified under the NPRI, inviting them to commit their companies to ARET. These 20 firms account for approximately 3,000 tonnes of ARET substance emissions annually. Overall responses were not positive. Only one company has agreed to join ARET.

The substances emitted in the largest quantities by the 20 companies are methylene chloride (dichloromethane), benzene, phenol, formaldehyde, and some metals (zinc, copper, lead, chromium) and their compounds. All these substances are declared toxic under the *Canadian Environmental Protection Act* (CEPA) (e.g. methylene chloride, benzene) or are on the Priority Substance List 2 for CEPA toxicity assessment (e.g. phenol, formaldehyde).

The presidents or CEOs of 100 additional companies from the NPRI were sent invitations to become ARET participants. Results from this effort are not yet available.

There are many other emitters of toxic substances that are not identified in the NPRI. These include municipalities, public institutions, health providers and agriculture and transportation sectors. As ARET evolves, consideration must be given to these sources to identify whether and how significant reduction of these toxic substance emissions can be achieved.

The next ARET Report

Environmental Leaders 3 (EL3) will be produced in the fall of 1998. To ensure inclusion of emission data in EL3, participants must provide their 1997 data to the ARET Secretariat by July 1, 1998.

PREVIOUS ARET PROGRESS REPORTS

The first ARET report, *Environmental Leaders 1* (EL1), was issued in March 1995 and the second report, *Environmental Leaders 2* (EL2) was released in January 1997. Both reports are available from the Enquiry Centre, Environment Canada, Ottawa, Ontario K1A 0H3 (1-800-668-6767), or by e-mail at enviroinfo@ec.gc.ca.

This document is an update to EL2 and provides emission reduction data from all 1996 ARET participants. It has been designed to work in conjunction with EL2. This update is available on-line at www.ec.gc.ca/aret.

PROGRAM CONTACT

You are welcome to visit the ARET website at <http://www.ec.gc.ca/aret>. To speak to someone directly about the ARET program or to discuss an ARET-related issue, call any member of the ARET Stakeholders Committee (see Appendix 6). You may also contact the ARET Secretariat by phone (819-953-9086), by fax (819-994-7762) or by e-mail (aret@ec.gc.ca).



"Prairie Infinity", Richard Russell

Chapter 2

ARET ACHIEVEMENTS

SUMMARY OF ARET ACHIEVEMENTS

During 1996, ARET participants reduced their overall emissions by 5,064 tonnes. This brings the total emission reduction to 21,499 tonnes from base year to December 1996, which represents a 61 per cent overall decrease from base-year levels.

Even though there was an overall emission decrease, participants reported increases in emissions for Lists A-1, A-2, B-1 and B-2 substances in 1996. Emissions showed an increase because of higher production, upsets in manufacturing processes, and improvements in analytical and emission estimation methods.

Notable reductions were reported for hydrogen sulphide (4,816 tonnes), nickel (308 tonnes), formaldehyde (275 tonnes), benzene (122 tonnes), ethanol (100 tonnes), 1,3 butadiene (98 tonnes), chloroform (79 tonnes), 1,1,2,2-tetrachloroethylene (24 tonnes), chromium (14 tonnes), and 1,4-dichlorobenzene (3 tonnes).

Emissions of PAHs, cadmium, lead, copper, arsenic, zinc, phenol, acetaldehyde and chlorine dioxide increased during 1996.

The ARET short-term 50 per cent reduction target has already been achieved for four of those ARET substances showing increases in 1996: lead, arsenic, zinc and chlorine dioxide.

During 1996, 10 new companies representing 13 new facilities submitted ARET action plans. One company already participating in ARET submitted a new action plan for an additional facility. In addition, five companies have declared intent to file ARET action plans in the near future.

PARTICIPANTS

At present, 292 facilities from 152 companies and government organizations are participating in the ARET program (see Appendix 4). An additional 115 companies and government organizations have stated they have nil or negligible emissions of ARET substances and have filed Declarations of Support for the initiative (see Appendix 5).

Nearly half of the participating facilities with quantitative action plans have already met the short-term targets for all substance categories for which they report. Some of these facilities have completely eliminated their emissions of ARET substances. Of the 54 facilities reporting on List A-1 substances, 23 (43 per cent) have met or exceeded the 90 per cent reduction target. There are 46 facilities reporting on List A-2 substances. Of these, 21 or 46 per cent have achieved emission reductions greater than 50 per cent. For List B substances, the following number of facilities have met or exceeded the 50 per cent target: 27 of 42 facilities or 64 per cent for List B-1; 101 of 168 facilities or 60 per cent for List B-2; and 91 of 159 facilities or 57 per cent for List B-3.

The 10 new companies submitting ARET action plans include Harmac Pacific, Donohue, Gerdau MRM Steel, The Cobalt Refinery Company, Barrick Gold, Sherritt International, Les Ressources Aur, Neste Resins, Theratronics International and Nalco/Exxon Energy Chemicals. Kimberly Clark, which was already participating in ARET, submitted an action plan for its Terrace Bay facility. In addition, the following five companies intend to file action plans in the near future: Spruce Falls Inc., Fort James-Marathon Ltd., Duo-Fast Industries, Alpha/Owens Corning and Air Canada.

Of the eight industrial associations in the ARET program, 70 per cent of overall membership is participating in ARET. This participation rate includes those companies with actions plans as well as those which have declared nil or negligible emissions and that have declared support for the ARET initiative.

New ARET Participants Since January 1997

Sector	New Participants	Number of Facilities
Chemical	2	2
Pulp & Paper	2	3
Mining & Smelting	4	7
Steel	1	1
Other Manufacturing	1	1
Total	10	14

Promised ARET Action Plans Since January 1997

Sector	Number of Plans	Number of Facilities
Chemical	1	1
Pulp & Paper	2	2
Other Manufacturing	2	2
Total	5	5

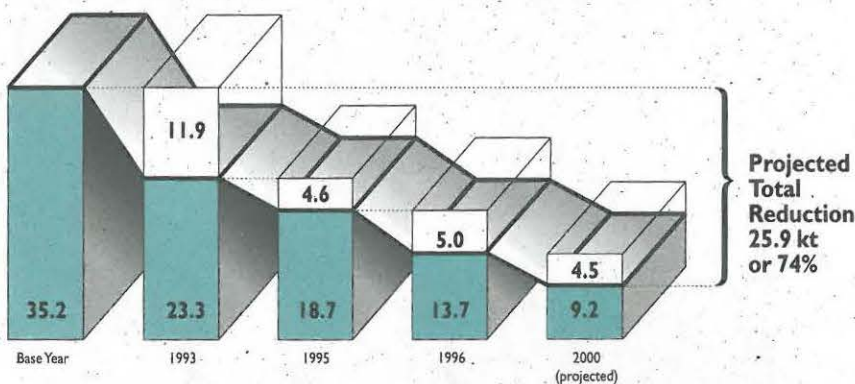
CHANGES TO EMISSION REDUCTION COMMITMENTS

Emission reduction commitments change as new participants join the program and existing participants revise their emission data. Revisions result from improved data collection and reporting methods and from participants adding previously unreported ARET substances to their action plans.

Some ARET participants also change their reduction projections after implementing new strategies to target the reduction of ARET substance emissions. New or improved estimation methods have also changed projection levels in some cases.

Base-year emission levels have increased from 27,888 tonnes reported in ELI to 35,175 tonnes for this report, which represents a 26 per cent increase. Projected emissions for the year 2000 have increased by less than one per cent from 9,152 tonnes reported in ELI to 9,238 tonnes as of December 1996. These changes have resulted in an increased reduction commitment by participants of over 7,200 tonnes from original levels.

Figure 1: Actual and Projected Emission Reduction Progress from Base Year to 2000 (kilotonnes)



Of the eight industrial associations in the ARET program, 70 per cent of overall membership is participating in ARET. This participation rate includes those companies with actions plans as well as those which have declared nil or negligible emissions and that have declared support for the ARET initiative.

New ARET Participants Since January 1997

Sector	New Participants	Number of Facilities
Chemical	2	2
Pulp & Paper	2	3
Mining & Smelting	4	7
Steel	1	1
Other Manufacturing	1	1
Total	10	14

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Sector	Number of Plans	Number of Facilities
Chemical	1	1
Pulp & Paper	2	2
Other Manufacturing	2	2
Total	5	5

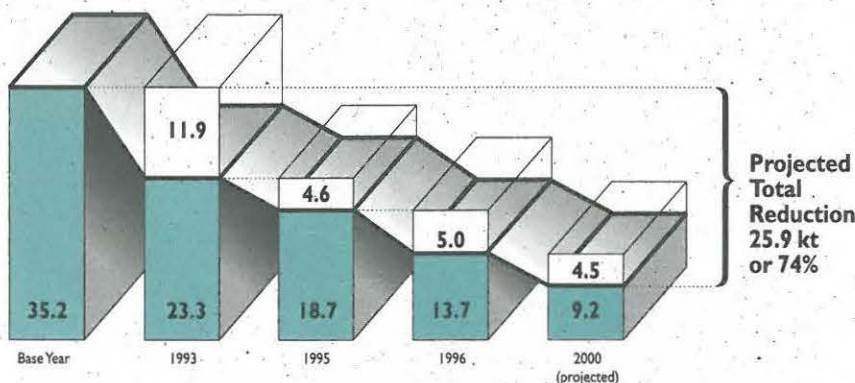
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Figure 1: Actual and Projected Emission Reduction Progress from Base Year to 2000 (kilotonnes)



OVERALL EMISSION REDUCTION PROGRESS

The total emission of ARET substances in 1996 was 13,676 tonnes – a significant reduction from base-year emission levels of 35,175 tonnes. As a result, 21,499 tonnes of emissions are no longer being released into the environment, representing a 61 per cent reduction from base-year levels.

During 1996, participants reduced their emissions by 5,064 tonnes or 27 per cent from 1995 levels. This reduction comes primarily from B-3 category substances.

By 2000, a further reduction of 4,438 tonnes of emissions is expected. As a result, the total reductions achieved by ARET participants will be over 25,937 tonnes or 74 per cent from base-year levels.

REDUCTIONS BY SUBSTANCE CATEGORY

By December 1996, emission reductions for three substance categories with short-term targets of 50 per cent reduction were met or exceeded: B-1 (59 per cent), B-2 (65 per cent), and B-3 (60 per cent). Emissions of List A-1 substances, for which the short-term target is 90 per cent, have been reduced by 54 per cent. Reductions of chlorinated organic PBT substances from List A-1 exceed 99 per cent. The substance selection committee did not reach consensus on whether List A-2

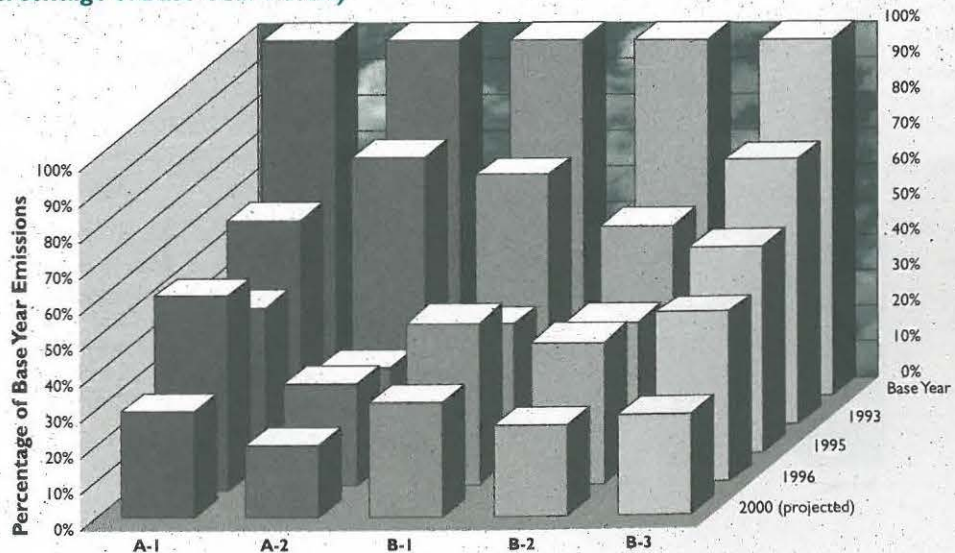
Actual and Projected Emission Reduction by Substance Category from Base Year Levels

	1996	2000 (projected)
List A-1	54%	71%
List A-2	72%	80%
List B-1	59%	74%
List B-2	65%	75%
List B-3	60%	73%

substances meet the persistence, bioaccumulation and toxicity criteria. Therefore, the year 2000 target for List A-2 is 'best efforts'. In 1996, List A-2 reductions were 72 per cent.

LIST A-1 – Emissions of A-1 substances increased by 15 per cent from 1995 levels, mainly due to an 11 per cent increase in production at ALCAN's smelting facilities and, to a lesser extent, to the start-up of several new smelting pots. The lower 1995 production levels were a temporary phenomenon caused by a strike at ALCAN's smelting operations. Overall emissions of A-1 substances, 99 per cent of which are PAHs, have been reduced by 54 per cent from base-year levels. ARET participants emitting A-1 substances have committed to a further 38 per cent reduction from 1996 levels by 2000.

Figure 2: ARET Emissions by Substance Category (Percentage of Base-Year Levels)



Percentage of Total 1996 Emissions by Substance Category

List A-1	3.6%
List A-2	0.3%
List B-1	0.1%
List B-2	25%
List B-3	71%

It is important to note that ALCAN has reduced its overall emissions from 1988 levels by 504 tonnes or 56 per cent. The company also achieved significant emission reductions of PAHs in years prior to the 1988 base year as a result of major corporate investment in new technology at their smelting operations. ALCAN's PAH reduction program is moving ahead with the implementation of new pitches in all Horizontal Stud Soderberg (HSS) smelters during 1998. An environmental impact study on the replacement of the Isle-Maligne HSS smelter has also been successfully submitted to public hearings last summer.

LIST A-2 – The four tonne or 10 per cent emission increase in List A-2 substances was composed of cadmium. Refer to the section on List B-2 (below) for an explanation of this increase.

LIST B-1 – The three tonne or 25 per cent emission increase in this category was reported by Stelco Inc.'s Hilton works. This increase was caused by the application of new emission factors used to calculate anthracene emissions.

LIST B-2 – The 125 tonne or four per cent increase in B-2 substance emissions was comprised of zinc, copper, lead and arsenic. Despite this increase, the short-term 50 per cent reduction target has already been achieved for three of the four substances: zinc, lead and arsenic. Copper releases have been reduced by 44 per cent.

Emission increases in categories A-2 and B-2 during 1996 are attributed to increases in heavy-metal emissions from two companies in the mining and smelting sector. Hudson Bay Mining and Smelting experienced a drop in efficiency at the baghouse controlling off-gases at its Flin-Flon smelter. Cominco had a temporary technology transition problem while upgrading its smelting operations. Both companies report that they have corrected these problems and that 1997 emissions levels are expected to show a significant decrease in line with their projections.

LIST B-3 – Reductions of 5,261 tonnes of B-3 substance emissions were reported between 1995 and 1996. This represents a 35 per cent drop in B-3 emissions in only one year. Major contributors to this were Weyerhaeuser Inc.'s Prince Albert facility and Domtar Inc.'s Windsor and Lebel-sur-Quevillon facilities. These participants from the pulp and paper sector achieved significant improvements in odour control by reducing hydrogen sulphide emissions.

