Environmental Leaders 3 Update

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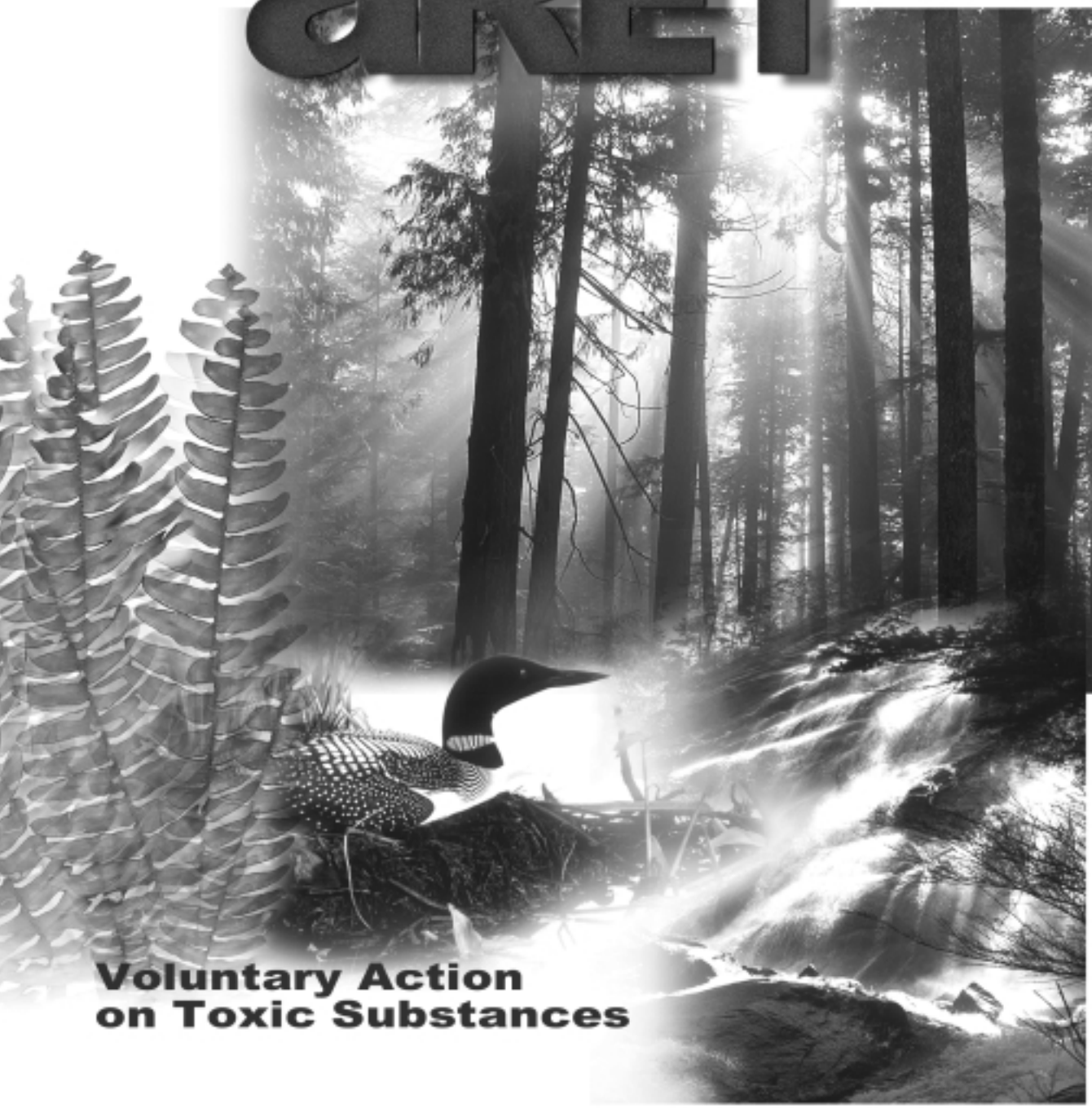

Voluntary Action on Toxic Substances

aRET
Accelerated Reduction/Elimination of Toxics

Environmental leaders 3 update:
ARET, voluntary action on toxic substances

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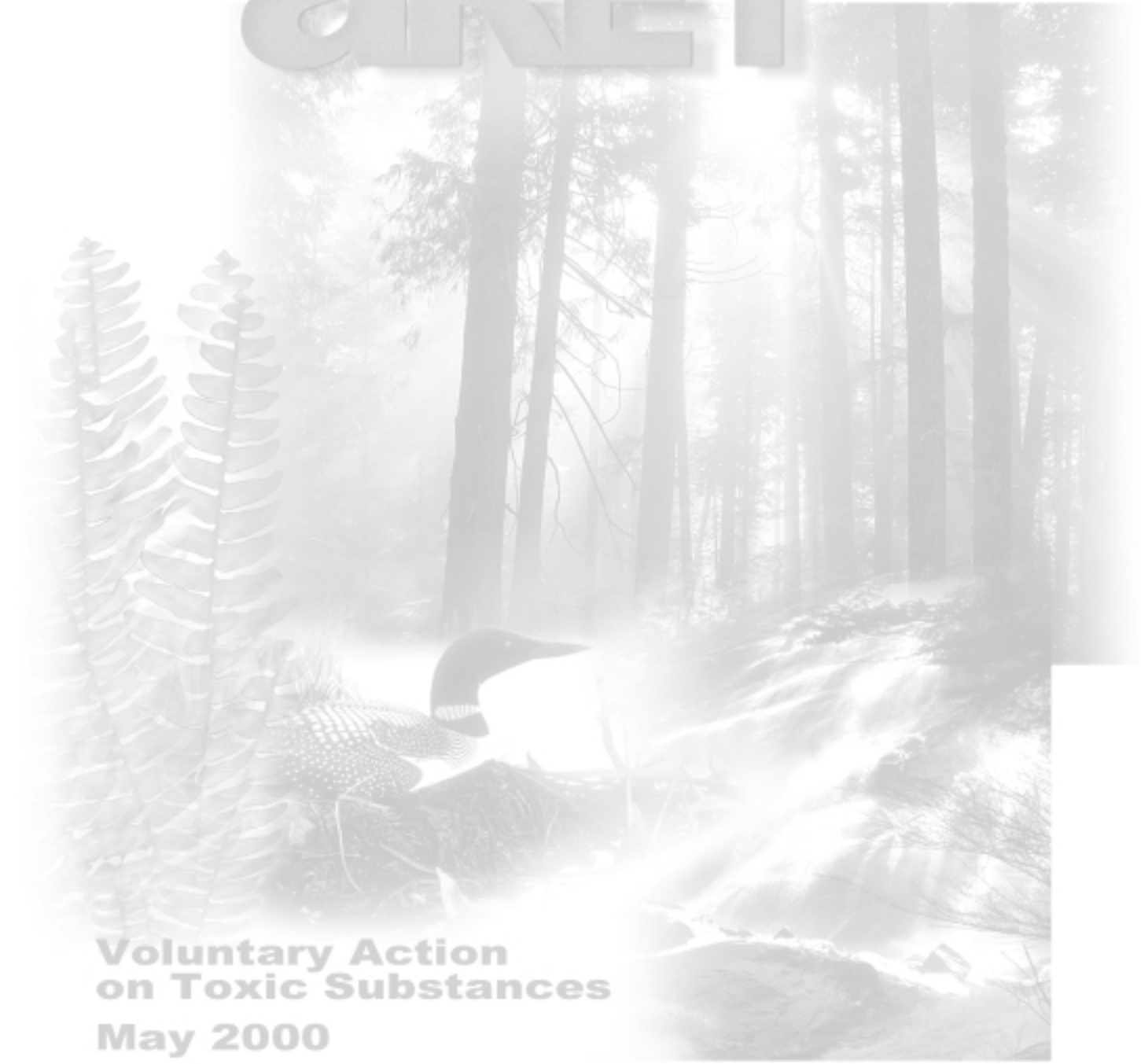


Voluntary Action on Toxic Substances

May 2000

aRET
Accelerated Reduction/Elimination of Toxics

Table of Contents

What is ARET?