Substances Showing Major Increases from 1995 to 1996

	Increase 1995 to 1996		Reduction Base Year to 1996
	Tonnes	Percent	Percent
A-1 PAHs	64	15%	54%
A-2 Cadmium	6	21%	73%
B-2 Zinc	289	42%	70%
Copper	90	18%	44%
Lead	80	12%	59%
Arsenic	49	47%	55%
B-3 Chlorine dioxide	95	15%	65%
Phenol	39	20%	22%
Acetaldehyde	29	8%	1%

Substances Showing Major Reductions from 1995 to 1996

	Reduction 1995 to 1996		Reduction Base Year to 1996
	Tonnes	Percent	Percent
A-2 1,4 dichlorobenzene	3	14%	67%
B-2 Nickel	308	46%	75%
Chloroform	79	30%	74%
1,1,2,2-tetrachloroethylene	24	20%	64%
Chromium (Cr6+)	14	61%	63%
B-3 Hydrogen sulphide	4816	47%	64%
Formaldehyde	275	26%	62%
Benzene	122	7%	43%
Ethanol	100	51%	83%
1,3 butadiene	98	43%	64%

REDUCTIONS BY SUBSTANCE

Individual levels of several substances decreased in 1996. Reductions of 1,4-dichlorobenzene, nickel, chloroform, 1,1,2,2-tetrachloroethylene, chromium, hydrogen sulphide, formaldehyde, benzene, ethanol and 1,3 butadiene are notable.

Rises in List A-1 PAH emissions are due to increased production within the aluminum

sector. Increased emissions of cadmium, zinc, copper, lead and arsenic resulted from problems with emission-control systems and technology transition at two companies in the mining and smelting sector. Phenol and acetaldehyde emission increases were due to the application of previously unavailable emission factors, which cannot be extrapolated to base-year emissions.

Chlorine dioxide emissions rose because the pulp and paper sector has increased its use of this bleaching agent in place of chlorine gas. This substitution allows pulp mills to reduce their emissions of chlorinated organics in pulp bleaching effluents, particularly dioxins and furans.

One method of gauging participant progress is through the achievement of the 90 per cent short-term target for A-1 substances and the 50 per cent short-term target for List B substances.

List A-1, A-2 Substances

By the end of 1996, ARET participants had achieved the short-term targets for over half of the substances targeted in their action plans. For List A-1 substances, participants have met or exceeded reduction targets of 90 per cent for 7 of the 24 reported substances. Six of these seven substances are persistent, bioaccumulative and toxic chlorinated compounds such as 2,3,7,8-tetrachlorodibenzofuran, 2,3,7,8-tetrachlorodibenzo-p-dioxin, polychlorinated biphenyls (PCBs), and pentachlorophenol.

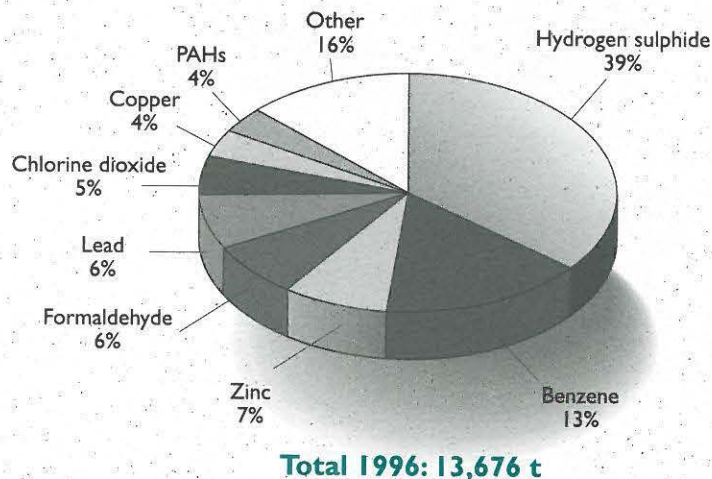
The substance selection committee did not reach consensus on whether the List A-2 substances, 1,4 dichlorobenzene and cadmium (inorganic inhalable and soluble forms), meet the PBT criteria. Therefore, the year 2000 target is for 'best efforts'. A 72 per cent reduction in emissions was achieved for List A-2 substances.

List B-1 to B-3 Substances

Goals were also met or exceeded for 35 of the 61 reported substances from Lists B-1, B-2, and B-3.

Figure 3 shows that 84 per cent of the 1996 reported emissions of 13,676 tonnes can be attributed to eight substances or substance groups.

Figure 3: Major Substance Emissions during 1996



Hydrogen sulphide: In 1995, hydrogen sulphide emissions represented over half of the total ARET emissions reported. Due to the almost 5,000 tonne decrease during 1996, it now accounts for only 39 per cent of total emissions. Hydrogen sulphide also accounts for nearly 45 per cent of ARET's total toxic substance emission reductions thus far.

Hydrogen sulphide is emitted primarily from pulp and paper mills and steel manufacturing operations. The pulp and paper sector has contributed over 7,800 tonnes of hydrogen sulphide reductions from base-year levels through plant process modifications made under odour-control programs. The steel industry has reduced hydrogen sulphide emissions by over 1,000 tonnes from the base year, mainly by preventing releases during the slag-quenching process, as well as by improving coke-ovens.

Toxic Substances under the *Canadian Environmental Protection Act*

Twenty-two ARET substances are identified as toxic under the *Canadian Environmental Protection Act* (CEPA). Three of these are part of the top eight ARET substances emitted into the environment: benzene, lead (all forms except alkyl) and PAHs. Other ARET substances declared toxic under CEPA are oxidic, sulphidic and soluble nickel, inorganic arsenic compounds, 1,1,2,2-tetrachloroethylene, inorganic cadmium compounds, hexachlorobenzene, dioxins, furans, PCBs, 3,3 dichlorobenzidine, bis(2-ethylhexyl)phthalate, carbon tetrachloride, 1,2 dichloroethane, methylene chloride, asbestos, hexavalent chromium, elemental and inorganic mercury, bis(chloromethyl)ether, 1,1,2-trichloroethylene, and benzidine.

Emissions from substances common to the CEPA and ARET lists total 8,335 tonnes or almost 25 per cent of ARET's base year. As of this update, ARET has achieved substantial reductions totalling 4,809 tonnes or 58 per cent. ARET participants have made further emission reduction projections of 1,179 tonnes for substances declared toxic under CEPA. These new projections will result in an overall reduction of nearly 6,000 tonnes or 72 per cent from base year to 2000.

Polychlorinated biphenyls (PCBs) are another ARET substance about which there has been much public concern. PCB contamination is present in the oil used in many electrical transformers. Although PCBs are not generally emitted to the environment, there is a risk of release in the case of a transformer fire or oil leakage.

Many ARET participants are making extensive efforts to remove PCB-contaminated transformers from service and to clean up PCB-contaminated oils, machinery and soil. Several ARET participants reported progress in reducing/eliminating their PCB-contaminated wastes by shipping them to designated facilities for destruction. In 1996, ARET participants removed some 2,150 tonnes of PCB-contaminated liquids and solids from their sites. A further 66 tonnes are scheduled to be removed for destruction in 1997.

SUBSTANCES NOT ON THE ARET LIST

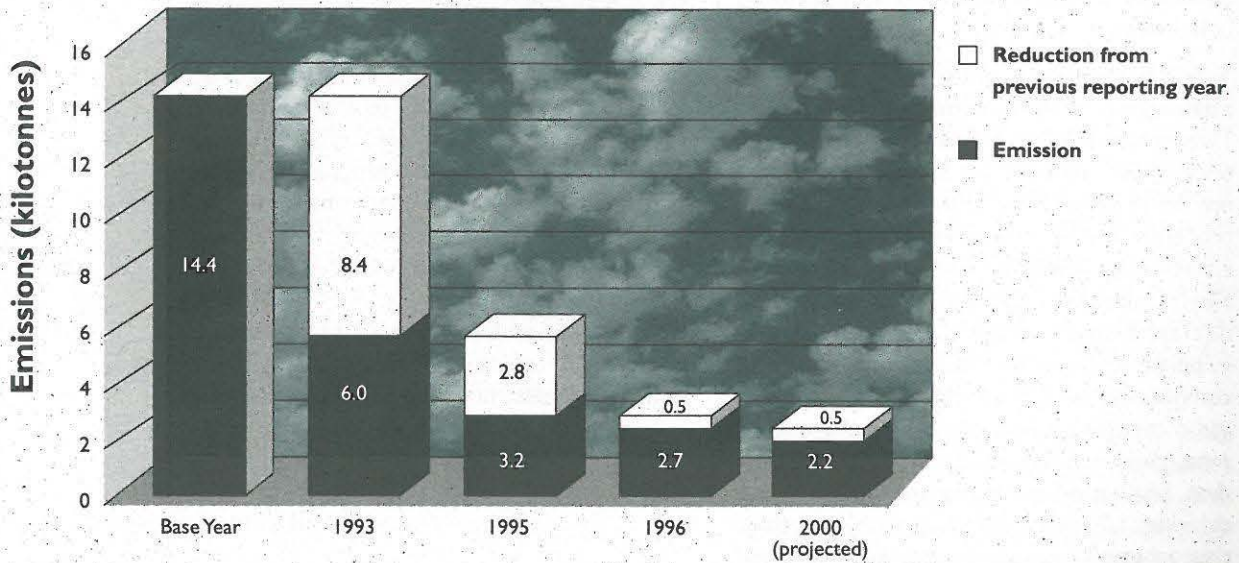
In some cases, participants report emissions of substances that are not on the ARET list. These include adsorbable organic halides, mainly from the pulp and paper sector; volatile organic compounds and styrene. Since these substances are not on the ARET list, they are not included in the totals for ARET emissions/reductions presented in this report.

Reductions from the base year to 1996 for other substances total 11,690 tonnes or 81 per cent from the 14,361 tonnes reported in the base year.

Participants have committed to a further reduction of more than 500 tonnes from these other substances by 2000. This will produce an overall decrease in these other substances of 12,200 tonnes or 85 per cent from base-year levels.

Figure 4 shows actual and projected emission reductions for 'other' substances reported by ARET participants, but which do not appear on the ARET list.

Figure 4: Actual and Projected Emissions Reduction for 'Other' Substances



Chapter 3 SECTOR PROGRESS

Each industrial sector faces unique challenges in reducing toxic substance emissions from its operations. For that reason, it may not be accurate or useful to compare reduction achievement between sectors. Most ARET participants are making their best efforts to reduce the listed substances while attempting to stay competitive in domestic and international markets.

EMISSION REDUCTION BY SECTOR
On average, each sector achieved a 61 per cent emission reduction from base year to December 1996. During 1996, the average reduction for each sector was 27 per cent.

Sector Progress	Change in Emissions (Base Year to 1996)		Change in Emissions (1995 to 1996)	
	(percentage)	(tonnes)	(percentage)	(tonnes)
Aluminum	-56.2%	-506	+15.0%	+51
Chemical Manufacturing	-62.4%	-1,533	-18.8%	-215
Chemical Specialties Manufacturing	-32.1%	-86	-8.6%	-17
Electric	-38.1%	-45	-7.2%	-6
Government	-2.6%	-0.039	-2.6%	-0.039
Manufacturing	-70.5%	-233	-37.4%	-58
Mining and Smelting	-65.0%	-5,092	+10.7%	+266
Oil, Gas and Petroleum Products	-57.0%	-948	-10.3%	-82
Pulp and Paper	-67.3%	-11,109	-47.3%	-4,843
Steel	-36.4%	-1,806	-4.9%	-162
Overall	-61.0%	-21,357	-27.0%	-5,065

- denotes reduction + denotes increase

"We have ... expressed our support of the voluntary approach taken by the ARET group. This is, in fact, what we have been striving for during past years, and that which allowed us to significantly improve the quality of the environment at our installations."

*C. Chamberland,
President, Société
d'électrolyse et de chimie
Alcan Ltée*

ALUMINUM

From base year to 1996, ALCAN reduced its emissions of PAHs by 56 per cent or 504 tonnes compared to 62 per cent in 1995. The difference in emission levels is mostly related to production startup following the 1995 strike at some of ALCAN's Horizontal Stud Soderberg (HSS) smelters, and to a lesser extent to increased aluminum production.

The PAH reduction program for all HSS plants is moving ahead with the implementation of new pitches during the first part of 1998. Based on lab and pilot-scale testing, this should result in significant PAH emission reductions.

The replacement of old HSS technology is also progressing. In 1997, ALCAN submitted an environmental impact study on the replacement of the Isle-Maligne HSS smelter with new prebake technology, which will emit very low levels of PAHs. This project was successfully reviewed through a public hearing process.

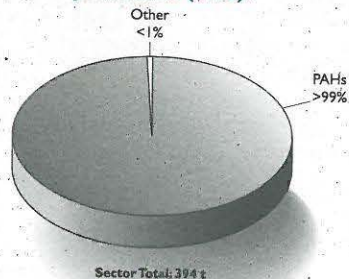
A review of literature in the 1996 ALCAN emission report suggests that PAHs may not bioaccumulate in fish in their natural habitat.

Aluminum Industry Sector Changes from 1995 to 1996

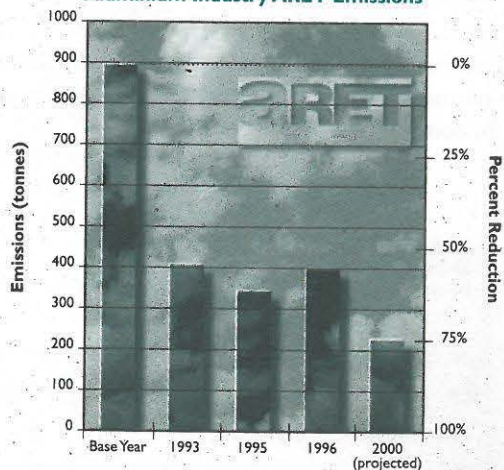
Substance	Increase (tonnes)	Decrease (tonnes)
PAHs	+52	
Other	0	
Total	+52	
Net Change	+52	

Alcan Smelting and Chemicals accounts for all Aluminium Sector emissions and reductions.

Aluminium Industry Emissions by Substance (1996)



Aluminium Industry ARET Emissions



CHEMICAL MANUFACTURING

Chemical manufacturers reduced their emissions of ARET substances by 214 tonnes or 19 per cent during 1996.

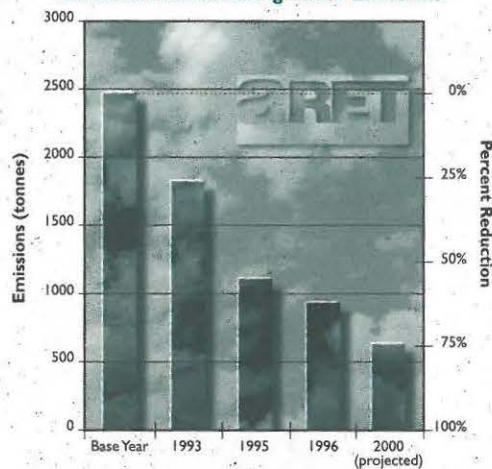
Emissions of 1,2-dichloroethane and acetaldehyde increased. The increase in 1,2 dichloroethane is due to a change in the method used to calculate fugitive emissions. Increased use of underground injection in Alberta caused 20 of the 23-tonne increase in acetaldehyde emissions. Underground injection, which does not result in dispersing emissions into the environment, is an environmental management approach approved by the Alberta government.

The Canadian Chemical Producers' Association (CCPA) strongly encourages all its members to continue participating in ARET. As part of the Responsible Care® initiative, CCPA aims to maintain 100 per cent member involvement as participants continue to meet or exceed the ARET objectives for emissions reductions.

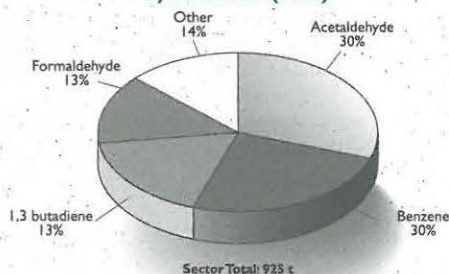
Chemical Manufacturing Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Benzene		-111
1,3 butadiene		-98
Formaldehyde		-23
Acetaldehyde	+23	
1,2 dichloroethane	+11	
Carbon tetrachloride		-9
Other		-7
Total	+34	-248
Net Change		-214

Chemical Manufacturing ARET Emissions



Chemical Manufacturing Emissions by Substance (1996)



"We strongly support ARET because it is based on a scientifically sound process developed by a multistakeholder group to identify candidate substances for action, while giving facilities with ARET emissions the flexibility to achieve their reduction goals in the most technically sound, cost-effective manner."

David Shortt, Manager - Environmental Quality, Dow Chemical Canada Inc.

"We continue to support the ARET process as one of the most successful voluntary initiatives for toxics reduction in the world, and will continue to monitor and report any emissions of ARET substances at our facilities."

Kevin Mahoney,
Regulatory Affairs
Manager, Procter &
Gamble Inc.

CHEMICAL SPECIALTIES

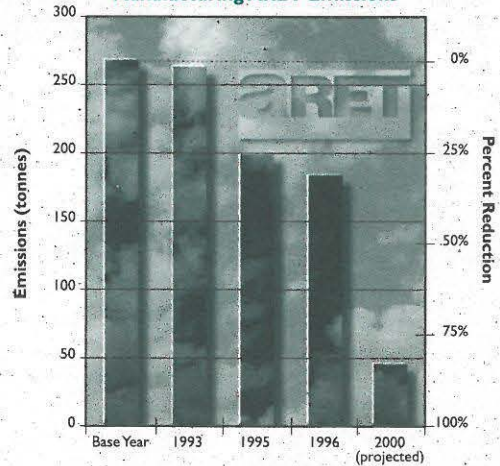
ARET participants within the chemical specialties manufacturing sector reduced their emissions of ARET substances by 17 tonnes or nine per cent in 1996. The current emission levels are 86 tonnes or 32 per cent lower from base-year levels. A further reduction of 136 tonnes is planned by 2000, bringing an overall projected emission reduction to 223 tonnes or 83 per cent for this sector.

In 1996, tetrachloroethylene reductions were achieved through process modification at Advanced Monobloc's Penetanguishene plant. A slight increase of formaldehyde resulted from production increases at 3M Canada's Perth plant. This increase is temporary, as 3M Canada has pledged a 90 per cent overall reduction in ARET substance emissions from base-year levels.

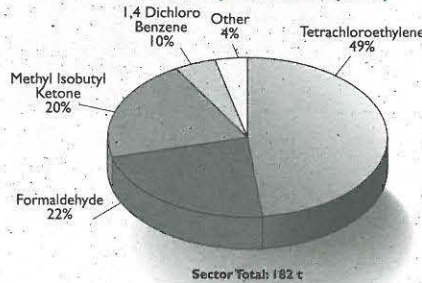
Chemical Specialties Manufacturing Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Tetrachloroethylene		-22
Formaldehyde	+5	
Other		0
Total	+5	-22
Net Change		-17

Chemical Specialties Manufacturing ARET Emissions



Chemical Specialties Manufacturing Emissions by Substance (1996)



ELECTRICAL UTILITIES

In 1997, Ontario Hydro commissioned an independent assessment of copper and zinc releases to water, first identified in 1989. Among other things, the assessment concluded that:

- there had been and continues to be large quantities of copper and zinc emitted to the Great Lakes from Admiralty brass-condenser corrosion/erosion at Ontario Hydro generating stations using these condensers
- there was little evidence of adverse environmental effects from copper and zinc releases but more study is required
- no measurable effect on drinking water quality in surrounding municipalities could be identified

Admiralty brass condensers are 72 per cent copper, 27 per cent zinc, 1 per cent tin, and contain small amounts of lead, iron and arsenic. The largest releases of these substances came from the Pickering nuclear generating station.

Actions taken or planned by Ontario Hydro include:

- replace Admiralty brass condensers tubes at Pickering
- evaluate coatings as an option for Bruce nuclear generating station units 1 and 2, and fossil stations
- implement other measures to minimize copper emissions
- evaluate and revise copper-bearing heat exchanger management programs as necessary, so that areas of high potential environmental risk are eliminated

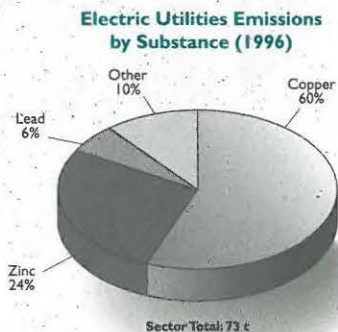
“Along with other utilities, Alberta Power remains committed to the voluntary process and is working to ensure that its purchasing procedures minimize the introduction of ARET substances into the workplace. This is consistent with the pollution prevention approach fostered by the ARET initiative.”

Alberta Power Limited, 1996 Environmental Review

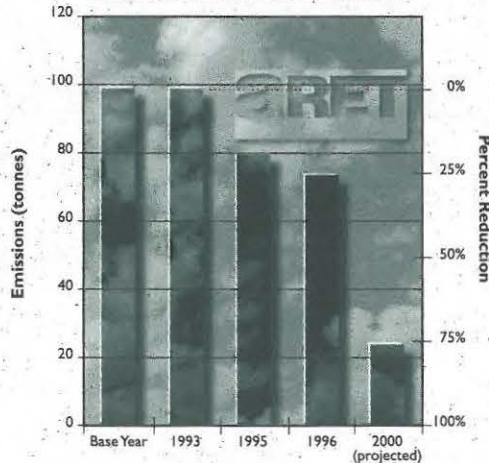
Electrical Utilities Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Copper		-3
Zinc		-3
Other		0
Total		-6
Net Change		-6

Note that Ontario Hydro accounts for 85% of the 1996 sector emissions, and 81% of total reductions.



Electrical Utilities ARET Emissions



"The ARET program has certainly sharpened our pollution prevention focus on the reduction of toxic substance emissions to the environment."

Paul Hansen, Manager - Environmental Affairs, Chrysler Canada Ltd.

OTHER MANUFACTURING

In 1996, the other manufacturing sector achieved a 58 tonne decrease of ARET substance emissions. This represents an overall emission reduction of approximately 225 tonnes or 69 per cent from base-year levels.

The year 2000 emission target is actually greater than the 1996 reported emissions, because many companies in the manufacturing sector have already exceeded their original reduction targets.

Further contribution to ARET substance reductions

The ARET program has brought stakeholders across a range of industry sectors together to demonstrate that voluntary non-regulatory approaches to environmental protection can be a complement to regulation. Many other Canadian voluntary pollution prevention initiatives concentrate on achieving reductions of targeted substances within specific sectors. Some of these initiatives contribute to the achievement of ARET's long-term goals. Often, these initiatives take the form of a Memorandum of Understanding (MOU) to identify the shared goals of the agreement and the role of each partner in the MOU.

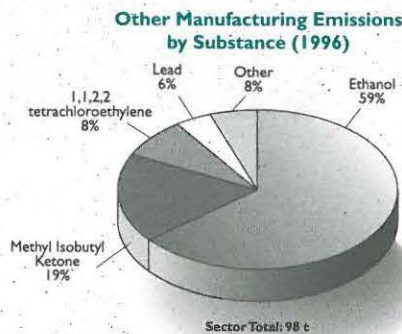
One such initiative is the Canadian Automotive Manufacturing Pollution Prevention Project which was initiated in 1992 by the Canadian Vehicle Manufacturers' Association (CVMA), the Ontario Ministry of the Environment, Environment Canada and the companies participating in the MOU; Chrysler Canada Ltd., Ford Motor Company of Canada, Limited, and General Motors of Canada Limited.

These companies have been active in reducing the risk of PCB emissions, both through secure storage and destruction. CVMA members are looking at the life cycle effects of their operations, and are encouraging automotive suppliers to improve their environmental performance.

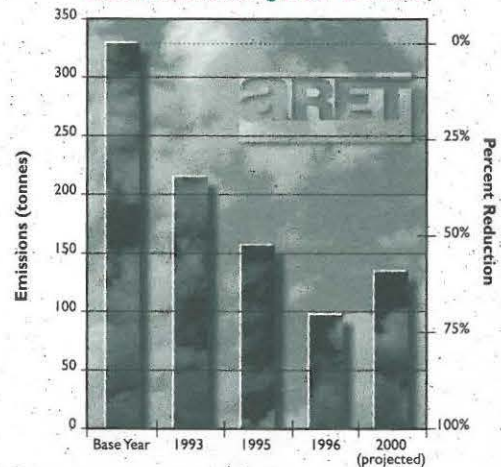
In 1995, Chrysler Canada submitted an ARET action plan. The ARET Stakeholder Committee encourages other CVMA members to become formal participants in the ARET program.

Other Manufacturing Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Ethanol		-25
Methyl isobutyl Ketone		-22
Tetrachloroethylene		-8
Other		-3
Total		-58
Net Change		-58



Other Manufacturing ARET Emissions



MINING AND SMELTING

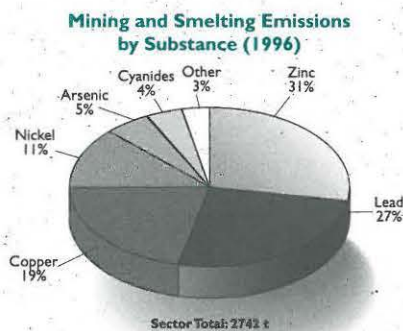
In 1996, total releases from mines and smelters increased slightly over 1995 levels. The increase was temporary in nature, and resulted from problems with the efficiency of emission control systems and technology transition at two facilities. Releases generally remained below 1994 levels, and further reductions are projected to the year 2000 and beyond.

As part of the Base Metal Smelting Strategic Options Process in 1997, companies publicly committed to sectoral targets for further emission reductions of several substances released from base metal smelters and refineries. Eighty-per-cent reductions from base-year levels by 2008, and 90 per cent beyond 2008 are being targeted through site-specific facility environmental management plans and emission guidelines. These plans are being developed by industry with governments, local communities and other affected stakeholders.

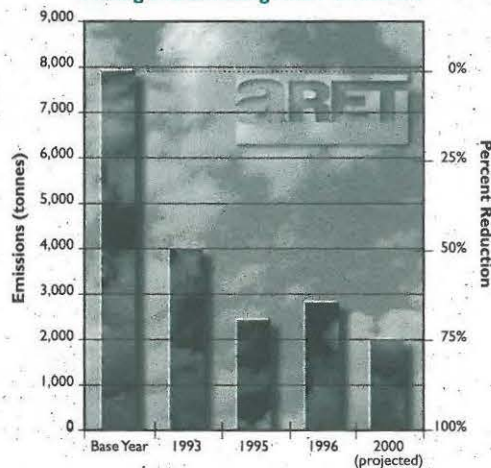
“Noranda is deeply committed to the ARET process and to voluntary release reductions that are consistent with public and business priorities.... [Our ARET] results reflect a consistent focus by management and concerted efforts by employees at Noranda operations, as well as substantial investments in pollution prevention and control technology, monitoring and training.”

Mining and Smelting Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Nickel		-311
Zinc	+308	
Copper	+95	
Lead	+79	
Arsenic	+49	
Other	+46	
Total	+577	-311
Net Change	+266	



Mining and Smelting ARET Emissions



Noranda Metallurgy Inc. and Noranda Mining and Exploration Inc., 1996 ARET Action Plan

OIL, GAS AND PETROLEUM PRODUCTS

In 1996, the oil, gas and petroleum products sector achieved a decrease of 82 tonnes or 10 per cent from 1995 levels of ARET substance emissions. This brings the overall reductions achieved to 948 tonnes, or 57 per cent of base-year levels. Additional emission decreases planned should bring the overall reduction for this sector to 1,157 tonnes or 70 per cent from base-year levels by 2000.

The 1996 reduction was achieved through decreased emissions of hydrogen sulphide and benzene. An increase in methyl isobutyl ketone (MIBK) resulted from changes in the ratio of MIBK and another chemical being used at Imperial Oil's operations. These emissions will revert to original levels as process modifications continue.

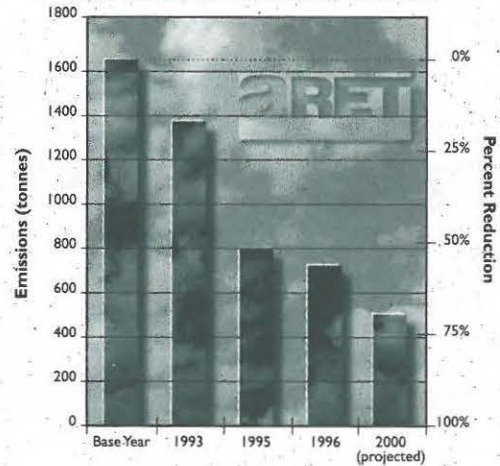
"...we've been able to focus on three substances for a nominal amount of money relative to other mechanisms that are trying to achieve similar results."

*Sheldon Wamboldt,
Sustainable Development
Adviser, Shell Canada*

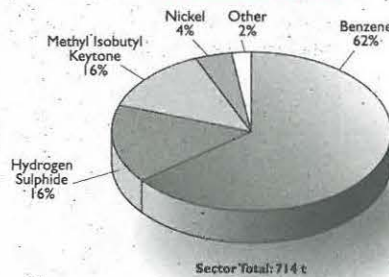
Oil, Gas and Petroleum Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Hydrogen Sulphide		-89
Methyl Isobutyl Ketone	+19	
Benzene		-16
Other	+4	
Total	+23	-105
Net Change		-82

Oil, Gas and Petroleum ARET Emissions



Oil, Gas and Petroleum Industry Emissions by Substance (1996)



PULP AND PAPER

The pulp and paper industry decreased its overall emissions by 4,843 tonnes during 1996 by reducing hydrogen sulphide emissions.

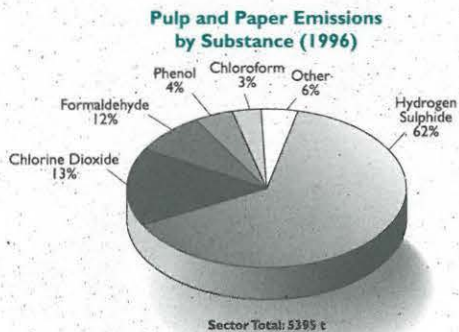
Since base year, pulp and paper facilities have reduced their ARET substances emissions by 11,100 tonnes or 67 per cent. A further reduction of over 2,000 tonnes is expected by the year 2000, resulting in an overall emission reduction of 80 per cent from base-year levels.

The drop in hydrogen sulphide during 1996 is due to investments in odour reduction programs at a number of mills, in particular Weyerhaeuser's Prince Albert facility as well as Domtar's Windsor and Lebel-sur-Quevillon facilities.

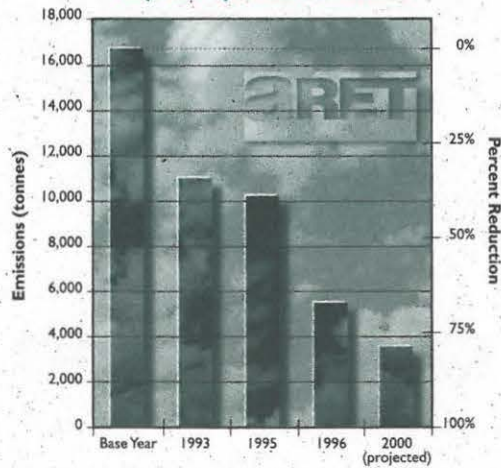
Chlorine dioxide emissions increased by 95 tonnes as a result of increased substitution of chlorine dioxide for chlorine gas, which helps reduce chlorinated organic compounds such as dioxins and furans in pulp mill bleaching effluents. The elevated phenol emissions reported are due to the application of previously unavailable emission factors which cannot be extrapolated back to the base year.