ARET (Accelerated Reduction/Elimination of Toxics) is a multi-stakeholder pollution prevention and abatement initiative involving industry, health and professional organizations, as well as governments across Canada. Its purpose is to decrease the adverse effects of toxic substances on human health and the environment by accelerating the reduction or elimination of toxic substance emissions, including those that persist in the environment and may bioaccumulate in living organisms. The ARET initiative promotes cooperation among industry, governments, and other stakeholders, and provides participants the opportunity to gain credibility, public trust and support while improving their environmental performance. ARET participants voluntarily set emission reduction targets, thereby creating an open and non-prescriptive approach to the prevention of toxic pollution. Participants report publicly on their progress toward achieving toxic reduction targets.

THE ARET VISION

In the long term, ARET seeks the:

- virtual elimination of emissions of persistent, bioaccumulative and toxic substances;
- reduction of other toxic emissions to levels insufficient to cause harm to human health and the environment.

ARET SHORT-TERM TARGETS AND SCHEDULES

By the end of the year 2000, ARET participants aim to reduce:

- persistent, bioaccumulative and toxic substance emissions by 90 per cent;
- all other toxic substance emissions by 50 per cent from base-year levels.

Best efforts by all participants on reducing any of the ARET listed substances are also encouraged.

The Key Components of ARET

The four key components of the ARET process are

1. the development of the ARET Substances List using science-based criteria and multi-stakeholder agreement;
2. the ARET Challenge to potential program participants;
3. the response to the ARET Challenge in the form of an ARET action plan where program participants make a public commitment to achieve specific reduction or elimination goals by a specific date; and
4. the ARET participants' report of progress achieved and the annual publication of results.

The ARET Substances List

The ARET Substances List includes 117 toxic substances, 30 of which are identified as being persistent, bioaccumulative and toxic **(PBT)**. The list resulted from a scientific assessment of 2,000 substances of concern by a panel of toxicology experts, including representatives from government, industry, and health and environmental organizations. The substance selection process and the ARET Substances List are found in Appendix 1.

The ARET list of substances includes five categories:

1. **List A-1** substances (30) meet PBT criteria;
2. **List A-2** substances (2): consensus was not achieved on whether these two substances meet the PBTcriteria;
3. **List B-1** substances (8) meet bioaccumulation and toxicity criteria;
4. **List B-2** substances (33) meet persistence and toxicity criteria; and
5. **List B-3** substances (44) meet toxicity criteria only.

The ARET Challenge

In 1994, the ARET Stakeholders Committee challenged selected Canadian companies, institutions, government departments and agencies to voluntarily reduce or eliminate their emissions of ARET substances by the year 2000. Participants were asked to choose a base year after 1987 from which they would make their reductions, and to outline their commitments in a publicly accessible action plan. ARET action plans can be obtained through the contacts listed in Appendix 4.

Progress under ARET has been reported in *Environmental Leaders 1* (January 1995), *Environmental Leaders 2* (January 1997), *Update to Environmental Leaders 2* (January 1998) and *Environmental Leaders 3* (May 1999). This *Update to Environmental Leaders 3* reports progress made during 1998. All ARET progress reports are available from the Inquiry Centre, Environment Canada, Ottawa, Ontario K1A 0H3 (819-997-2800), (1-800-668-6767), (e-mail: enviroinfo@ec.gc.ca). ARET reports and other documentation concerning the program can be accessed through the Internet at http://www.ec.gc.ca/aret.

THE ARET STAKEHOLDERS COMMITTEE

The ARET Stakeholders Committee comprises representatives from industry, health and professional associations as well as from both federal and provincial governments, as follows:

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

A BRIEF HISTORY OF ARET

ARET grew out of a proposal to the federal Minister of the Environment from leading industry executives and environmentalists in late 1991. They proposed a cooperative approach to identify and then reduce or eliminate the most significant toxic substances. The proposal suggested that stakeholders work together to develop a framework for action on toxics that would be faster and more effective than relying on regulations alone.

In 1992, the Minister responded by creating the ARET Stakeholders Committee. One of the Committee's first tasks was evaluating the toxicity of 2,000 substances and ranking these substances according to their persistence, bioaccumulation and toxicity. By late 1993, the Committee finished its substance identification, assessment and categorization, resulting in a list of 117 toxic substances for immediate action.

It soon became apparent that the Committee could not reach consensus on the issue of eliminating substance use as opposed to reducing substance emissions. The viability of voluntary approaches to achieve action on toxics was also questioned. Pollution Probe, the Canadian Labour Congress, the Toxics Watch Society of Alberta, the West Coast Environmental Law Association, Great Lakes United, and the *Union québécoise pour la conservation de la nature* withdrew from the ARET Stakeholders Committee at that time. The remaining Committee members chose to continue the ARET process.

Program Contact

You are welcome to visit the ARET website at http://www.ec.gc.ca/aret. You can also speak directly to someone about the ARET program or an ARET-related issue by calling any ARET Stakeholders Committee member (see Appendix 6). You may also contact the ARET Secretariat by phone (819-953-9086), by fax (819-994-5030) or by e-mail (aret@ec.gc.ca).

ARET Progress

Participation

Currently, 316 facilities from 169 companies and government organizations have submitted action plans to the ARET program (see Appendix 4). Seven companies submitted new action plans to ARET for the 1998 reporting year: INMET from the mining and smelting sector, Petro-Canada from the oil, gas and petroleum products sector, and Air Canada, Elastocraft, Flying Colours, Novopharm and Suzorite Mica from the other manufacturing sector. Falconbridge, from the mining and smelting sector, started reporting for its new Raglan facility.

KEY ARET ACHIEVEMENTS (AS OF THE 1998 REPORTING YEAR)

- Emissions have been reduced by 26,360 tonnes or 67 per cent from base-year levels.
- 169 companies have submitted and are implementing ARET action plans.
- 136 of 316 facilities have already met or exceeded ARET year 2000 targets for all categories of substances which they report.
- Year 2000 targets have been exceeded for three of the five ARET substance categories: B-1, B-2 and B-3.
- Year 2000 targets have been met or exceeded for 62 per cent of ARET substances being reported.

An additional 142 companies and government organizations have filed Declarations of Support for ARET in which they state that they have negligible or no emissions of ARET substances (see Appendix 5). Fifteen of these companies have become supporters of the ARET program since the *Environmental Leaders 3* **(EL3)** report.

Nine industry sector associations are on the ARET Stakeholders Committee. Fifty-eight per cent of the overall membership of these sectoral associations participate in the program with action plans to reduce emissions of ARET substances. An additional 33 per cent of the associations' members have declared their support for ARET and that they have no or negligible emissions of ARET substances. The Alliance of Manufacturers and Exporters Canada is not included in these calculations since most of its more than 2,500 members are small companies for which participation may not be practical due to the limited amount of ARET substances they emit.

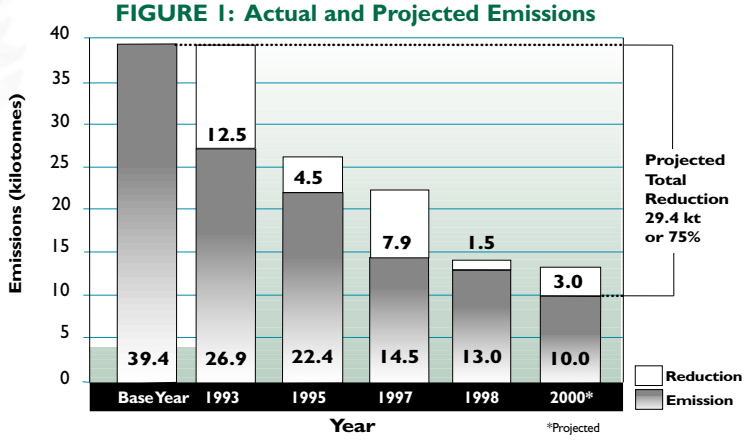
Overall Reduction Progress

Emissions of ARET substances in 1998 totaled 13,026 tonnes — a 67-per-cent reduction from base-year emission levels. When combined with previous reductions reported to ARET, this means that 26,358 tonnes of ARET toxic substances are no longer being emitted into the environment each year.

From 1997 to 1998, participants reduced their emissions by 1,469 tonnes or 10 per cent.

By the year 2000, a further reduction of 3,052 tonnes is projected. As a result, the total reduction achieved by ARET participants is expected to be 29,410 tonnes, a 75-per-cent reduction from base-year levels.