Pulp and Paper Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Hydrogen Sulphide		-4542
Formaldehyde		-258
Chlorine Dioxide	+95	
Ethanol		-81
Chloroform		-79
Phenol	+45	
Other		-23
Total	+140	-4983
Net Change		-4843



Pulp and Paper ARET Emissions



"Weldwood has already met the ARET targets of 90% reduction of emissions of P.B.T.S and 50% reduction of other toxic substance emissions. This does not mean that the company is not continuously seeking ways to further reduce or eliminate any emission of pollutants into the biosphere. We want to be a "green" and proactive company that is known for our product quality and environmental stewardship. We believe pollution prevention is better than pollution control in achieving sustainable development; it is better to anticipate and prevent than to react and contain pollution problems."

Minh Ho, Environmental Coordinator, Weldwood of Canada Limited

“The goals of the ARET program clearly fit in well with Dofasco’s way of doing business and our commitment to reducing, phasing out, and eliminating the use and release of toxics in the long term.”

Dofasco Inc., 1996 ARET Action Plan

STEEL

During 1996, the Steel sector made significant advances towards achieving its ARET goals. The Strategic Options Process for the steel manufacturing sector resulted in the recommendation to surpass the ARET reduction targets and schedules, and to develop environmental performance standards for emissions. Some of the major accomplishments from 1996 are described below.

Hydrogen Sulphide

In 1996, a nine-per-cent drop in hydrogen sulphide emissions was achieved over 1995 levels, bringing overall reduction achievement to 35 per cent below base-year levels. Hydrogen sulphide gas produces noxious odours. This gas is emitted by blast furnace slag pits and coke-oven batteries.

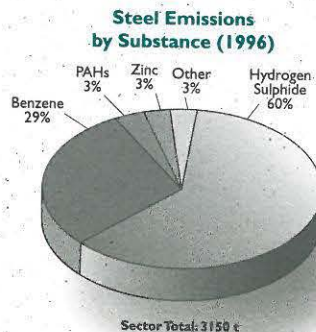
At Lake Erie Steel Company (LESC), a task force tested several chemical methods to reduce hydrogen sulphide air emissions at the blast furnace slag pits. These unsuccessful tests included using hydrogen peroxide, caustic soda and a proprietary chemical. However, success followed in 1996 when LESG tested extending air cooling time and modifying spraying methods. The result was a significant reduction in the number of hours the plant exceeded the Ontario guideline of 20 ppb. LESG’s ongoing efforts to maximize pollution prevention include air-cooling slag by pelletizing, then collecting and scrubbing hydrogen sulphide.

Benzene

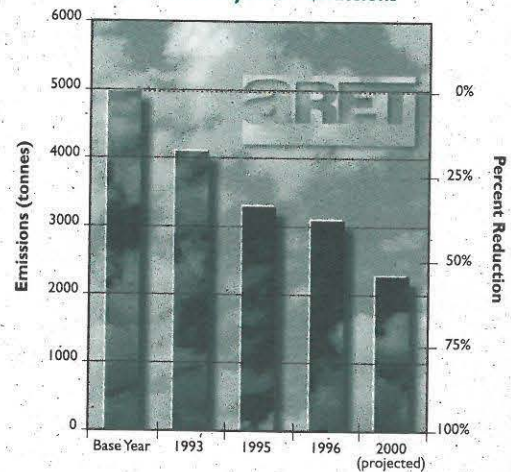
Though benzene emissions were unchanged in 1996 over 1995 levels, emission reductions are expected during 1997. In late 1996, Dofasco completed construction of its #2 and #3 by-products plants, at a cost of \$5.7 million. Dofasco expects to reduce fugitive benzene emissions by 50 per cent (225 tonnes per year). In addition, a 1996 Dofasco study confirmed the feasibility of shutting down its #3 by-products plant Sretford desulphurization process, the company’s largest single source of benzene emissions. During early 1997 at Dofasco’s #1 by-products plant, a 50-tonne decrease in benzene emissions is projected when it shuts down to take advantage of excess gas treatment capacity.

Steel Sector Changes from 1995 to 1996

Substance	Increase (tonnes)	Decrease (tonnes)
Hydrogen Sulphide		-185
Nickel		-12
Benzene	+12	
Phenol	+6	
Zinc		-5
Other	+22	
Total	+40	-202
Net Change		-162



Steel Industry ARET Emissions



Zinc

Gerdeau MRM Steel is on schedule with its 1996 commitment to reduce atmospheric emissions. This is being achieved by replacing an aging baghouse with a new air pollution control system. The new system will decrease stack emissions and reduce fugitive emissions in the plant through increased collection and treatment.

In 1996, Slater Steel started constructing a new electric arc furnace (EAF) that will reduce air emissions. This EAF, housed in an enclosed building, is equipped with new pollution-control equipment including direct fume extraction, settling chamber, cyclones, canopy hood, baghouse and stack. Modifications are being made to existing fume collection facilities to provide improved emission control from the existing ladle refining furnace.

Others

In 1996, the Stelco Inc. group of businesses, with the exception of Stelpipe Ltd. where a labour withdrawal held up progress, successfully destroyed all stored PCB waste and PCB contaminated material and equipment at an approved facility at Swan Hills, Alberta.



"Flowing Beauty", Brad Cumming

"Stelco Inc. and its group of businesses reconfirm their acceptance of the ARET challenge. ARET continues to be a major program for the corporation to measure environmental performance success, and we remain committed to the process."

J.C. Alfano, President and Chief Executive Officer, Stelco Inc.

"The federal government cannot in good faith ask the private sector and other levels of government to embrace pollution prevention if it is not prepared to do so itself."

*Creating Opportunity,
The Liberal Plan for
Canada*

GOVERNMENT

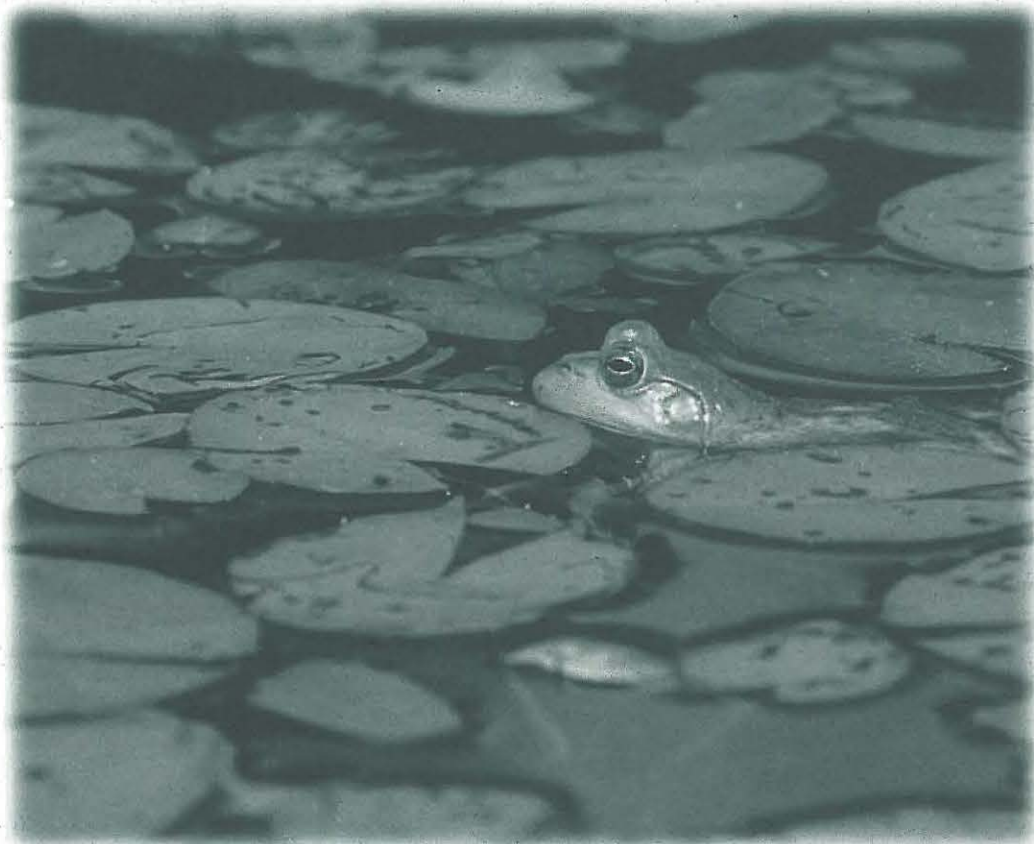
Four of the eight federal departments or agencies that participate in ARET determined that they have nil or negligible emissions of ARET substances and will not be submitting action plans, although they continue to support ARET.

Natural Resources Canada (NRCAN) identified emissions of 51 ARET substances in small quantities when it first committed to the ARET challenge in 1994. NRCAN's 1996 update indicated that emissions of some substances have been reduced. Further reductions will be investigated as ARET emissions are surveyed in the future.

Although Environment Canada does not generate large quantities of ARET substances, it has three potential sources of emissions: laboratory solvents, mercury in measurement instruments, and air fresheners and deodorizers.

By 2000, the Department plans to replace all its mercury manometers with new, efficient and environmentally friendly technology. This measure will eliminate an estimated 454 kilograms of mercury from its operations. To date, approximately 200 manometers (20 per cent of the total being used) have been replaced. In addition, the Department is working on the development and implementation of an Environmental Management System, which will encourage a pollution prevention approach in day-to-day operations across Canada.

The federal government is implementing a number of other voluntary initiatives. For example, the Voluntary Challenge and Registry Program addresses greenhouse gas emissions. Furthermore, all federal departments are charged with submitting sustainable development action plans under the Guide to Green Government initiative.



"Afternoon Bath", Ela Kinowska

Appendix I ARET Substances

LIST A-1

(meet or exceed criteria for toxicity, bioaccumulation and persistence)

ARET's vision for substances on this list is the virtual elimination of emissions into the environment from human activities. The short-term goal is for a 90 per cent reduction in emissions by 2000.

Polychlorinated biphenyls (PCBs)

Polycyclic aromatic hydrocarbons (PAHs) as a group

(The following specific PAHs met or exceeded the criteria for List A-1.)

	CASRN
Benz(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(e)pyrene	192-97-2
Benzo(b)fluoranthene	205-99-2
Benzo(j)fluoranthene	205-82-3
Benzo(k)fluoranthene	207-08-9
Benzo(g,h,i)perylene	191-24-2
Chrysene	218-01-9
Dibenz(a,h)anthracene	53-70-3
Dibenzo(a,i)pyrene	189-55-9
Dibenzo(a,j)acridine	224-42-0
7H-dibenzo(c,g)carbazole	194-59-2
Fluoranthene	206-44-0
Indeno(1,2,3-c,d)pyrene	193-39-5
Perylene	198-55-0
Phenanthrene	85-01-8
Pyrene	129-00-0
Nitro-PAHs	
1,6-dinitropyrene	42397-64-8
1,8-dinitropyrene	42397-65-9
Chlorinated organics	
Hexachlorobenzene	118-74-1
alpha-hexachlorocyclohexane	319-84-6
gamma-hexachlorocyclohexane	58-89-9
4,4'-methylenebis(2-chloroaniline)	101-14-4
Octachlorostyrene	29082-74-4
Pentachlorophenol	87-86-5
2,3,7,8-tetrachlorodibenzofuran	51207-31-9
2,3,7,8-tetrachlorodibenzo-p-dioxin	1746-01-6
Metal compounds	
*Methyl mercury	22967-92-6
Tributyltin	688-73-3

*For prevention/control actions, mercury should be addressed (see List B-2)

LIST A-2

ARET's goal for substances on this list is for the reduction of emissions to levels that are insufficient to cause harm. The short-term goal is for significant reduction in emissions.

CASRN

*1,4 dichlorobenzene	106-46-7
**Cadmium compounds (inhalable & soluble inorganic forms)	

*The toxicity criterion was met for possible carcinogenicity by accepting IARC (International Agency for Research on Cancer) classification of "possible human carcinogen."

**The selection process was unable to take into account specific metal compounds, and therefore scores for metals were based on a composite score for several metal species. For cadmium, actions may be tailored to such compounds as CdCO₃, Cd(OH)₂, CdCl₂, CdO, and CdSO₄. The concept of virtual elimination of discharges for metals is under discussion and was not resolved by ARET.

LIST B

For the List B substances, the vision is reduction of emissions to levels that are insufficient to cause harm. The short-term goal is a 50 per cent reduction by 2000.

LIST B-1

(meet or exceed criteria for toxicity & bioaccumulation)

PAHs	CASRN
Anthracene	120-12-7
7,12-dimethylbenz(a)anthracene	57-97-6
Dimethylnaphthalene	28804-88-8
Chlorinated organics	
3,3' dichlorobenzidine	91-94-1
Hexachlorocyclopentadiene	77-47-4
2,4,6-trichlorophenol	88-06-2
Other	
bis(2-ethylhexyl)phthalate	117-81-7
*Tetraethyl lead	78-00-2

*Degrades to lead, which is persistent (see List B-2).

For more information on the ARET substance selection process, please refer to Appendix I of Environmental Leaders 2.

For more information on the ARET substance selection process, please refer to Appendix 1 of Environmental Leaders 2.

LIST B-2

(meet or exceed criteria for toxicity & persistence)

PAHs	CASRN
Benzo(a)fluorene	238-84-6
Benzo(b)fluorene	30777-19-6
Dibenz(a,h)acridine	226-36-8
Chlorinated organics	
alpha-chlorotoluene	100-44-7
bis(2-chloroethyl)ether	111-44-4
Bromodichloromethane	75-27-4
Carbon tetrachloride	56-23-5
Chloroform	67-66-3
Chlorodibromomethane	124-48-1
1,2 dichloroethane	107-06-2
Methylene chloride	75-09-2
1,1,2,2-tetrachloroethylene	127-18-4
2,3,4,6-tetrachlorophenol	58-90-2
Metal compounds	
Arsenic (inorganic)	N/A*
Asbestos	1332-21-4
Beryllium	7440-41-7
Chromium (Cr6+)	N/A*
Cobalt (inorganic, soluble)	N/A*
Copper (inorganic salts)	N/A*
**Lead (all forms except alkyl)	N/A*
***Mercury (elemental and inorganic)	N/A*
Nickel (inorganic, inhalable, soluble)	N/A*
Silver (soluble inorganic salts)	N/A*
Uranium (inorganic, inhalable, soluble)	N/A*
Zinc (inorganic, inhalable, soluble)	N/A*
Other	
o-anisidine	90-04-0
Cyanides	57-12-5
4,6 dinitro-o-cresol	534-52-1
1,4 dioxane	123-91-1
Ethylene oxide	75-21-8
2-naphthylamine	91-59-8
2-nitropropane	79-46-9
Thiourea	62-56-6

*CASRN not applicable. The selection process was unable to take into account specific metal compounds, and therefore scores for metals were based on a composite score for several metal species.

**See also tetraethyl lead on List B-1

***See also methyl mercury on List A-1

LIST B-3

(meet or exceed toxicity criterion)

Chlorinated organics	CASRN
bis(chloromethyl) ether	542-88-1
Epichlorohydrin	106-89-8
1-bromo-2-chloroethane	107-04-0
1-chloro-4-nitrobenzene	100-00-5
1,2-dibromo-3-chloropropane	96-12-8
1,2-dichlorobut-3-ene	760-23-6
2,4-dichlorophenol	120-83-2
1,3 dichloropropene	542-75-6
1,1,2-trichloroethylene	79-01-6
Aromatics	
4-aminoazobenzene	60-09-3
4-aminobiphenyl	92-67-1
Aniline	62-53-3
Benzene	71-43-2
Benidine	92-87-5
Dimethylphenol (mixed-isomers)	1300-71-6
2,6 dimethylphenol	576-26-1
2,4 dinitrotoluene	121-14-2
2,6 dinitrotoluene	606-20-2
1,2 diphenylhydrazine	122-66-7
2-methylpyridine	109-06-8
Phenol	108-95-2
Toluene diisocyanates	26471-62-5
Nitrosamines	
N-nitrosodimethylamine	62-75-9
N-nitrosodiphenylamine	86-30-6
N-nitroso-di-n-propylamine	621-64-7
Other	
Acetaldehyde	75-07-0
Acetamide	60-35-5
Acrolein	107-02-8
Acrylamide	79-06-1
Acrylonitrile	107-13-1
1,3 butadiene	106-99-0
Chlorine dioxide	10049-04-4
n-dodecane	112-40-3
Ethanol	64-17-5
Ethylene dibromide	106-93-4
Ethylene thiourea	96-45-7
Formaldehyde	50-00-0
Hydrazine	302-01-2
Hydrogen sulphide	7783-06-4
Methyl isobutyl ketone	108-10-1
4-nitrosomorpholine	59-89-2
Quinoline	91-22-5
Tetramethylthiuram disulphide	137-26-8
Vinyl bromide	593-60-2

Appendix 2 Emissions by Facility

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
3M CANADA COMPANY								
London Plant	Other	8.7	8.7	4.2	4.0	▼53%	3.3	▼62%
Perth Plants	Other	35	35	40	44	▲24%	7.8	▼78%
ABITIBI-CONSOLIDATED CORP. (FORMERLY ABITIBI-PRICE AND STONE-CONSOLIDATED)								
Belgo Division	Other	216	216	145	3.0	▼99%	3.1	▼99%
Fort Frances Division	A-1	7.1x10 ⁻⁶	0	0	0	▼100%	0	▼100%
	Other	121	21	27	26	▼78%	19	▼84%
Fort William Division	A-1	8.7x10 ⁻⁷	8.7x10 ⁻⁷	8.7x10 ⁻⁷	8.7x10 ⁻⁷	▲0%	0	▼100%
	Other	5.2	5.2	0.82	0.82	▼84%	0.039	▼99%
Iroquois Falls Division	A-1	5.9x10 ⁻⁷	3.0x10 ⁻¹⁰	0	0	▼100%	0	▼100%
	Other	1.0	1.2	0.47	0.23	▼78%	0.48	▼54%
Kenora Division	Other	1.8	1.8	4.7	3.6	▲96%	1.3	▼29%
La Compagnie Gaspésia Ltée	Other	6.5	6.5	1.6	1.6	▼76%	0.71	▼89%
Laurentide Division	Other	117	117	117	4.1	▼96%	5.6	▼95%
Papeterie Alma	A-1	0.13	0.13	0	0	▼100%	0	▼100%
	Other	6.9	6.9	2.1	1.3	▼81%	1.0	▼85%
Papeterie Beaupré	A-1	1.1x10 ⁻³	1.1x10 ⁻³	1.1x10 ⁻³	0	▼100%	0	▼100%
	Other	2.6	2.6	2.6	1.4	▼45%	1.4	▼45%
Papeterie Kénogami	A-1	2.4x10 ⁻³	2.4x10 ⁻³	2.4x10 ⁻³	2.4x10 ⁻³	0%	0	▼100%
	Other	8.0	8.0	4.9	4.9	▼39%	3.5	▼56%
Port Alfred Division	Other	267	267	129	129	▼52%	9.2	▼97%
Wayagamack Division	A-1	0.020	0.014	5.6x10 ⁻³	0	▼100%	0	▼100%
	Other	315	159	56	55	▼83%	28	▼91%
ACIERS INOXYDABLES ATLAS	Other	95	62	32	23	▼75%	26	▼72%
ADVANCED MONOBLOC	Other	147	147	109	87	▼41%	0	▼100%
ALCAN SMELTING AND CHEMICALS LIMITED								
Arvida Aluminum Smelter	A-1	466	180	146	185	▼60%	110	▼76%
	Other	1.8	0.50	0.50	0.30	▼83%	0.40	▼78%
Beauharnois Aluminum Smelter	A-1	110	50	43	50	▼55%	30	▼73%
Isle-Maligne Aluminum Smelter	A-1	150	80	75	77	▼49%	50	▼67%
Shawinigan Aluminum Smelter	A-1	170	95	78	82	▼52%	50	▼71%
Vaudreuil Chemical Works	A-1	0.57	0.010	0.010	0.010	▼98%	0.010	▼98%
	Other	0.40	0.075	0.075	0.088	▼78%	0.035	▼91%
ALGOMA STEEL INC.	A-1	84	84	14	16	▼80%	12	▼86%
	Other	369	369	188	183	▼51%	86	▼77%
ASHLAND CHEMICAL CANADA LTD.	Other	1.4	1.2	1.2	1.3	▼7%	1.2	▼15%
ATLAS SPECIALTY STEELS	Other	15	6.7	1.1	1.6	▼89%	0.072	▼100%
AVENOR INC.								
Dryden Operations	Other	182	176	174	103	▼43%	103	▼43%
Gatineau Operations	A-1	2.6x10 ⁻⁷	2.6x10 ⁻⁷	2.6x10 ⁻⁷	2.6x10 ⁻⁷	0%	2.6x10 ⁻⁷	0%
	Other	0	0	0	0.19	n/a	0	0%
Gold River Operations	A-1	2.6x10 ⁻⁴	2.6x10 ⁻⁶	2.6x10 ⁻⁶	8.3x10 ⁻⁷	▼100%	0	▼100%
	Other	209	132	114	88	▼58%	101	▼52%
Thunder Bay Operations	A-1	0.74	0.74	0.74	0.74	▼0%	0.74	▼0%
	Other	1,051	993	1,585	1,093	▲4%	536	▼49%
BARRICK GOLD CORPORATION	Other	8.1	0.97	0.75	0.95	▼88%	4.0	▼51%

*Other - Total from lists A-2, B-1, B-2 and B-3.

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
BASF CANADA LIMITED								
Brantford	Other	1.6	1.6	1.7	1.6	▼0%	0.21	▼87%
Sarnia	Other	2.1	2.1	0.050	0	▼100%	0	▼100%
Toronto	Other	0.41	0.41	0.018	0.022	▼95%	0.20	▼51%
Windsor	Other	3.9	3.9	0.95	1.9	▼53%	1.9	▼52%
BATTLE MOUNTAIN CANADA LTD.								
Golden Giant Mine	Other	83	122	61	97	▲17%	102	▲23%
Holloway Mine	Other	0.013		0.013	0.019	▲41%	0.013	0%
Sildor Mine	Other	0.017	0.023	0.042	0.019	▲15%	0	▼100%
BAYER INC. Sarnia Site	Other	554	554	362	163	▼71%	104	▼81%
BENJAMIN MOORE & CO., LIMITED								
Montreal Facility	Other	1.6	1.6	0.50	0.50	▼68%	2.8	▲77%
Toronto Facility	Other	0.62	0.62	0.62	0.62	0%	0.32	▼49%
Vancouver Facility	Other	0.029	0.029	0.029	0.029	0%	0.018	▼38%
BOWATER MERSEY PAPER COMPANY LTD.								
Newsprint Facility	Other	8.7	8.7	4.4	0.20	▼98%	4.3	▼50%
Bridgestone/Firestone Canada Inc.								
Usine de Joliette	Other	1.1	1.1	0.35	0	▼100%	0	▼100%
CAMBIOR INC.								
Mine Bouchard-Hebert	Other	0.17	0.10	0.064	0.29	▲72%	0.20	▲20%
Mine Geant Dormant	Other	0.37	0.035	0.010	0.35	▼7%	0.14	▼62%
Mine Gonzague-Langlois	Other	0.50	0.50	0.013	2.0x10 ⁻³	▼100%	0.010	▼98%
Usine Yvan Vezina	Other	8.0x10 ⁻³	8.0x10 ⁻³	0.011	0.020	▲150%	0.010	▲25%
CANADA COLORS & CHEMICALS LIMITED								
Brampton	Other	0.27	0.27	0.14	0.14	▼49%	0.14	▼49%
Colborne	Other	1.0x10 ⁻³	1.0x10 ⁻³	0	0	▼100%	0	▼100%
Montreal	Other	0.067	0.067	0.054	1.1	▲1493%	1.1	▲1493%
Vancouver	Other	1.0x10 ⁻³	1.0x10 ⁻³	0	0	▼100%	0	▼100%
CANADIAN FOREST PRODUCTS LTD.								
Howe Sound Pulp & Paper Ltd.	A-1	0.26	0	0	2.4x10 ⁻⁷	▼100%	0	▼100%
	Other	88	5.9	5.9	7.7	▼91%	7.7	▼91%
Prince George Pulp & Paper Mills	A-1	0.06	0.015	3.3x10 ⁻⁷	9.3x10 ⁻⁷	▼100%	3.3x10 ⁻⁷	▼100%
	Other	438	95	95	14	▼97%	14	▼97%
CARIBOO PULP AND PAPER COMPANY								
Quesnel Kraft Pulp Mill	Other	65	48	60	50	▼23%	24	▼63%
CARTONS ST-LAURENT								
Usine de La Tuque	A-1	0.049	1.4x10 ⁻⁶	0	0	▼100%	0	▼100%
	Other	265	266	142	154	▼42%	79	▼70%
CASCO IMPREGNATED PAPERS, INC.								
Cobourg Plant	Other	3.7	3.7	3.7	6.5	▲74%	2.9	▼22%
CELANESE CANADA INC.								
Millhaven Site	Other	48	50	39	45	▼7%	27	▼44%
Edmonton Plant	Other	316	308	308	338	▲7%	245	▼22%
CHINOOK GROUP Sombra Plant	A-1	4.8x10 ⁻⁹	4.8x10 ⁻⁹	9.1x10 ⁻¹²	8.8x10 ⁻¹²	▼100%	0	▼100%
	Other	0.094	0.094	0.094	1.7	▲1699%	2.5x10 ⁻⁵	▼100%
CHRYSLER CANADA LTD.								
Assembly, Trim, Casting & Distribution Plants	Other	116	116	80	45	▼61%	50	▼56%
CO-STEEL LASCO Whitby mini-mill	Other	29	29	14	12	▼59%	15	▼50%
COMINCO LTD.	Other	862	280	294	459	▼47%	159	▼82%

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
CRESTBROOK FOREST INDUSTRIES								
Pulp Mill Division	A-1	2.7x10 ⁻⁶	2.7x10 ⁻⁶	3.1x10 ⁻⁷	1.5x10 ⁻⁷	▼95%	0	▼100%
	Other	375	375	18	23	▼94%	16	▼96%
CROWN CORK & SEAL CANADA INC.								
Plant 233 (Concord)	Other	46	46	34	34	▼26%	23	▼50%
Plant 234 (Montreal)	Other	0.26	0.26	0.41	0.37	▲41%	0.10	▼62%
Plant 244 (Concord)	Other	4.3	4.3	0.83	3.0	▼31%	1.0	▼77%
Plant 246 (St. Laurent)	Other	0.21	0.21	2.0x10 ⁻³	1.7x10 ⁻³	▼99%	0	▼100%
Plant 250 (Winnipeg)	Other	0.087	0.087	0	0	▼100%	0	▼100%
Plant 257 (Chatham)	Other	1.1	0	0.27	0.038	▼97%	0.1	▼91%
CXY CHEMICALS CANADA LTD.	Other	0	0	0	2.0x10 ⁻³	n/a	0	n/a
CYTEC CANADA INC.	Other	0.037	0.037	0.049	0.054	▲46%	0	▼100%
DAISHOWA INC.	Other	236	162	79	0.27	▼100%	0.97	▼100%
DELMAR INC. Lasalle Plant	Other	33	33	32	32	▼5%	17	▼50%
DOFASCO INCORPORATED								
	A-1	52	44	41	40	▼23%	31	▼41%
	Other	2,312	1,573	1,323	1,261	▼45%	960	▼58%
DOMTAR INC.								
Beauharnois Facility	A-1	2.0x10 ⁻⁴	2.0x10 ⁻⁴	2.0x10 ⁻⁴	0	▼100%	2.0x10 ⁻⁴	0%
	Other	24	1.8	0.17	0.10	▼100%	0.13	▼99%
Cornwall Facility	A-1	3.0	3.0	3.0	2.9	▼3%	2.9	▼5%
	Other	237	204	162	161	▼32%	162	▼32%
Lebel-sur-Quévillon Facility	A-1	0.058	0.042	0.055	1.0	▲1645%	0.031	▼47%
	Other	1,446	1,408	1,404	253	▼83%	44	▼97%
Red Rock Facility	A-1	0.097	0.097	0.057	0.057	▼41%	0.057	▼41%
	Other	98	85	46	47	▼53%	47	▼53%
St. Catharines Facility	A-1	2.0x10 ⁻⁴	2.0x10 ⁻⁴	2.0x10 ⁻⁴	2.0x10 ⁻³	▲900%	2.0x10 ⁻⁴	0%
	Other	0.11	0.11	0.10	0.039	▼63%	0.10	▼4%
Trenton Facility	Other	20	20	19	19	▼7%	27	▲33%
Windsor Facility	A-1	0.059	0.059	0.061	0.14	▲140%	0.042	▼29%
	Other	731	725	1,241	158	▼78%	32	▼96%
DOW CHEMICAL CANADA INC.								
Fort Saskatchewan Site	A-1	1.7x10 ⁻⁶	1.7x10 ⁻⁶	1.7x10 ⁻⁶	1.7x10 ⁻⁶	0%	2.0x10 ⁻⁷	▼88%
	Other	92	50	49	50	▼46%	49	▼47%
Sarnia Site	A-1	2.1x10 ⁻³	1.9x10 ⁻⁹	1.0x10 ⁻³	0	▼100%	0	▼100%
	Other	200	60	50	37	▼81%	15	▼93%
Varenes Site	Other	25	13	0.11	0.11	▼100%	0.10	▼100%
West Coast Distribution Centre	Other	1.9	1.9	1.9	2.4	▲24%	2.4	▲24%
DUPONT CANADA INC.								
Ajax Manufacturing Operation	Other	2.5	2.5	0.52	0.95	▼62%	0.50	▼80%
Maitland Manufacturing Operation	Other	11	6.5	7.8	8.0	▼26%	6.0	▼44%
E.B. EDDY FOREST PRODUCTS LTD.								
Espanola Division	A-1	0.13	0.13	0.13	0.11	▼14%	0.012	▼91%
	Other	417	417	376	364	▼13%	88	▼79%
Island Paper Mills Co.	Other	2.3	2.3	2.3	2.3	▲0%	0.80	▼65%
Ottawa/Hull Division	A-1	6.0x10 ⁻³	6.0x10 ⁻³	6.0x10 ⁻³	6.0x10 ⁻³	▲0%	6.0x10 ⁻⁴	▼90%
	Other	1.6	1.6	1.6	2.0	▲22%	1.1	▼34%
ECHO BAY MINES LTD.								
Lupin Operation	Other	0.83	0.31	0.37	0.44	▼47%	0.20	▼76%

*Other - Total from lists A-2, B-1, B-2 and B-3.