FIGURE 1: Actual and Projected Emissions



Changes to Reduction Commitments

The overall emission reduction committed by ARET participants changes as new companies join ARET. It also changes as existing action plans are revised due to improved monitoring and reporting methods and as participants add previously unreported ARET substances to their action plans. Some ARET participants also change their reduction commitment as they implement new strategies to target the reduction or elimination of ARET substances.

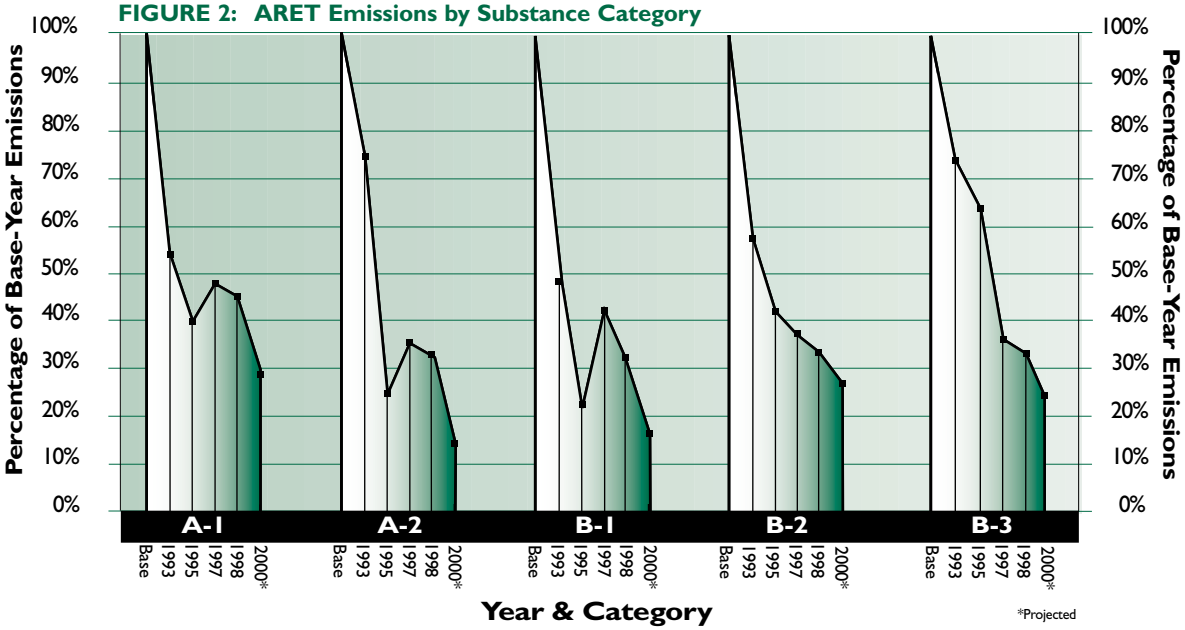
Base-year emission levels have increased from 27,888 tonnes reported in *Environmental Leaders 1* **(EL1)** to 39,384 for this report, an augmentation of 11,496 tonnes. At the same time, total projected emissions for the year 2000 have increased by only 822 tonnes. Therefore, the total reduction commitment by ARET participants has been increased by 10,674 tonnes from EL1.

Reductions by Substance Category

As of 1998, emission reduction for three substance categories exceeded their 50-per-cent short-term reduction targets: B-1 (67 per cent), B-2 (67 per cent) and B-3 (67 per cent). The year 2000 target for List A-2 is "best efforts". As of 1998, List A-2 substance emissions have been reduced by 68 per cent. Emission of List A-1 substances, for which the short-term target is 90 per cent, has been reduced by 54 per cent.

Companies generally measure their achievements against the short-term targets for categories of substances on which they report. As of 1998, 136 of 316 facilities (43 per cent) have achieved the ARET short-term targets for all categories of substances on which they report.

FIGURE 2: ARET Emissions by Substance Category



PAHs are a group of chemical substances characterized by a structure containing more than one benzene nucleus. They are emitted by a number of natural and human sources such as forest fires, wood and fuel combustion, and steel and aluminum production. The number and arrangement of benzene nuclei vary between different PAHs and influence the characteristics, including the toxicity, bioaccumulation and persistence, of that specific PAH compound. Although some evidence suggests that PAHs do not bioaccumulate in the food chain, many met the criteria of the initial ARET substance selection process for A-1 substances. Other PAH compounds are included in Lists B-1 and B-2.

List A-1

Emissions of A-1 substances decreased by four per cent, or 22 tonnes, from 1997 levels. Reductions in emission of List A-1 polycyclic aromatic hydrocarbons **(PAHs)** from the steel sector, specifically Stelco's Lake Erie Steel and Hilton Works, and Algoma Steel, were significant. This decrease was partially offset by increases in A-1 emissions at some aluminum smelters and one steel facility.

Emissions of A-1 substances, of which over 99 per cent by weight are PAHs, have been reduced by 54 per cent from base-year levels. ARET participants emitting A-1 substances have committed to a further 37-per-cent reduction by the year 2000. If this commitment is met, the overall reduction will be 71 per cent. Although short of the 90-per-cent reduction target for A-1 substances, this reduction is still significant. Emitters of A-1 substances will be unable to reach ARET's 90-per-cent reduction goal by 2000, due to the prohibitive capital expenditures required to upgrade plants that necessitate a longer time frame for reduction.

It is important to note that individual substances within a specific ARET substance category do not represent equivalent environmental or health risks. An example is PAHs. Although a number of PAHs meet the PBT criteria of ARET's List A-1, the risk to the environment or human health they represent may be much less than that from an equal quantity of some other List A-1 substances such as dioxins and furans. When the other non-PAH micro-pollutants from List A-1 are considered separately, their reduction from base-year levels exceeds 99 per cent. However, the success achieved in reducing these substances is not apparent in the overall results for List A-1 substances because they are emitted in much smaller quantities.

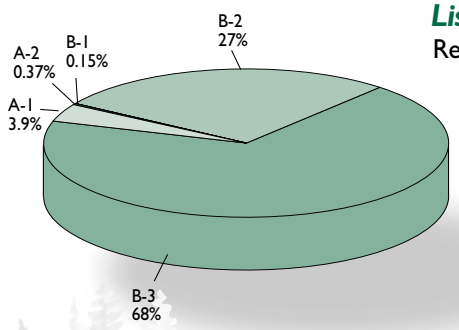
List A-2

Emissions of List A-2 substances have been reduced by 68 per cent from base-year levels. List A-2 emissions have decreased by seven tonnes or 13 per cent from 1997 levels of 56 tonnes. This decrease is due to cadmium* reductions at Hudson Bay Mining and Smelting in Flin Flon, where a problem with emission control equipment that caused elevated cadmium levels in 1996 and 1997 has been corrected.

List B-1

List B-1 substance emissions were reduced by six tonnes or 23 per cent since 1997, bringing the total reduction from base-year levels to 67 per cent. The reduction from 1997 levels is mainly due to decreases in List B-1 PAH emissions from Stelco's Hilton Works and Algoma Steel from the steel sector.

FIGURE 3: Relative Quantities of ARET Emissions by Category in 1998



Total 1998: 13,026 tonnes

List B-2

Reduction of emissions of B-2 substances from base-year levels is currently 67 per cent or 7,294 tonnes. In 1998, emitters of List B-2 substances have reduced their emissions by 561 tonnes or 14 per cent from 1997 levels. The majority of this reduction has been achieved by companies in the mining and smelting sector. More than half of the emission reduction in B-2 substances is attributable to Hudson Bay Mining and Smelting's Flin Flon smelter. Other major reductions were achieved at Noranda's Horne smelter and Novopharm's Markham and Toronto manufacturing operations.

*When metals are mentioned, please note that they refer to the specific metallic compounds identified in Appendix 1. For example, cadmium compounds on the ARET list are those that are inhalable, soluble and inorganic.

List B-3

From 1997 to 1998, emission of List B-3 substances was reduced by 873 tonnes or 19 per cent, bringing the total reduction to 18,321 tonnes or 67 per cent from base year. Major reductions were achieved at Weyerhaeuser Prince Albert, St. Anne Nackawic and Stora Enso from the pulp and paper sector, auto manufacturer Daimler Chrysler, steel producer Dofasco, and Shell Canada in the oil, gas and petroleum products sector.

Reductions by Substance

The ARET short-term reduction targets apply to categories of substances instead of individual substances. However, the achievement of short-term targets for individual substances provides participants with a measure of the success of the ARET program. As of 1998 ARET participants have reported emissions of 93 substances. This number includes substances such as PAHs that are often reported as a group. Of these 93, short-term goals have been met for 58 substances, or 62 per cent of all substances being reported.

For List A-1 substances, the short-term emission reduction target is 90 per cent by the year 2000. Seven of 25 reported List A-1 substances or substance groups have exceeded the 90-per-cent target. These include substances such as hexachlorobenzene and pentachlorophenol. PAHs represent the only List A-1 substances for which short-term reduction targets have not been achieved.

THE *CANADIAN ENVIRONMENTAL PROTECTION ACT* AND ARET

A substance is considered toxic under CEPA if there is potential to cause a harmful effect on the environment, if it might constitute a danger to the environment on which human life depends, or if it constitutes a danger in Canada to human life or health. Twenty-two ARET substances are identified as toxic in Schedule 1 of CEPA. Four of these are part of the top 10 substances reported to ARET (see Figure 4): benzene, lead, methylene chloride (also known as dichloromethane) and PAHs. Other ARET substances declared toxic under CEPA are: 1,2-dichloroethane, 3,3'-dichlorobenzidine, inorganic arsenic compounds, asbestos, benzidine, bis(2-ethylhexyl)phthalate, bis(chloromethyl)ether, inorganic cadmium compounds, carbon tetrachloride, hexavalent chromium compounds, hexachlorobenzene, mercury, oxidic, sulphidic and soluble inorganic nickel compounds, polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, polychlorinated biphenyls (PCBs), tetrachloroethylene, and trichloroethylene.

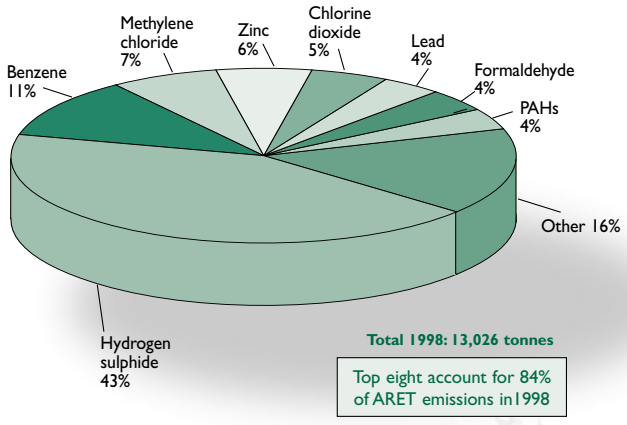
The ARET substance list includes 117 individual substances. However, only 89 of these are reported by ARET participants as being emitted. Analysis indicates that the 28 substances not being reported are not used or generated in significant quantities in Canada.

Significant reductions were reported for a number of substances from 1997 to 1998 levels, including PAHs (A-1 and B-1), cadmium (A-2), zinc, methylene chloride, cyanides and lead (B-2), and hydrogen sulphide, chlorine dioxide, benzene, ethanol and formaldehyde (B-3).

Toxic Substances Under the Canadian Environmental Protection Act *(CEPA)*

Participants reported emitting 10,240 tonnes of the 22 substances common to Schedule 1 of the CEPA and the ARET list in their base year. This represents 26 per cent of the total base-year emissions reported to ARET. As of 1998, ARET participants have achieved substantial emission reductions of CEPA toxics totaling 6,258 tonnes or 61 per cent from base-year levels. In the past year, a reduction of 361 tonnes was reported. ARET participants have projected a further emission reduction of 1,146 tonnes for substances declared toxic under CEPA, which will result in an overall reduction of 7,405 tonnes or 72 per cent from base year to 2000.

FIGURE 4: Substances with Highest Emissions in 1998



Sector Progress

ARET Accelerated Reduction/Elimination of Toxics

Aluminum

The Aluminum Association of Canada (AAC) represents the aluminum industry on the ARET Stakeholders Committee. AAC member companies are responsible for all of the aluminum production in Canada.

All five members of the AAC participate in or support the program. Four companies have stated that the new technology they use does not emit significant quantities of ARET substances. Alcan is the only AAC member with reported emissions, the majority being PAHs, from five facilities.

The Canadian aluminum industry produced almost 2.4 million tonnes of raw aluminum in 1998, third in world production after the United States and Russia. Shipments exceeded $4.5 billion in 1998. The industry employs almost 15,000 people directly. All aluminum plants except one are located in Quebec.

The aluminum sector accounts for three per cent of overall 1998 ARET substance emissions, and 83 per cent of 1998 emissions of List A-1 substances.

ALUMINUM- CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
PAHs	+12	
Other	0	
Total	**+12**	
Net Change	**+12**	

From the base year of 1988 to 1998, Alcan has reduced PAH emissions to air by 52 per cent or 462 tonnes. The 12-tonne increase in PAH emissions to air reported by Alcan in 1998 is mainly attributable to increased production levels at two facilities and to process fluctuations at one of Alcan's operations. It is important to note that, since the early 1980s, Alcan has voluntarily reduced emissions of PAHs by over 70 per cent on average and by up to 85 per cent in the Saguenay Region of Quebec.

A recent review of literature submitted by Alcan to the ARET Secretariat suggests that PAHs do not bioaccumulate in fish in their natural habitat through biomagnification like other A-1 substances do. Based on the conclusions of this study, Alcan has consistently reported its opposition to classification of PAHs as List A-1 substances under ARET. However, members of the original substance selection sub-committee are of the opinion that the initial selection criteria, which do not differentiate between bioaccumulation in some aquatic species and the bioaccumulation in the food web, have to be maintained. The issue of PAHs will be discussed as part of the establishment of a substance list for a successor program to ARET.

FIGURE 5: Aluminum- ARET Emissions

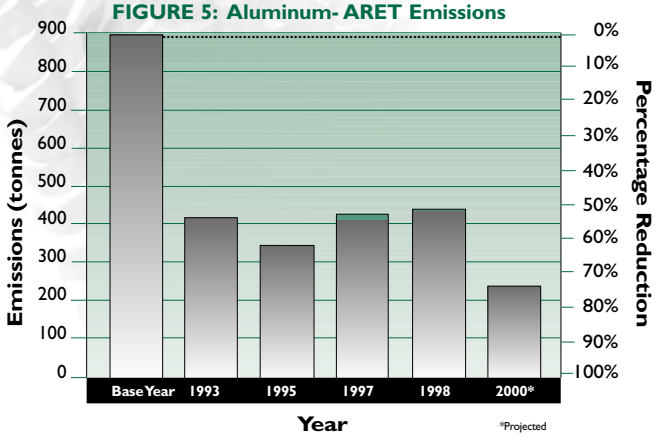
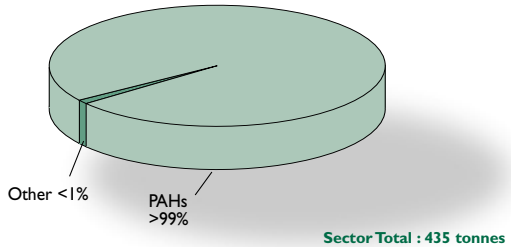


FIGURE 6: Aluminum– Emissions by Substance (1998)



Alcan Smelting and Chemicals accounts for all reported aluminum sector emissions and reductions.

Chemical Manufacturing

The Canadian Chemical Producers' Association **(CCPA)** represents the manufacturers of a broad range of petrochemicals, inorganic chemicals, polymers and other organic and specialty chemicals. CCPA member companies produce over 90 per cent of the industrial chemicals manufactured in Canada.

CHEMICAL MANUFACTURING– CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Formaldehyde		-26
Acetaldehyde		-26
Benzene		-18
Copper	+9	
1,2-dichloroethane	+7	
Other		-9
Total	**+16**	**-79**
Net Change		**-63**

For the third year in a row, 100 per cent of CCPA's member companies are participating in or supporting ARET. These include 48 companies with action plans and 22 companies who have declared support for ARET and that they emit no or negligible quantities of ARET substances.

The chemical industry is the third largest industry in Canada in terms of value of shipments. With sales of $15 billion in 1998, CCPA member companies directly employ more than 24,000 people, and operate sites in over 100 communities across Canada.

The chemical sector accounted for four per cent of total ARET emissions reported for 1998.