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
EKA NOBEL CANADA INC.								
Magog Site	Other	0.010	2.8x10 ⁻³	1.3x10 ⁻³	1.4x10 ⁻³	▼87%	3.0x10 ⁻³	▼71%
Valleyfield Site	Other	3.7x10 ⁻³	1.7x10 ⁻³	2.0x10 ⁻⁴	7.4x10 ⁻⁴	▼80%	1.0x10 ⁻³	▼73%
ETHYL CANADA INC. Corunna	Other	31	18	0.081	0.11	▼100%	0.35	▼99%
F. F. SOUCY INC.	Other	11	11	11	1.9	▼83%	11	▼0%
FALCONBRIDGE LIMITED								
Kidd Metallurgical Division	Other	175	160	110	113	▼35%	65	▼63%
Kidd Mining Division	Other	5.5	2.8	2.9	6.4	▲16%	2.8	▼50%
Sudbury Operations	Other	183	85	75	75	▼59%	51	▼72%
FLETCHER CHALLENGE CANADA LIMITED								
Crofton Pulp and Paper	A-1	0.044	0.044	0.044	0.044	▼0%	0.044	▼0%
	Other	785	610	599	374	▼52%	357	▼54%
Elk Falls Pulp and Paper	A-1	0.064	0.064	0.064	0.064	▼0%	0.064	▼0%
	Other	1,142	872	421	463	▼59%	436	▼62%
Mackenzie Pulp	A-1	3.2x10 ⁻⁵	6.5x10 ⁻⁷	0	0	▼100%	0	▼100%
	Other	153	39	1.9	9.6	▼94%	1.9	▼99%
GATES CANADA LIMITED								
Belt Processing Plant	Other	0.025	0.025	0.025	0.029	▲18%	4.9x10 ⁻³	▼80%
Hose Processing Plant	Other	0.25	0.25	0.25	0.13	▼47%	0.048	▼81%
GE PLASTICS CANADA LTD.	Other	3.4	3.4	1.5	1.6	▼54%	2.6	▼25%
GENERAL ELECTRIC CANADA INC.								
GE Lighting	Other	19	19	18	19	▲0%	54	▲180%
GE Meters	Other	10	10	9	1.5	▼85%	0	▼100%
Motors & Industrial Systems	Other	45	3.0	5.8	5.8	▼87%	1.5	▼97%
Nuclear Products Dept.	Other	2.0	2.0	2.0	2.0	▲0%	6.0x10 ⁻³	▼100%
GERDAU COURTICE STEEL INC.	Other	7.6	7.6	7.6	10	▲35%	7.6	0%
GERDAU MRM STEEL	Other	16	16	19	19	▲15%	19	▲15%
H.L. BLACHFORD LTD.	Other	0.66	0.66	0	0.012	▼98%	0	▼100%
HARMAC PACIFIC INC.	A-1	3.0x10 ⁻⁶	5.4x10 ⁻⁷	7.9x10 ⁻⁷	7.8x10 ⁻⁷	▼74%	5.7x10 ⁻⁷	▼81%
	Other	112	66	60	70	▼38%	59	▼48%
HERCULES CANADA INC.	Other	0.32	0	0	0	▼100%	0	▼100%
HOMESTAKE CANADA INC. / PRIME RESOURCES GROUP								
	Other	20	1.1	1.3	0.39	▼98%	3.3	▼83%
HUDSON BAY MINING & SMELTING COMPANY LTD.								
Flin Flon Smelter Complex	Other	2,037	1,662	171	419	▼79%	142	▼93%
HUNTSMAN CORPORATION CANADA INC.								
Guelph Plant	Other	39	39	4.1	3.9	▼90%	1.4	▼97%
HYDRO AGRI CANADA Maitland	Other	0.048	0.048	0.048	0.046	▼4%	0.040	▼17%
HYDRO QUÉBEC	A-1	0.38	0.38	0.36	0.25	▼33%	0.25	▼33%
	Other	7.6	7.6	5.2	3.2	▼57%	3.2	▼57%
IBM CANADA LTD. Bromont	Other	105	31	10	8.3	▼92%	7.8	▼93%
ICI Canada Inc.								
Cornwall Chemicals Ltd.(CLOSED)	Other	35	41	8.7	0	▼100%	0	▼100%
ICI Explosives, Brownsburg	Other	4.4	6.7	6.0	6.0	▲36%	3.5	▼22%
ICI Forest Products (CLOSED)	Other	0.12	0.065	0.032	0.010	▼92%	3.0x10 ⁻³	▼97%
IMPERIAL OIL LIMITED Manufacturing, oil production and refining operations								
	Other	453	453	291	293	▼35%	203	▼55%
INCO Copper Cliff and Thompson	Other	2,006	853	882	683	▼66%	818	▼59%
IRVING FOREST PRODUCTS LTD.	Other	71	71	71	69	▼3%	55	▼22%

COMPANY/Facility	Category ^a	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
IVACO ROLLING MILLS LIMITED PARTNERSHIP								
	Other	27	12	11	7.008	▼74%	9.4	▼65%
KIMBERLY-CLARK CORPORATION								
Kimberly-Clark Nova Scotia	A-1	1.0x10 ⁻⁵	5.2x10 ⁻⁷	0	0	▼100%	0	▼100%
	Other	791	281	281	122	▼85%	55	▼93%
Terrace Bay Pulp	A-1	5.1x10 ⁻⁶	3.1x10 ⁻⁶	4.3x10 ⁻⁷	3.4x10 ⁻⁷	▼93%	0	▼100%
	Other	71	71	71	57	▼20%	37	▼48%
KODAK CANADA INC.								
	Other	0.30	0.25	0.25	0.35	▲16%	0.15	▼50%
KRONOS CANADA, INC.								
	Other	4.9	1.9	1.1	0.50	▼90%	1.1	▼78%
KRUGER INC.								
Corner Brook Pulp & Paper Ltd	Other	4.5	4.5	4.5	4.5	0%	0	▼100%
Kruger Inc. & Kruger PTR Inc.	Other	0.089	0.089	0	0	▼100%	0	▼100%
Kruger Inc. & Kruger Urban Forest Products	Other	0.014	0.014	0	0	▼100%	0	▼100%
LES MINES SELBAIE								
	Other	19	2.5	3.5	2.2	▼88%	2.9	▼85%
LES RESSOURCES AUR								
	Other	0.51			0.51	0%	0.51	0%
LUBRIZOL CANADA LIMITED								
	Other	0.42	0.023	1.0x10 ⁻³	4.0x10 ⁻³	▼99%	4.0x10 ⁻³	▼99%
MACMILLAN BLOEDEL LTD.								
Engineered wood products	Other	20	20	20	20	0%	20	0%
Paper mills - Powell River & Port Alberni	A-1	0.035	0.012	0.012	0.012	▼66%	0.012	▼66%
	Other	268	90	90	90	▼66%	90	▼66%
METHANEX CORPORATION								
Kitimat Methanol Plant	Other	0.2	0.2	0.2	0.035	▼83%	0.1	▼50%
Medicine Hat Methanol Plant	Other	2.7	2.3	2.2	1.2	▼54%	0.56	▼79%
MICHELIN TIRES (CANADA) LTD.								
Bridgewater Facility	Other	3.1	3.1	2.8	1.5	▼51%	1.4	▼55%
Granton Facility	Other	17	17	16	5.2	▼70%	7.9	▼54%
Waterville Facility	Other	1.6	1.6	1.6	0.31	▼81%	0.81	▼49%
MONTELL CANADA INC.								
	Other	0.42	0.14	0.19	0.11	▼73%	0	▼100%
NACAN PRODUCTS LIMITED								
Boucherville Plant	Other	0.070	0.058	0.076	0.054	▼23%	0.018	▼74%
Vancouver Plant	Other	0.022	0.018	0.033	7.2x10 ⁻³	▼67%	5.0x10 ⁻³	▼77%
NALCO CANADA INC. Burlington								
	Other	1.8	1.5	1.2	0.72	▼60%	0.40	▼78%
NALCO/EXXON ENERGY CHEMICALS CANADA INC.								
Chemical Manufacturing Plant	Other	1.4x10 ⁻⁴	1.4x10 ⁻⁴	1.4x10 ⁻⁴	9.0x10 ⁻⁶	▼94%	9.0x10 ⁻⁶	▼94%
NATURAL RESOURCES CANADA								
	A-1	1.1x10 ⁻³	1.1x10 ⁻³	1.1x10 ⁻³	1.1x10 ⁻³	▼1%	1.1x10 ⁻³	▼1%
	Other	1.5	1.5	1.5	1.4	▼3%	1.3	▼15%
NESTE RESINS CANADA Ste Therese								
	Other	111	17	14	14	▼88%	17	▼85%
NORANDA FOREST INC.								
Edmunston NB sulphite pulp	Other	10		10	12	▲15%	3.2	▼69%
La Sarre Oriented Strandboard	Other	27	27	27	14	▼47%	21	▼22%
Masson Newsprint	Other	25	25	17	0	▼100%	2.5	▼90%
Prince George Kraft Pulp	Other	94	88	81	66	▼30%	59	▼37%
Thurso Kraft Pulp	Other	8.9	8.9	7.7	0.10	▼99%	0.90	▼90%
Val d'Or Oriented Strandboard	Other	91	99	32	43	▼53%	46	▼50%
NORANDA METALLURGY, INC.								
Canadian Electrolytic Zinc	Other	184	153	113	117	▼36%	35	▼81%
CCR Refinery	Other	31	6.8	5.2	7.3	▼76%	4.3	▼86%
General Smelting of Canada	Other	0			0	0%	0.1	n/a
Horne Smelter	Other	1,591	492	636	648	▼59%	546	▼66%

*Other - Total from lists A-2, B-1, B-2 and B-3.

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
NORANDA MINING & EXPLORATION, INC.								
Brunswick Mining Division	Other	51	29	12	22	▼58%	21	▼59%
Brunswick Smelting Division	Other	75	33	20	23	▼70%	18	▼76%
CLOSED Sites	Other	23	13	14	12	▼49%	4.5	▼80%
Gaspe Mines	Other	259	54	47	32	▼87%	27	▼90%
Heath Steele Division	Other	47	15	12	11	▼76%	8.3	▼82%
Matagami Division	Other	10	2.6	3.2	3.4	▼66%	3.0	▼71%
NOVA CHEMICALS LTD.								
Corunna Site	Other	99	99	56	84	▼16%	59	▼41%
Joffre Manufacturing Site	Other	37	31	36	22	▼41%	22	▼40%
Sarnia site	Other	267	231	23	24	▼91%	24	▼91%
St. Clair River Site	Other	6.4	6.4	0.90	0.10	▼98%	0	▼100%
NOVA SCOTIA POWER, INC.								
	A-1	4.4x10 ⁻³	4.4x10 ⁻³	4.4x10 ⁻³	4.4x10 ⁻³	0%	4.4x10 ⁻³	0%
	Other	5.0	5.0	5.0	5.0	0%	5.0	0%
ONTARIO HYDRO								
	Other	83	83	66	62	▼24%	14	▼83%
OXYCHEM DUREZ CANADA								
	Other	2.1	1.7	3.1	3.2	▲54%	0.11	▼95%
PERKINS PAPERS LTD. Cadiac								
	A-1	1.9x10 ⁻⁹	1.9x10 ⁻⁹	1.9x10 ⁻⁹	1.9x10 ⁻⁹	0%	1.9x10 ⁻⁹	0%
	Other	0.38	0.38	0.38	0.38	0%	0.38	0%
PETROMONT INC.								
Site de Montreal-Est	Other	84	84	0	0	▼100%	0	▼100%
Site de Varennes	Other	57	57	52	37	▼35%	29	▼48%
PLACER DOME (CLA) LIMITED								
	Other	142	13	7.0	8.3	▼94%	10	▼93%
PLASTMO LTD.								
	Other	0.10	0.10	0.10	0.050	▼50%	0	▼100%
PPG CANADA INC.								
	Other	0.013	3.3x10 ⁻³	1.4x10 ⁻³	9.0x10 ⁻⁴	▼93%	0	▼100%
RECOCHEM INC. Montreal								
	Other	26	25	9.8	9.1	▼65%	10	▼62%
REPAP NEW BRUNSWICK INC.								
	A-1	2.5x10 ⁻⁵	0	0	0	▼100%	0	▼100%
	Other	1,435	84	84	85	▼94%	85	▼94%
RHONE-POULENC CANADA INC.								
Mississauga Plant	Other	36	5.9	5.1	3.2	▼91%	0.85	▼98%
St. Catharines Plant	Other	1.0x10 ⁻³		1.0x10 ⁻³	1.0x10 ⁻³	0%	1.0x10 ⁻³	0%
Valleyfield Plant	Other	6.5	6.5	6.3	5.3	▼18%	7.0x10 ⁻³	▼100%
ROHM AND HAAS CANADA INC.								
	Other	0.77	0.73	0.98	0.060	▼92%	0.060	▼92%
SAFETY-KLEEN CANADA INC.								
	Other	0.91	0.91	0.91	0.26	▼71%	0.36	▼60%
SASKATOON CHEMICALS LTD.								
	Other	1.6x10 ⁻⁴	1.6x10 ⁻⁴	2.0x10 ⁻³	2.0x10 ⁻⁵	▼88%	0	▼100%
SHELL CANADA LTD. & SHELL CHEMICAL CANADA LTD.								
	Other	850	497	353	317	▼63%	204	▼76%
SHERRITT INTERNATIONAL								
	Other	2.06	2.06	0.2	0.2	▼90%	0.20	▼90%
SHRADER CANADA LTD.								
	Other	0.39	0.39	0.26	0.13	▼67%	0.20	▼49%
SKEENA CELLULOSE INC.								
	Other	800	1.0	1.0	1.0	▼100%	1.0	▼100%
SLATER STEELS INC.								
	Other	74	8.6	8.6	8.4	▼89%	2.61	▼96%
SOLUTIA CANADA INC. LaSalle								
	A-1	4.0x10 ⁻³	0	0	0	▼100%	0	▼100%
	Other	300	57	48	28	▼91%	13	▼96%
ST. ANNE-NACKAWIC PULP COMPANY LTD.								
	Other	702	702	315	366	▼48%	118	▼83%