The CCPA's Responsible Care® verification teams add credibility to the industry's voluntary actions. They confirm that management systems are in place to enable the achievement of results reported to programs such as ARET. The four-person teams, comprising community members, industry representatives, environmentalists and academics, are wholly independent of the companies being verified. The teams prepare a report on their findings for public, employee and peer scrutiny.

As of 1998, the industry had reduced its ARET emissions by 1,899 tonnes or 78 per cent from base-year levels. It is on target for a 2,032-tonne or 84-per-cent overall reduction by 2000.

From 1997 to 1998, emissions from the sector were reduced by 66 tonnes or 11 per cent. Contributing to this decrease were reductions in acetaldehyde at Celanese, formaldehyde at Solutia, and benzene at Bayer, Shell Chemicals and NOVA.

FIGURE 7: Chemical Manufacturing– ARET Emissions

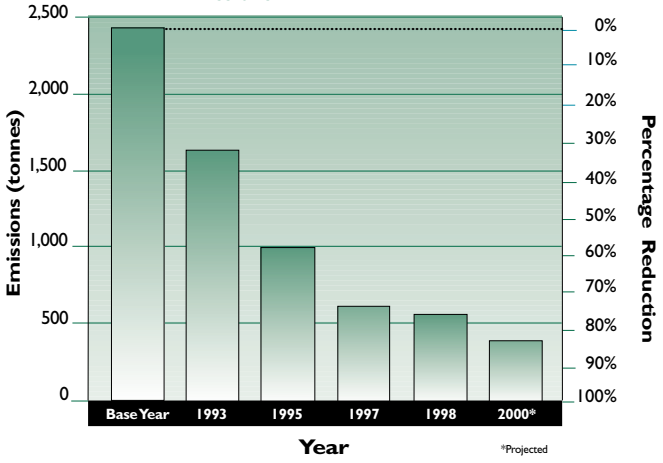
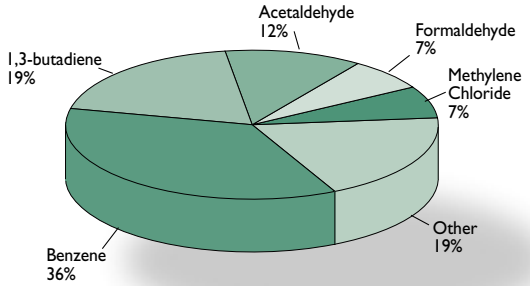


FIGURE 8: Chemical Manufacturing– Emissions by Substance (1998)



Sector Total : 526 tonnes

Chemical Specialties

The Canadian Manufacturers of Chemical Specialties Association (**CMCS**) represents the chemical specialties manufacturing sector in ARET. CMCS member companies manufacture, distribute, package and process products such as detergents, floor finishes, deodorizers, disinfectants, pesticides and flame retardant chemicals.

The chemical specialties industry produced $1.4 billion of goods in 1998 while directly employing over 15,000 people. Annual exports are $280 million.

CHEMICAL SPECIALTIES– CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Methyl isobutyl ketone	+7	
Phenol		-5
Other		0
Total	**+7**	**-5**
Net Change	**+2**	

Eighty-one per cent of CMCS member companies participate in or support ARET. These include 11 with action plans and 19 who support ARET but emit no or negligible amounts of ARET substances. Excluded in the calculation of the participation rate are a number of CMCS members such as brokers or consultants, and companies that have no or minimal production in Canada or that manufacture products using minimal or no ARET substances.

In 1998, the chemical specialties sector accounted for less than one per cent of overall ARET emissions. Due to the nature of this sector, large quantities of ARET substances are generally not emitted to the environment. Consequently, reduction opportunities do not exist on the same scale as in other sectors.

Current emissions of ARET substances from the chemical specialties sector are 106 tonnes. This represents a reduction of 31 per cent from the base-year level of 153 tonnes. By the year 2000, this sector projects a further decrease of 32 tonnes, which will bring the total reduction from base year to 79 tonnes or 52 per cent.

The two-tonne increase from 1997 levels was due to higher production levels at one Crown Cork & Seal plant that resulted in increased methyl isobutyl ketone emissions.

FIGURE 10: Chemical Specialties– Emissions by Substance (1998)

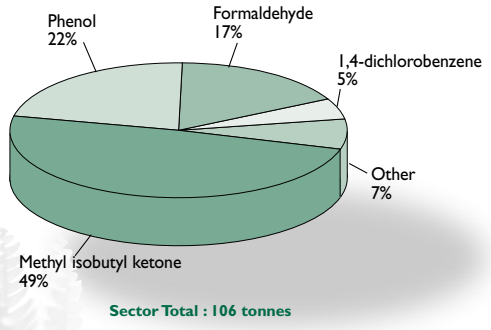
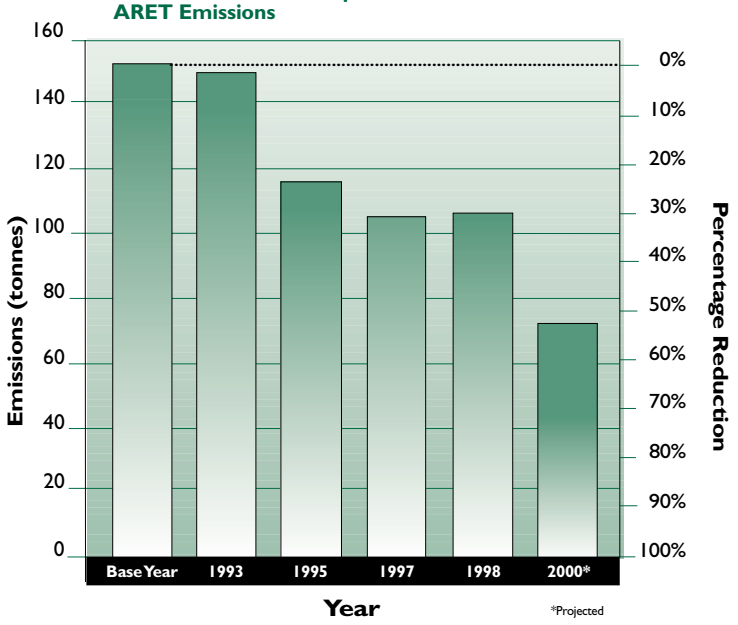


FIGURE 9: Chemical Specialties– ARET Emissions



Electric Utilities

The Canadian Electricity Association **(CEA)** represents the Canadian electric utility industry on the ARET Stakeholders Committee. Member companies are responsible for generating, distributing and transmitting electric power, and account for about 90 per cent of installed generating capacity in Canada.

ELECTRIC UTILITIES– CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Copper		-9
Zinc	+3	
Other	+3	
Total	**+6**	**-9**
Net Change		**-3**

All electric utility members of the CEA with significant generating capacity are participating in or supporting the ARET program. Twelve companies have submitted action plans while six support ARET but have no or negligible emissions of ARET substances.

In 1998, total revenue generated by the electric utilities industry amounted to $28.8 billion, and almost 83,000 people were directly employed.

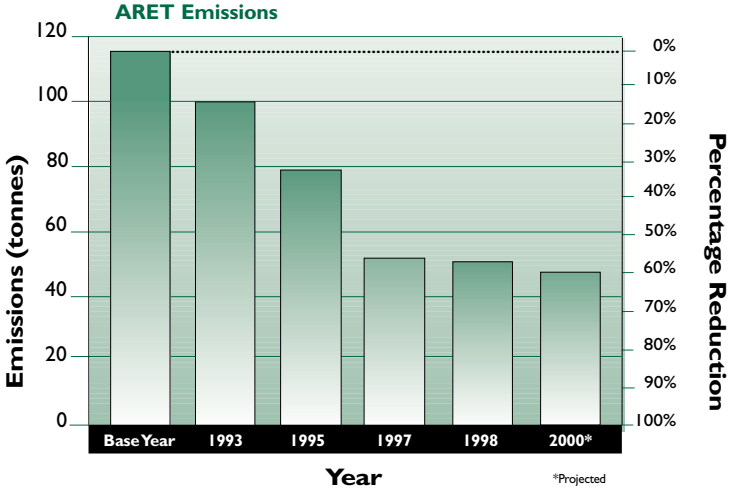
Emissions from the electric utilities sector represent less than one per cent of overall 1998 ARET emissions. Ontario Power Generation accounts for 76 per cent of the 1998 electric utility sector emissions and 92 per cent of the overall reductions for ARET substances reported.