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
STELCO INC.								
AltaSteel Ltd.	Other	3.759	3.759	4.468	13	▲239%	11	▲192%
CHT Steel Company Inc.	Other	0.001	0.001	0.001	0.	▼99%	0	▼100%
Frost Wire Products Ltd.	Other	0.22	0.22	0.28	0.23	▲1%	0.16	▼28%
Hilton Works	A-1	45	45	23	35	▼21%	22	▼50%
	Other	857	857	686	821	▼4%	420	▼51%
Lake Erie Steel Company Ltd.	A-1	16	16	16	14	▼10%	8.6	▼45%
	Other	935	935	897	667	▼29%	649	▼31%
Stelco Fasteners Ltd.	Other	0.019	0.018	0.016	0.059	▲205%	0.016	▼19%
Stelco McMaster Ltee	Other	7.3	7.3	16	16	▲121%	7.3	▲0%
Stelfil Ltee	Other	2.6	2.6	7.9	0.32	▼88%	1.3	▼48%
Stelpipe Ltd.	Other	0.74	0.50	0.51	0.51	▼32%	0.13	▼82%
Stelwire Ltd., Burlington Works	Other	0.14	0.14	0.088	8.6x10 ⁻³	▼94%	8.6x10 ⁻³	▼94%
Stelwire Ltd., Parkdale Works	Other	5.4	0.70	0.70	0.90	▼83%	0.69	▼87%
Welland Pipe Ltd.	Other	0.068	0.068	0.022	0.21	▲216%	0.22	▲226%
STEPAN CANADA INC.	Other	0.79	0.79	0.12	0.12	▼85%	0.12	▼85%
STERLING PULP CHEMICALS LTD.	Other	2.2	2.2	0.11	0.16	▼93%	0.75	▼66%
STORA N. A. Port Hawkesbury	Other	231	221	221	190	▼18%	100	▼57%
STRATHCONA PAPER COMPANY	Other	7.7x10 ⁻³	7.7x10 ⁻³	2.7x10 ⁻³	0.034	▲339%	1.0x10 ⁻⁴	▼99%
SUNCOR - SUNOCO GROUP								
Sarnia Refinery	Other	49	49	31	29	▼41%	23	▼53%
SYDNEY STEEL CORPORATION	Other	1.3	1.3	0.78	0.33	▼74%	0.64	▼50%
SYNCRUDE CANADA LTD.	Other	277	352	107	61	▼78%	68	▼75%
SYNERGISTICS	Other	0.75	0.75	0.75	0.75	0%	0.75	0%
TEMBEC INC. Temiscaming	Other	16	16	16	10	▼37%	0	▼100%
THE COBALT REFINERY COMPANY	Other	15	15	5.1	2.4	▼84%	4.0	▼72%
TRANSALTA UTILITIES CORPORATION								
Kepphills Thermal Generating Plant	A-1	3.0x10 ⁻³	3.0x10 ⁻³	3.0x10 ⁻³	3.0x10 ⁻³	0%	3.0x10 ⁻³	0%
	Other	0.44	0.44	0.44	0.44	0%	0.44	0%
Sundance Thermal Generating Plant	A-1	9.0x10 ⁻³	9.0x10 ⁻³	9.0x10 ⁻³	9.0x10 ⁻³	0%	9.0x10 ⁻³	0%
	Other	1.3	1.3	1.3	1.3	0%	1.27	0%
Wabamun Thermal Generating Plant	A-1	3.0x10 ⁻³	3.0x10 ⁻³	3.0x10 ⁻³	3.0x10 ⁻³	0%	3.0x10 ⁻³	0%
	Other	0.69	0.69	0.40	0.36	▼48%	0.51	▼27%
ULTRAMAR LTD. St-Romuald	Other	33	33	13	15	▼55%	7.2	▼78%
UNION CARBIDE CANADA INC.								
Prentiss Plant	Other	20	11	5.2	5.4	▼73%	5.1	▼74%
UNIROYAL CHEMICAL LTD.								
Elmira Manufacturing Facility	Other	1.5	1.5	1.5	2.4	▲56%	0.90	▼41%
VFT INC. Hamilton Plant	Other	16	14	14	6.3	▼60%	4.0	▼75%
WELDWOOD OF CANADA LIMITED								
Hinton Division	A-1	0.15	3.8x10 ⁻³	4.0x10 ⁻³	3.9x10 ⁻³	▼97%	3.9x10 ⁻³	▼97%
	Other	234	70	22	37	▼84%	27	▼89%
WESTMIN RESOURCES LIMITED								
Myra Falls Operation	Other	4.1	1.8	2.4	0.66	▼84%	1.8	▼55%
Premier Gold Operation	Other	1.4	1.4	0.21	0.27	▼81%	0.23	▼84%

*Other - Total from lists A-2, B-1, B-2 and B-3.

COMPANY/Facility	Category*	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
WEYERHAEUSER CANADA LTD.								
Grande Prairie Operation	A-1	2.1x10 ⁻⁶	4.1x10 ⁻⁷	1.2x10 ⁻⁷	2.0x10 ⁻⁸	▼99%	8.0x10 ⁻⁸	▼96%
	Other	21	15	10	7.5	▼65%	4.0	▼81%
Kamloops Pulp Mill	A-1	2.0x10 ⁻⁵	4.5x10 ⁻⁶	4.6x10 ⁻⁷	7.5x10 ⁻⁷	▼96%	4.6x10 ⁻⁷	▼98%
	Other	313	102	71	56	▼82%	40	▼87%
Prince Albert Pulp & Paper	A-1	5.2x10 ⁻⁵	2.8x10 ⁻⁷	4.3x10 ⁻⁶	3.3x10 ⁻⁷	▼99%	4.0x10 ⁻⁷	▼99%
	Other	2,250	1,482	1,664	443	▼80%	315	▼86%
WITCO CANADA INC.								
Upton Road Plant	Other	7.2x10 ⁻³	7.2x10 ⁻³	0	0	▼100%	0	▼100%
West Hill Plant	Other	5.1x10 ⁻³	5.1x10 ⁻³	0	0	▼100%	0	▼100%
ZEP MANUFACTURING OF CANADA	Other	2.0x10 ⁻³	2.0x10 ⁻³	0	0	▼100%	0	▼100%

n/a = not applicable

*Other - Total from lists A-2, B-1, B-2 and B-3.

Appendix 3 Emissions by Substance

Substance	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
A-1 TOXIC SUBSTANCES							
PAHs (from list A-1, not all species)	902	410	347	399	▼56%	244	▼73%
Fluoranthene	66	65	22	24	▼64%	17	▼74%
Phenanthrene	28	26	21	22	▼21%	16	▼44%
Pyrene	22	21	17	19	▼17%	14	▼39%
Chrysene	21	21	7.9	8.4	▼60%	6.0	▼72%
Benz(a)anthracene	15	14	4.2	4.2	▼72%	3.3	▼78%
Benzo(a)pyrene	10	10	5.0	6.4	▼39%	3.9	▼63%
Benzo(k)fluoranthene	6.5	6.4	3.5	6.1	▼6%	3.2	▼50%
Dibenz(a,h)anthracene	6.2	6.1	1.6	1.3	▼80%	1.2	▼80%
Indeno(1,2,3-c,d)pyrene	6.0	5.8	1.6	1.6	▼72%	1.2	▼79%
Benzo(e)pyrene	5.9	5.7	5.2	6.0	▲2%	3.1	▼47%
Benzo(g,h,i)perylene	4.5	4.3	3.2	3.7	▼16%	2.6	▼41%
Dibenzo(a,i)pyrene	1.5	1.3	1.2	1.1	▼22%	0.88	▼40%
Benzo(b)fluoranthene	1.3	1.1	1.0	2.1	▼53%	0.76	▼43%
Perylene	0.68	0.58	0.54	0.53	▼22%	0.41	▼40%
• Pentachlorophenol	0.54	0.023	4.0x10 ⁻³	3.9x10 ⁻³	▼99%	3.9x10 ⁻³	▼99%
Benzo(j)fluoranthene	0.41	0.34	0.32	0.31	▼24%	0.24	▼42%
• 7H-dibenzo(c,g)carbazole	0.040	0.040	4.7x10 ⁻⁴	0	▼100%	4.0x10 ⁻³	▼90%
Dibenz(a,i)acridine	0.040	0.040	4.7x10 ⁻⁴	0.070	▲75%	4.0x10 ⁻³	▼90%
• Hexachlorobenzene	2.1x10 ⁻³	4.1x10 ⁻⁴	1.0x10 ⁻³	8.7x10 ⁻⁷	▼100%	0	▼100%
• 2,3,7,8-tetrachlorodibenzofuran	1.1x10 ⁻³	2.5x10 ⁻⁵	9.8x10 ⁻⁶	7.8x10 ⁻⁶	▼99%	6.7x10 ⁻⁶	▼99%
• Octachlorostyrene	7.0x10 ⁻⁴	0	0	0	▼100%	0	▼100%
• 2,3,7,8-TCDF/TCDD	1.9x10 ⁻⁴	3.5x10 ⁻⁷	3.5x10 ⁻⁷	3.5x10 ⁻⁷	▼100%	3.5x10 ⁻⁷	▼100%
• 2,3,7,8-tetrachlorodibenzo-p-dioxin	1.4x10 ⁻⁴	9.3x10 ⁻⁷	2.7x10 ⁻⁷	7.2x10 ⁻⁷	▼99%	3.4x10 ⁻⁷	▼100%
• PCBs	3.8x10 ⁻⁵	0	4.0x10 ⁻⁶	0	▼100%	0	▼100%
TOTAL A-1 EMISSIONS	1099	598	441	505	▼54%	318	▼71%
A-2 TOXIC SUBSTANCES							
• Cadmium (inhalable & soluble inorganic)	126	89	28	33	▼73%	20	▼84%
• 1,4 dichlorobenzene	28	26	11	9.3	▼67%	10	▼64%
TOTAL A-2 EMISSIONS	154	116	39	43	▼72%	30	▼80%

For substances highlighted in green, (• Pentachlorophenol...) the ARET short-term target has already been met or exceeded (90% reduction for list A-1 and 50% reduction for other lists.)

Substance	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
B-1 TOXIC SUBSTANCES							
• Tetraethyl lead	15	8.6	5.0x10 ⁻³	5.0x10 ⁻³	▼100%	0.18	▼99%
Anthracene	11	9.9	6.8	10	▼11%	5.6	▼51%
• 2,4,6-trichlorophenol	5.0	2.2	1.3	0.53	▼89%	0.25	▼95%
Dimethylnaphthalene	2.7	2.5	2.5	2.5	▼8%	2.1	▼21%
bis(2-ethylhexyl)phthalate	1.7	1.5	1.3	1.2	▼28%	1.2	▼31%
PAHs (from list B-1, not all species)	0.15	0.079	0.098	0.084	▼44%	0.079	▼48%
Hexachlorocyclopentadiene	6.0x10 ⁻³	6.0x10 ⁻³	6.0x10 ⁻³	6.0x10 ⁻³	▼0%	6.0x10 ⁻³	▼0%
TOTAL B-1 EMISSIONS	36	25	12	15	▼59%	9.4	▼74%
B-2 TOXIC SUBSTANCES							
• Zinc (inorganic, inhalable, soluble)	3288	1577	694	983	▼70%	489	▼85%
• Lead (all forms except alkyl)	1872	1117	690	770	▼59%	454	▼76%
• Nickel (inorganic, inhalable, soluble)	1412	576	668	360	▼75%	572	▼59%
Copper (inorganic salts)	1041	738	497	586	▼44%	484	▼53%
• Chloroform	718	421	264	184	▼74%	115	▼84%
• Arsenic (inorganic)	340	118	104	153	▼55%	72	▼79%
• 1,1,2,2-tetrachloroethylene	266	178	120	96	▼64%	8.2	▼97%
Cyanides	244	157	98	139	▼43%	124	▼49%
• Ethylene oxide	145	104	25	25	▼83%	12	▼92%
• Carbon tetrachloride	81	39	10	0.65	▼99%	0.58	▼99%
• 1,2 dichloroethane	70	20	6.2	17	▼75%	17	▼76%
Methylene chloride	49	47	37	38	▼22%	23	▼53%
• 1,4 dioxane	34	24	7.5	6.3	▼81%	1.8	▼95%
• Mercury (elemental and inorganic)	28	11	5.2	5.8	▼79%	3.8	▼86%
• Chromium (Cr6+)	26	24	24	9.4	▼63%	14	▼46%
Cobalt (inorganic, soluble)	13	12	10	9.0	▼29%	9.1	▼29%
Benzo(b)fluorene	2.9	2.9	2.2	2.5	▼12%	1.9	▼34%
Benzo(a)fluorene	2.6	2.6	1.9	2.3	▼12%	1.7	▼34%
• Silver (soluble inorganic salts)	1.7	0.76	0.56	0.82	▼50%	0.52	▼69%
• 2,3,4,6-tetrachlorophenol	0.36	0.072	0.072	3.9x10 ⁻³	▼99%	0.038	▼90%
Bromodichloromethane	0.34	0.29	0.23	0.32	▼4%	0.31	▼9%
Chlorodibromomethane	0.30	0.30	0.30	0.30	▼1%	0.30	▼1%
4,6 dinitro-o-cresol	0.29	0.28	0.28	0.25	▼12%	0.31	▲9%
Uranium (inorganic, inhalable, soluble)	0.14	0.14	0.14	0.14	▲2%	0.14	▼0%
• Beryllium	0.13	0.094	0.060	0.060	▼53%	0.059	▼54%
Dibenz(a,h)acridine	0.030	0.030	0.030	0.030	▼0%	0.030	▼0%
• bis(2-chloroethyl)ether	8.0x10 ⁻³	0	0	0	▼100%	0	▼100%
• PAHs (from list B-2, not all species)	2.8x10 ⁻³	7.9x10 ⁻⁴	7.9x10 ⁻⁴	7.9x10 ⁻⁴	▼72%	7.9x10 ⁻⁴	▼72%
• Thiourea	1.0x10 ⁻³	1.0x10 ⁻³	0	0	▼100%	0	▼100%
TOTAL B-2 EMISSIONS	9635	5170	3264	3389	▼65%	2405	▼75%

Substance	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1995 Emissions (tonnes)	1996 Emissions (tonnes)	1996 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
B-3 TOXIC SUBSTANCES							
• Hydrogen sulphide	14965	9528	10196	5380	▼64%	3614	▼76%
Benzene	3044	2784	1852	1730	▼43%	952	▼69%
• Formaldehyde	2094	1794	1074	799	▼62%	563	▼73%
• Chlorine dioxide	2058	1677	632	727	▼65%	441	▼79%
• Ethanol	568	300	199	98	▼83%	125	▼78%
Acetaldehyde	412	414	378	408	▼1%	303	▼26%
• 1,3 butadiene	360	316	226	128	▼64%	121	▼66%
Phenol	291	234	189	228	▼22%	168	▼42%
Methyl isobutyl ketone	282	263	178	177	▼37%	145	▼49%
• 1,1,2-trichloroethylene	127	46	31	25	▼80%	26	▼79%
• Acrylonitrile	24	22	17	11	▼53%	11	▼53%
Acrolein	14	9.1	9.1	10	▼31%	2.2	▼84%
Hydrazine	3.7	3.7	1.6	2.4	▼34%	2.4	▼34%
• Acrylamide	1.7	1.7	0.81	0.38	▼78%	0.83	▼52%
• 2,4 dinitrotoluene	1.5	1.0x10 ⁻³	1.0x10 ⁻³	1.0x10 ⁻³	▼100%	1.0x10 ⁻³	▼100%
• Ethylene dibromide	1.4	1.3	0.010	0.010	▼99%	0.010	▼99%
• 2,4-dichlorophenol	1.2	0.78	0.011	9.7x10 ⁻³	▼99%	4.0x10 ⁻³	▼100%
• Aniline	1.1	6.1x10 ⁻³	6.0x10 ⁻³	0.015	▼99%	0.011	▼99%
Quinoline	1.1	0.92	0.86	0.84	▼22%	0.86	▼20%
• Epichlorohydrin	0.75	0.18	1.0x10 ⁻³	1.0x10 ⁻³	▼100%	1.0x10 ⁻³	▼100%
• 2,6 dinitrotoluene	0.12	0	0	0	▼100%	0	▼100%
• N-nitrosodimethylamine	0.044	6.1x10 ⁻³	6.0x10 ⁻³	3.0x10 ⁻³	▼93%	8.7x10 ⁻⁵	▼100%
• N-nitroso-di-n-propylamine	9.5x10 ⁻³	0	0	0	▼100%	0	▼100%
• N-nitrosodiphenylamine	8.4x10 ⁻³	0	0	0	▼100%	0	▼100%
Toluene diisocyanates	6.0x10 ⁻³	6.0x10 ⁻³	6.0x10 ⁻³	4.0x10 ⁻³	▼33%	4.0x10 ⁻³	▼33%
Acetamide	1.0x10 ⁻³	1.0x10 ⁻³	1.0x10 ⁻³	1.0x10 ⁻³	▼0%	1.0x10 ⁻³	▼0%
Vinyl bromide	1.0x10 ⁻³	1.0x10 ⁻³	1.0x10 ⁻³	1.0x10 ⁻³	▼0%	1.0x10 ⁻³	▼0%
TOTAL B-3 EMISSIONS	24,251	17,396	14,985	9724	▼60%	6475	▼73%
TOTAL EMISSIONS (ALL SUBSTANCES)	35,175	23,304	18,740	13,676	▼61%	9238	▼74%

For substances highlighted in green, (• Pentachlorophenol...) the ARET short-term target has already been met or exceeded (90% reduction for list A-1 and 50% reduction for other lists.)

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Battle Mountain Canada Ltd.

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Golden Giant Mine, Marathon, ON
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Holloway Mine, ON

Silidor Mine, Rouyn Noranda, PQ

Cambior Inc.