Base-year emissions from companies in this sector total 117 tonnes. As of 1998, emissions to air and water of ARET substances have been reduced by 56 per cent to 52 tonnes. Further reductions forecast for 2000 will bring overall reductions to 60 per cent from base-year levels.

The highest environmental priorities for electric utilities are the reduction of greenhouse gases, and air quality issues such as acid rain. ARET provides a venue for reporting progress on industry concerns related to toxic substances, such as polychlorinated biphenyls **(PCBs)**, stack emissions of trace metals and water emissions.

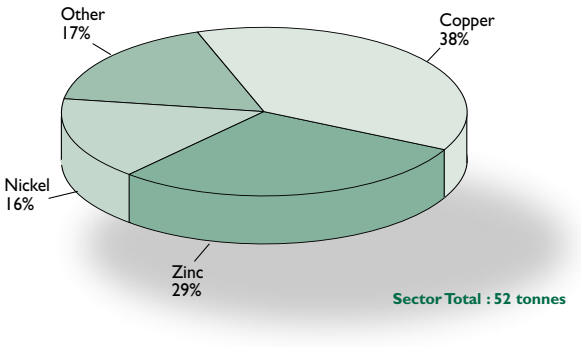
PCBs (List A-1) may be found in some electrical equipment such as transformers. They are not released to the environment except in the case of fire, spills or leaks. Although new electrical equipment has not contained PCBs since the early 1980s, some older equipment may still contain PCB material. Utilities have aggressive programs in place through which PCBs are removed and sent for licensed destruction when equipment is serviced or replaced. In 1998, Ontario Power Generation facilities shipped 899 tonnes of PCB waste for destruction.

FIGURE 11: Electric Utilities– ARET Emissions



Stack emissions, containing trace metals such as cadmium (List A-2) and arsenic, chromium, copper, lead, mercury, nickel and zinc (List B-2), are produced during the burning of fossil fuels such as coal and oil for electrical generation. In 1998, Ontario Power Generation added previously unreported air emissions to its ARET report, increasing emissions to air reported by the sector to 28 tonnes.

FIGURE 12: Electric Utilities– Emissions by Substance (1998)



Government

Five of the nine federal departments or agencies involved in ARET have determined that they have no or negligible ARET substance emissions. As a result, Industry Canada, Health Canada, the National Research Council of Canada, Agriculture and Agri-Food Canada and the Canadian Security Intelligence Service have submitted declarations of support for ARET. Another four departments or agencies, National Defence, Environment Canada, Natural Resources Canada **(NRCan)** and the National Capital Commission, have submitted action plans to ARET.

Participants from government are achieving progress under ARET by identifying products in use that contain ARET substances, and eliminating or replacing those products.

Mining and Smelting

The Mining Association of Canada **(MAC)** represents the mining and smelting sector in the ARET program. This sector includes companies involved in mineral exploration, as well as the mining, smelting, and refining of metals such as gold, zinc, copper, lead and nickel. MAC members account for the majority of Canada's output of metals.

Involvement of MAC members in ARET is at 97 per cent. Seventeen companies are implementing action plans, and a further 13 companies support ARET but emit no or negligible amounts of ARET substances. Since EL3, INMET Mining has submitted an action plan, and Falconbridge has begun reporting for its new Raglan operation. Emissions from the mining and smelting sector represent 16 per cent of the total reported to ARET in 1998.

Under the Strategic Options Process for Base Metal Smelting, MAC and other stakeholders have worked with Environment Canada to develop management options for a range of substances declared toxic under the *Canadian Environmental Protection Act*. These substances are also targeted under ARET and include arsenic, cadmium, lead, mercury and nickel. This work has resulted in a commitment by this sector to reduce emissions of these toxic substances by 80 per cent by 2008, from 1988 levels.

Emissions reported to ARET from the mining and smelting sector in 1998 amounted to 2,112 tonnes. This represents a reduction of 5,824 tonnes or 73 per cent from base-year levels. The emission level reported in 1998 is actually less than that which was earlier projected for 2000, indicating that overall the sector has exceeded the reduction it originally committed to. Participants from this sector are planning to continue to reduce their emissions in the spirit of continual improvement.

MINING AND SMELTING– CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Zinc		-275
Cyanides		-76
Lead		-71
Hydrogen Sulphide		-19
Arsenic	+7	
Other		-16
Total	**+7**	**-457**
Net Change		**-450**

The mining and smelting industry in Canada is a major contributor to the economy. In 1998, the industry produced minerals worth over $18 billion, while employing over 365,000 people directly. Production amounted to almost four per cent of the Canadian gross domestic product, and the industry accounted for over 14 per cent of 1998 Canadian exports.

A number of companies contributed to the 450-tonne or 18-per-cent reduction from 1997 levels. Major reductions in emission of zinc, lead, arsenic and cadmium were achieved at Hudson Bay Mining and Smelting. Similarly, at Noranda's Horne smelter reductions were made in lead, zinc and copper emissions. Offsetting these reductions to some extent, increases were reported at Inco for lead and copper, and at Noranda Horne for arsenic. The elevated arsenic emission at the Horne smelter is due to an ongoing problem in the pyro-processing stage of the smelting process. A solution to the problem has been identified, and emissions should be reduced during the year 2000.

FIGURE 13: Mining and Smelting– ARET Emissions

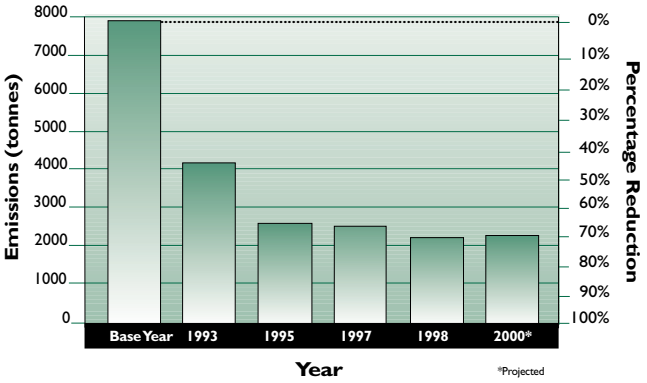
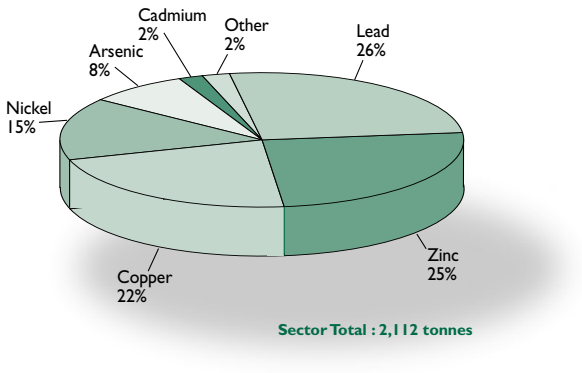


FIGURE 14: Mining and Smelting– Emissions by Substance (1998)



Oil, Gas and Petroleum Products

The Canadian Petroleum Products Institute **(CPPI)** represents companies involved in the refining, distribution and/or marketing of petroleum products, which is referred to as the downstream sector of the oil industry. A number of upstream companies, involved in the extraction of oil and natural gas, participate in ARET although they are not represented on the ARET Stakeholders Committee.

Seven of 10 members of the CPPI have submitted action plans to ARET. These participants represent nearly all of CPPI's refining capacity and over 80 per cent of Canada's total refining capacity.

Emissions from the oil, gas and petroleum sector account for six per cent of total ARET emissions in 1998. Petro-Canada joined ARET for the 1998 reporting year and is reporting emissions from its refining operations.

As of 1998, reductions for the sector from base year are 1,758 tonnes or 70 per cent. Minimal emission reduction is projected from 1998 to 2000, which indicates that participants from this sector have nearly met the 71-per-cent reduction commitment made under their action plans.

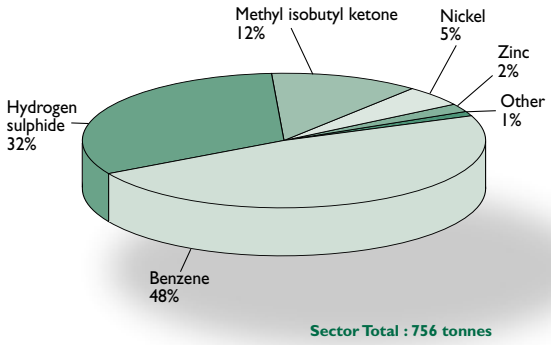
The 19 refineries operating in Canada collectively process about 1.6 million barrels of crude oil each day. Exports of refined petroleum products exceeded 110 million barrels in 1998. This level is nearly twice the amount imported. Directly and indirectly, the downstream sector of the petroleum industry employs more than 230,000 Canadians.

A decrease of 104 tonnes was achieved from 1997 to 1998 through reduction of benzene at Imperial Oil and Shell Canada.

OIL, GAS AND PETROLEUM PRODUCTS– CHANGES FROM 1997 TO 1998

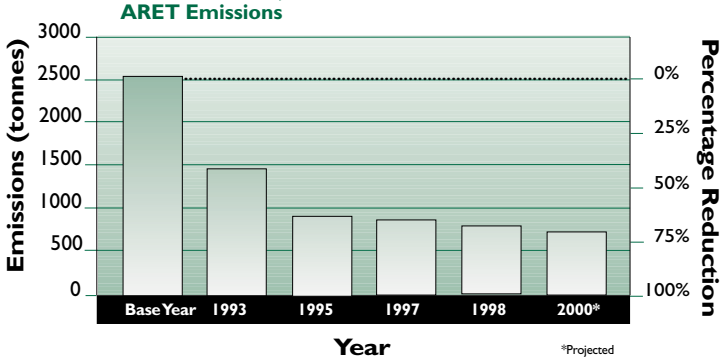
Substance	Increase (tonnes)	Decrease (tonnes)
Benzene		-95
Zinc		-10
Methyl isobutyl ketone	+8	
Other		-7
Total	**+8**	**-112**
Net Change		**-104**

FIGURE 16: Oil, Gas and Petroleum Products– Emissions by Substance (1998)



Sector Total : 756 tonnes

FIGURE 15: Oil, Gas and Petroleum Products– ARET Emissions



Other Manufacturing

Manufacturers which do not fall under the other key industrial sectors listed in ARET are represented on the ARET Stakeholders Committee by the Alliance of Manufacturers and Exporters Canada. The Alliance has approximately 2,500 member companies including manufacturers, service companies and exporters. Seventy per cent of Alliance members are small to medium-sized enterprises **(SMEs)**.

Some Alliance members are not involved in activities that produce or use ARET substances. Many others are too small to make ARET participation practical. However, 45 companies from the Alliance have action plans and a further 10 companies support ARET but have no or negligible ARET emissions. These companies account for the majority of the Alliance's manufacturing production.

Emissions reported by this sector represent eight per cent of total 1998 ARET emissions.

OTHER MANUFACTURING- CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Methylene chloride		-116
Ethanol		-92
Other		-8
Total		**-216**
Net Change		**-216**

The multi-stakeholder Strategic Options Process for methylene chloride (also known as dichloromethane) recommended that companies using or emitting this substance commit to voluntary action to reduce their emissions. Participation in ARET was recommended as the best way to facilitate these reductions. Since few companies responded within the agreed time frame to join ARET, the Minister of the Environment decided to regulate releases of methylene chloride. Nevertheless, a number of methylene chloride emitters have responded to the ARET challenge, joined the program, and made reduction commitments to be implemented over the next few years. New participants from this sector are Air Canada, Elastocraft, Flying Colours, Novopharm and Suzorite Mica.

Emissions of ARET substances reported by this sector in 1998 totaled 1,011 tonnes. This reflects a 524-tonne or 34-per-cent decrease from base-year levels of 1,534 tonnes. Some of the new participants could not commit to reductions by 2000, the date for achievement of the short-term targets set by ARET, due to the short time frame. However, projected emission reductions by the date identified by companies are expected to total 1,086 tonnes or 71 per cent from base-year levels. Of this reduction, 897 tonnes will be achieved by 2000, 140 tonnes is expected by 2002 and a further 49 tonnes is expected by 2003.

Over the past year, emissions have been decreased by 216 tonnes. This is due mainly to reductions in ethanol at Daimler Chrysler, as well as in methylene chloride emission from Suzorite Mica and Novopharm's Toronto and Markham operations.

FIGURE 17: Other Manufacturing– ARET Emissions

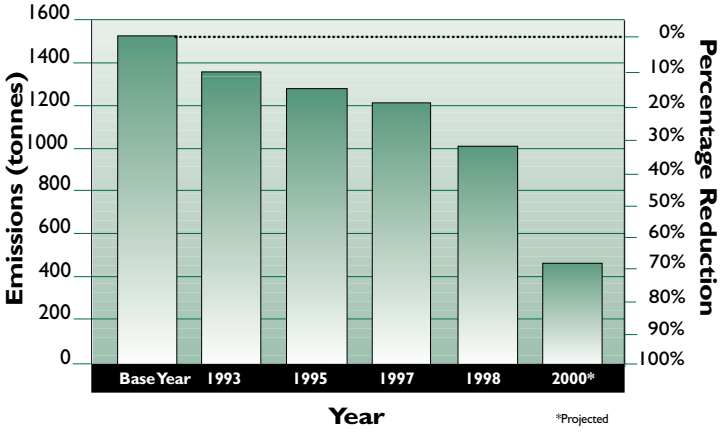
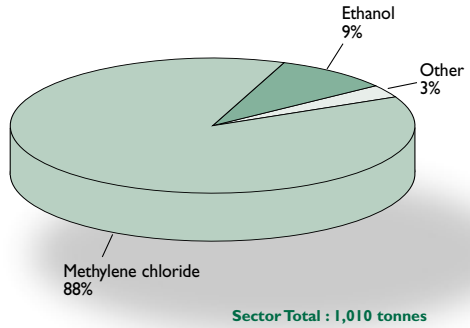


FIGURE 18: Other Manufacturing— Emissions by Substance (1998)



Pulp, Paper and Forest Products

In 1998, Canadian pulp and paper shipments decreased slightly to 28.5 million tonnes from 1997 levels. The forest products balance of trade contribution in 1998 increased to $31 billion.

Companies which manufacture pulp and paper products are represented on the ARET Stakeholders Committee by the Canadian Pulp and Paper Association **(CPPA)**. Companies in this sector also operate a number of facilities which produce forest products such as lumber and building materials. In 1998, association members accounted for over 75 per cent of Canadian pulp and paper production.

PULP, PAPER AND FOREST PRODUCTS– CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Hydrogen Sulphide		-632
Chlorine dioxide		-216
Formaldehyde		-57
Chloroform		-19
Other		-15
Total		**-939**
Net Change		**-939**

Of CPPA members, 82 per cent participate in or support ARET. This includes 29 companies with action plans and 6 companies that support ARET but have no or negligible emissions. CPPA members participating in ARET represent over 90 per cent of total CPPA production.

The pulp, paper and forest products sector was responsible for 39 per cent of total reported ARET emissions in 1998.

ARET emissions from this sector have been decreased by 14,610 tonnes or 74 per cent from base-year levels. The CPPA remains committed to achieving an 80-per-cent overall reduction in emission of ARET substances by the year 2000. Current projections indicate that this goal will be met.

Total reductions from 1997 levels were 939 tonnes or 16 per cent. The largest reductions in 1998 were in hydrogen sulphide at Weyerhaeuser's Prince Albert operation, StoraEnso, St. Anne Nackawic Pulp and Abitibi-Consolidated's Wayagamack mill, and in chlorine dioxide from St. Anne Nackawic Pulp and Kimberly Clark in Nova Scotia.