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Mine Bouchard-Hebert, Destor, PQ

Mine Geant Dormant, Val d'Or, PQ

Mine Gonzague-Langlois, Val d'Or, PQ

Usine Yvan Vezina, Destor, PQ

Cominco Ltd.

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Trail & Kimberly, BC; Polaris, NT

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Lupin Operation, NT

Falconbridge Limited

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Kidd Mining Division, Timmins, ON

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Sudbury Operations, Falconbridge, ON

Bruce Mikkila, Tel (705) 693-2761

Highland Valley Copper

Logan Lake, BC
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Homestake Canada Inc. / Prime Resources

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Marathon, ON; Stewart & Penticton, BC

Hudson Bay Mining & Smelting Company Ltd.

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Flin Flon Smelter Complex, MB

Joel Nilsen, Tel (204) 687-2074

Inco

Tom Burnett (Director, EHS)
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Copper Cliff, ON and Thompson, MB

Les Mines Selbaie

Joutel, PQ
Suzie Belanger (Environmental Superintendent)
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Les Ressources Aur

Mine Louvicourt, Val-d'Or, PQ

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Noranda Metallurgy, Inc.

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Canadian Electrolytic Zinc, Valleyfield, PQ
Daniel Daoust, Tel (514) 373-9144

CCR Refinery, Montreal East, PQ
Jaques Pageau, Tel (514) 645-2311

General Smelting of Canada, Lachine, PQ
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Horne Smelter, Rouyn-Noranda, PQ
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Noranda Mining & Exploration Inc.

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Brunswick Smelting Division, Belledune, NB
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Gaspé Mines, Murdochville, PQ
Victor Chapados, Tel (418) 784-4370

Heath Steele Division, Miramichi, NB
Michael Patterson, Tel (506) 623-4724

Matagami Division, PQ
Natasha Veljanovski, Tel (819) 739-2511

**CLOSED- Boss, Bell, Brunswick
Fertilizer, Mattabi, Brenda, & Geco**

Placer Dome (CLA) Limited

Tel (604) 661-1916 Fax (604) 661-3785

**Balmerton & Timmins, ON; Fraser Lake
& Houston, BC; Val d'Or, PQ**

Sherritt International Corporation

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H. Siebert (Superintendent of Environmental
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Kent Brandt
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The Cobalt Refinery Company

Fort Saskatchewan, AB
H. Siebert (Superintendent of Environmental
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Kent Brandt, Tel (403) 992-7423

Westmin Resources Limited

Dr. David Mchaine (Environmental Engineer)
Tel (604) 895-8419 Fax (604) 681-0357

Myra Falls Operation, Vancouver Island, BC
Premier Gold Operation, Stewart, BC

Oil, Gas and Petroleum Products

Imperial Oil Limited

R.G. O'Farrell, Public Affairs Department
Tel (416) 968-5506 Fax (416) 968-4272

**Manufacturing and Oil production and
refining Operations**

Sarnia & Nanticoke, ON; Dartmouth, NS;
Edmonton, AB

Safety-Kleen Canada Inc.

Renato Legati (Senior EHS Manager)
Tel (519) 648-2291 Fax (519) 648-2033

Breslau Re-Refinery, ON

Shell Canada Limited

Linton L. Kulak (Director- HSE)
Tel (403) 691-2091 Fax (403) 691-3321

Petroleum Operations

Sheldon Wamboldt (Advisor, Sustainable
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Tel (403) 691-4080 Fax (403) 691-3321

Suncor - Sunoco Group

Thomas Brown (Manager, Environmental
Affairs)
Tel (519) 383-3625 Fax (519) 383-3678

Sarnia Refinery, ON

Syncrude Canada Ltd.

Fort McMurray, AB
Gary Burns (Manager, Environmental Services)
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Ultramar Ltd.

Pierre Pelletier (directeur affaires environ-
nementales)
Tel (418) 835-8110 Fax (418) 833-9600

Raffinerie de St-Romuald, Levis, PQ

Pulp, Paper and Wood Products

**Abitibi-Consolidated Corporation
(formerly Abitibi-Price)**

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Iroquois Falls Division, ON

Monique Grenier, Tel (705) 258-4273

La Compagnie Gaspésia Ltée, Chandler, PQ

Jean Guérard, Tel (418) 689-5294

Papeterie Alma, PQ

Denis Moreau, Tel (418) 668-9400

Papeterie Beauré, PQ

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Papeterie Kénogami, Jonquiere, PQ

Jacques Paradis, Tel (418) 695-9227

Stephenville Division, NF

Michael Wilson, Tel (709) 643-7526

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(formerly Stone-Consolidated)**

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All Québec Divisions

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Laurentide Division, Grand-Mere, PQ

Gilles Michaud, Tel (819) 533-2564

Port Alfred Division, La Baie, PQ

Caroline Lachance, Tel (418) 544-9705

Wayagamack Division, PQ

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Dryden Operations, ON

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Cascades Inc.

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Crestbrook Forest Industries

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Division de l'usine de Québec, Québec, PQ
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Désencrage Cascades, Division de Rolland Inc.

Breakeyville, PQ
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Désencrage CMD

Cap de la Madeleine, PQ
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Cornwall Facility, ON
Raman Nayar, Tel (514) 848-5273

Lebel-sur-Quevillon Facility, PQ
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Trenton Facility, ON
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Donohue Inc.

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Island Paper Mills Company, New Westminster, BC

Ottawa/Hull Division, ON/PQ

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Riviere-du-Loup, PQ
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Fletcher Challenge Canada Limited

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Mackenzie Pulp, BC
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Pulp & Paper and Tissue Mills, Saint John, NB

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Kimberly-Clark Nova Scotia, New Glasgow, NS
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Kruger Inc.

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Corner Brook Pulp & Paper Ltd, NF

Kruger Inc. & Kruger PTR Inc., Trois Rivières, PQ

Kruger Inc. & Kruger Urban Forest Products, Bromptonville, PQ

MacMillan Bloedel Ltd.

Wayne Maksylewicz
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Engineered wood products, Vancouver, BC & Nipigon, ON

Paper mills, Powell River & Port Alberni, BC

Noranda Forest Inc.

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Edmunston NB sulphite pulp - Fraser Papers

La Sarre PQ Oriented Strandboard - Norboard

Masson PQ Newsprint - James Maclaren

Prince George BC Kraft Pulp - Northwood Pulp & Timber

Thurso PQ Kraft Pulp - James Maclaren

Val d'Or PQ Oriented Strandboard - Norboard

Perkins Papers Ltd.

Jean-Robert Brunelle
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Candiac Tissue Mill, PQ

Repap Enterprises Inc.

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Skeena Cellulose Inc.

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Skeena Pulp Operations, Prince Rupert, BC

Patrick O'Brien
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St. Anne-Nackawic Pulp Company Ltd.

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Tel (506) 575-3373 Fax (506) 575-3282

Nackawic Pulp Mill, NB

Stora North America

Derrick Cameron (Manager, Environment and Technical Services)
Tel (902) 625-2460 Fax (902) 625-2098

Stora Port Hawkesbury, NS

Strathcona Paper Company

Napanee, ON
Bryan Best (Chief Operating Officer)
Tel (613) 378-6672 Fax (613) 378-6158

Tembec Inc.

Line Roy (Coordonnatrice Environnement)
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Temiscaming complex, PQ

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Weldwood of Canada Limited

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Hinton Division, AB

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Weyerhaeuser Canada Ltd. - Alberta Division

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Grande Prairie Operation, AB
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Weyerhaeuser Canada Ltd. - Saskatchewan

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Prince Albert Pulp & Paper, SK
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Steel

Aciers Inoxydables Atlas, Division of Sammi

Tracy, PQ
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Algoma Stéel Inc.

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Atlas Specialty Steels, Division of Sammi Atlas

Welland, ON
 Donald G. Marr (Manager, Environment)
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 Karen Watt, Tel (905) 735-5661

Co-Steel Lasco

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Whitby steel mini-mill, ON

Dofasco Incorporated

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Hamilton Operations, ON

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Gerdau Courtice Steel Inc.

Robert J. Downie (Environmental Coordinator)
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Steel mini-mill, Cambridge, ON

Gerdau MRM Steel

Candi Bezte (Environmental Scientist)
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Steel Mini-mill, Selkirk, MB

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Ivaco Rolling Mills Limited Partnership

Joel E. Hartley (Environmental Engineer)
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Rod Mill and Melt Shop, L'Orignal, ON

Slater Steels Inc.

William Brown (Manager Manufacturing Services)
 Tel (905) 548-8104 Fax (905) 549-4652

Hamilton Specialty Bar, ON

Stelco Inc.

T.F. Huxley (General Manager- HSE)
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AltaSteel Ltd., Edmonton, AB

Alvin Bortnick, Tel (403) 468-7380

CHT Steel Company Inc., Richmond Hill, ON

A.L. Armstrong, Tel (905) 884-5000

Frost Wire Products Ltd., Hamilton, ON

N.D. Clark, Tel (905) 528-8895

Hilton Works, Hamilton, ON

R.R. Haber, Tel (905) 528-2511

Lake Erie Steel Company Ltd., Nanticoke, ON

G. Saldanha, Tel (905) 528-6662

Stelco Fasteners Ltd., Brantford, ON

D. Webster, Tel (519) 754-4400

Stelco McMaster Ltee, Contrecoeur, PQ

Luc Chabot, Tel (514) 652-1112

Stelfil Ltee, Lachine, PQ

D. Barras, Tel (514) 367-2424

Stelpipe Ltd., Welland, ON

B.C. Howlett, Tel (905) 735-7473

Stelwire Ltd., Burlington Works, ON

W.C. McDiarmid, Tel (905) 528-9473

Stelwire Ltd., Parkdale Works, Hamilton, ON

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Welland Pipe Ltd., ON

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Sydney Steel Corporation

Joel MacLean (Manager Environment & Energy)
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Steel Mini-Mill, Sydney, NS

Appendix 5 Other ARET Participants and Supporters

The following companies and organizations submitted qualitative action plan updates outlining progress made towards meeting their ARET emission reduction commitments:

Alberta Power Limited
 British Columbia Hydro and Power Authority
 Department of National Defense
 East York Hydro-Electric Commission
 Environment Canada
 EPCOR - Edmonton Power
 Manitoba Hydro
 National Capital Commission
 New Brunswick Power Corporation
 Newfoundland and Labrador Hydro Corporation
 Newfoundland Light & Power Co. Limited
 Procter & Gamble Inc.
 Rauscher Plating Limited
 SaskPower
Theratronics International Limited
Tolko Manitoba (formerly Repap Manitoba)
 Winnipeg Hydro
 Saint John Shipbuilding Limited

The following companies and organizations support the ARET process and have indicated that they emit nil or negligible quantities of ARET substances:

A.S. Paterson Company Limited
 Agriculture and Agri-Food Canada
 Air Products Canada Ltd.
 Akzo Nobel Chemicals Ltd.
 Albarrie Canada Ltd.
 Albright & Wilson Americas
Alcatel Cable
 Aluminerie Alouette Inc.
Aluminerie de Becancour Inc.
 Aluminerie Lauralco Inc., Une filiale d'Alumax
 Amway of Canada, Ltd.
 Armstrong Manufacturing Company
 Aromatics & Flavours Inc.
 ASL Analytical Service Laboratories Ltd.
 Azco Industries Ltd.
 BetzDearborn Canada Inc.
 BHP Diamonds
 Boehme Filatex Canada Inc.
 Bovar Environmental
 Bush Boake Allen Canada Inc.
 Canadian Biodiversity Informatics Consortium
 Canadian Niagara Power Company, Limited
 Canadian Security Intelligence Service
 Cascades (Plasticcharge, Joliette, Jonquiere, Sealed Air)
 CCH Canadian Limited
 CCL Custom Manufacturing, Islington Plant
 CCL Custom Manufacturing, Rexdale Plant
 Chemprox Chimie Inc.

Church & Dwight Ltd/Ltee
 Churchill Falls (Labrador) Corporation Limited
 City of Calgary Electric System
 Consolidated Bottle Co.
 Consumers Gas
 Cryovac Division, W.R. Grace
Degussa Catalyst Ltd.
 Denison Mines Limited
 Diavik Diamond Mines (formerly Kennecott)
 Diversey Lever Inc.
 Dow Corning Canada Inc.
 Dowbrands Canada Inc.
 Dynatec International Limited
 Enviromega Inc.
 Fisher Controls Inc.
 FMC of Canada Limited
 Gartner Lee Ltd.
 GE Aircraft Engines
 GE Apparatus Technical Services
 GE Capital Railcar
 GE Hydro
 GE Silicones
 Givaudan-Roure
 Golden Knight Resources
 Greif Containers Inc.
 Groupe Serrener Inc.
 Haarmann & Reimer
Health Canada
 Helmitin Canada Inc.
 Henkel Canada Limited
 Hillsborough Resources Limited
 Home Hardware Paint & Chemical Division
 Hüls Canada Inc.
 Huntsman Chemical Company of Canada Inc.
 Industry Canada
 ISP (Canada) Inc.
 K-G Packaging, A Division of CCL Industries Inc.
 Kelcoatings Limited
 Kerr Adison Mines Ltd.
 Kingsley & Keith (Canada) Inc.
 Kleen-Flo Tumbler Industries Ltd.
 La Compagnie Minière Québec Cartier
 Laidlaw Environmental Services Ltd.
 Lawson Products Inc.
 Lever Industrial
 Lever Ponds, A Division of U L Canada Inc.
 Manta Industries Limited
 Marsulex Inc.
 Mazarin Mining Corporation / AlumiCa inc.
 MDS Nordion Inc.
 MITEL Corporation
 Moli Energy (1990) Limited
 Monopros Limited
 Monsanto Canada Inc. - Searle and Morden plants
 Nanisivik Mines Ltd.
 National Research Council of Canada
 National Silicates Limited
 Northgate Exploration Limited
 Novartis Pharma Canada Inc. (formerly Ciba-Geigy)

Nucro-Technics Inc.
 Outokumpu Mines Ltd.
 Petresa Canada Inc.
 Potacan Mining Company
 Precision Valve Canada Ltd.
Prospec Chemicals
 QUNO Corporation
 Raisio Chemicals Canada Inc. (formerly Diachem)
 Raylo Chemicals, A Laporte Organics Company
 Reichhold Limited, Port Moody
 Reichhold Limited, Weston
 Rochester Midland Limited
RohMax Canada Co.
Scholle Canada Ltee
Sika Canada Inc.
 Societe Canadienne de Metaux Reynolds Ltee
 St-Jean Photochemicals Inc.
 Stablex Canada Inc.
 Sulzer Canada Inc.
 The Power Commission of the City of Saint-John
 The Sherwin-Williams Company
 The Yukon Electrical Company Limited
 Toronto Hydro
 Trojan Technologies Inc.
 Wajax Fluid Power (formerly Hydracine F.P.)
 Water and Earth Science Associates Ltd.
 Win Chemicals Limited
 WMC International Limited - Americas Division

The following companies submitted ARET substance emission data in the past, but were unable to supply 1996 emission data in time for inclusion in this report. For these companies, it has been assumed that 1996 emissions remained constant at the previous reporting year's level for the purposes of calculation. These companies together represent under 0.1% of the total emissions reported to ARET for 1993.

Abitibi-Consolidated - Kénogami and Gaspésie
 General Electric - Motors & Industrial Systems
 Husky Injection Molding Systems
 Perkins Papers
 Saint John Shipbuilding

The following companies have committed to submitting ARET Action Plans in the future:

Air Canada
 Alpha/Owens Corning
 Anderson Exploration
 Bombardier
 Duo-Fast Industries
 Fort James-Marathon
 INMET Mining Corporation
 Spruce Falls Inc.

Appendix 6 ARET Stakeholders Committee Members

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