FIGURE 20: Pulp, Paper and Forest Products– Emissions by Substance (1998)

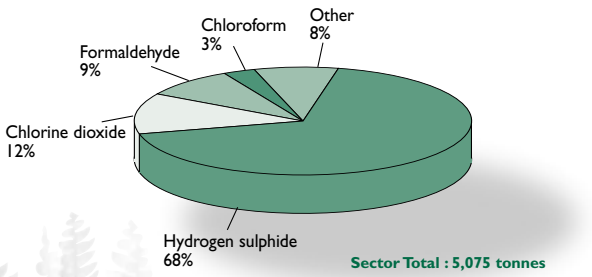
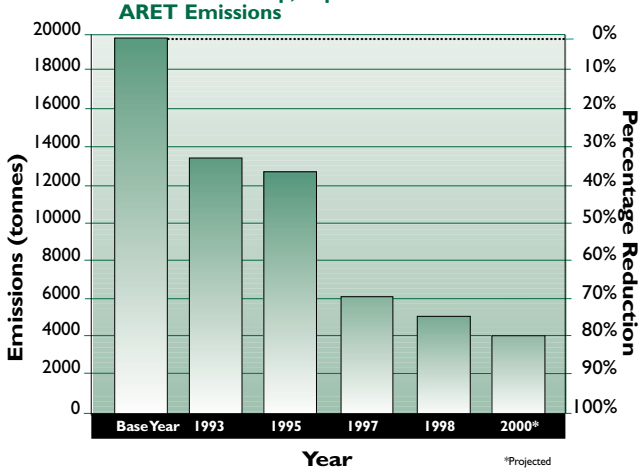


FIGURE 19: Pulp, Paper and Forest Products– ARET Emissions



Steel

The Canadian steel industry is represented on the ARET Stakeholders Committee by the Canadian Steel Producers Association **(CSPA)**. The CSPA includes companies that operate integrated steel mills (producing steel from raw materials), electric arc furnaces (recycling scrap steel) and steel processing facilities (rolling, tube making, etc.). CSPA members account for all steel production in Canada.

STEEL- CHANGES FROM 1997 TO 1998

Substance	Increase (tonnes)	Decrease (tonnes)
Hydrogen Sulphide	+397	
Benzene		-54
PAHs		-41
Nickel	+20	
Other		-30
Total	**+417**	**-125**
Net Change	**+292**	

In 1998, Canadian steel industry sales amounted to $11.2 billion and generated $3.6 billion in exports. The steel sector employed 33,400 people directly. To maintain their position in a highly competitive international market and to improve environmental performance, the industry has invested over $4 billion in facility upgrades and new technologies between 1984 and 1998.

Of the 14 steel companies in the CSPA, 12 or 86 per cent are involved in ARET. Eleven companies are implementing action plans, while one company supports the program but emits no or negligible quantities of ARET substances.

The steel sector accounts for 23 per cent of emissions reported to ARET in 1998.

A multistakeholder Strategic Options Process was established by Environment Canada to develop management options for a range of substances emitted from the steel sector that are declared toxic under the *Canadian Environmental Protection Act* (CEPA). Most of these substances are also targeted under ARET, including arsenic, cadmium, lead, mercury, benzene and PAHs. Concurrently, the CSPA issued its Statement of Commitment and Action for Environmental Protection **(SCA)** in June 1998. This voluntary initiative outlines the priorities and objectives of CSPA member companies in order to achieve continuous improvement in their environmental performance. The SCA commits members to reduce air emissions of benzene and PAHs, and to participate in the development of environmental codes of practice for CEPA toxic metals released in air emissions and water effluents.

As of 1998, the steel sector has reported a reduction in emissions of 1,165 tonnes or 28 per cent to ARET. Further projected decreases will bring overall reductions to 2,213 tonnes or 54 per cent by 2000.

From 1997 to 1998, emissions of ARET substances from the steel sector increased by 292 tonnes or 11 per cent. Higher reported emission levels at Stelco's Lake Erie Steel and Hilton Works for hydrogen sulphide were mainly a result of changes to the method of emission estimation at these facilities, and also due to increased production. On the other hand, significant emission reductions were achieved at Stelco's Hilton Works for benzene, and at Dofasco for hydrogen sulphide and benzene.

FIGURE 21: Steel– ARET Emissions

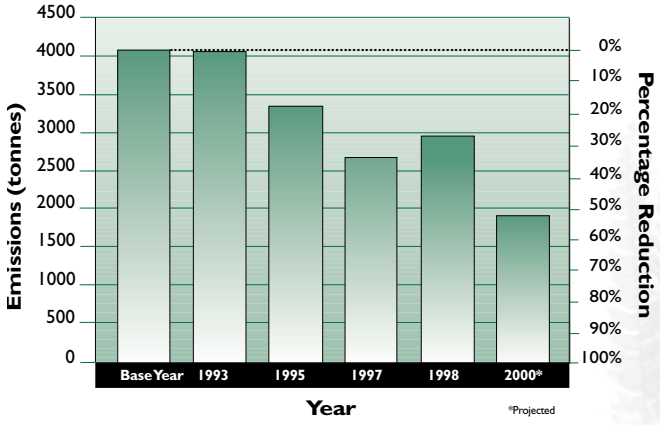
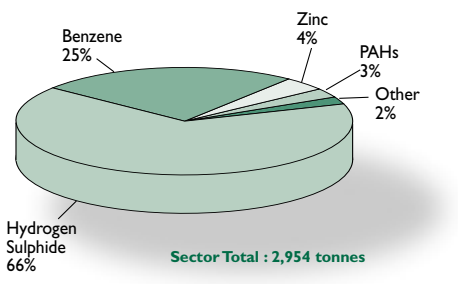


FIGURE 22: Steel– Emissions by Substance (1998)



ARET Beyond 2000

Since its launch in March 1994, ARET has steadily gained momentum and demonstrated that it can be a positive influence on accelerating the reduction of toxic substance emissions. The positive response and elevated levels of participation from key industrial sectors of the Canadian economy in ARET also demonstrate that voluntary action on toxic substances can be an effective complement to regulation in enhancing environmental performance.

In late 2001, the final report of the current ARET program will be released, detailing achievements made from the base year to 2000.

Renewal of ARET

Since the short-term goals of the ARET program were established to the year 2000, a renewal process for ARET has been initiated. In September 1999, the ARET Secretariat released a discussion paper on the future of the ARET program. It presented options, and key issues and principles to be considered when designing a successor program to ARET. The issues presented include increasing participation in ARET, evaluating the current ARET substances list with the objective of adding/deleting certain substances based on scientific data, and verifying the data reported by ARET participants.

The discussion paper was put on the ARET web site for public comment. Several organizations and members of the public commented on it and their observations are available on the ARET website. The input received will be taken into consideration and discussed in future ARET Stakeholders Committee meetings and other forums. Workshops in Ottawa and Calgary are planned for 2000 to discuss the issues and design of a renewed ARET program.

CESD Review of ARET

In May 1999, the Commissioner of the Environment and Sustainable Development **(CESD)** released a report on the effectiveness of the federal government's toxic substance management programs. The report noted that voluntary programs are being used as a core element of the federal management strategy to achieve reduction of toxic substances.

A key finding of the CESD report is that while voluntary initiatives can play a role in the management of toxic substances, they, as currently structured, may not be sufficient to effectively manage priority toxics. It was also concluded that there is a need for more rigour and better accountability mechanisms in using voluntary initiatives.

One recommendation made by the CESD is that Environment Canada establish conditions under which voluntary initiatives should be used to manage toxics. This is currently being done through the development of a policy framework for environmental performance agreements. The CESD also indicated that if Environment Canada chooses to use voluntary initiatives, rigorous requirements should be established including clear goals and targets, standardized performance measures, consequences if objectives are not met, credible verification of results, and continuous improvement.

Environment Canada's Evaluation of ARET

Environment Canada has also conducted an internal review of the ARET program. Results are currently being finalized and should be available early in 2000. Preliminary findings indicate that modifications need to be made to the current ARET program structure in order to increase the credibility and effectiveness of a successor program to ARET.

A Proposed Policy Framework for Environmental Performance Agreements

Environment Canada is currently developing a policy framework to ensure that voluntary environmental agreements are effective and credible complements to regulatory action. In particular, the department will ensure that voluntary agreements achieve the equivalent effect of regulations. To fulfill this objective, seven criteria are included in the proposed policy framework. The criteria include clear objectives and measurable results, public participation, verification of results, incentives and consequences, continuous improvement, a regulatory backstop, and public reporting.

These criteria would stipulate conditions under which Environment Canada could enter into voluntary agreements, and must be taken into consideration in the renewal of ARET.

The New Canadian Environmental Protection Act *(CEPA)*

In 2000, CEPA 1999 will come into effect. Included in the Act is the requirement to categorize 23,000 substances in commerce in Canada. Substances which meet the criteria under Section 73 of CEPA will then undergo a screening assessment to determine if they are toxic or capable of becoming toxic under the Act. Voluntary initiatives, such as the successor program to ARET, may be an important component of the strategy to efficiently and effectively manage substances of concern and other toxic substances that will be identified through the categorization and screening assessment exercises.

ARET and the NPRI

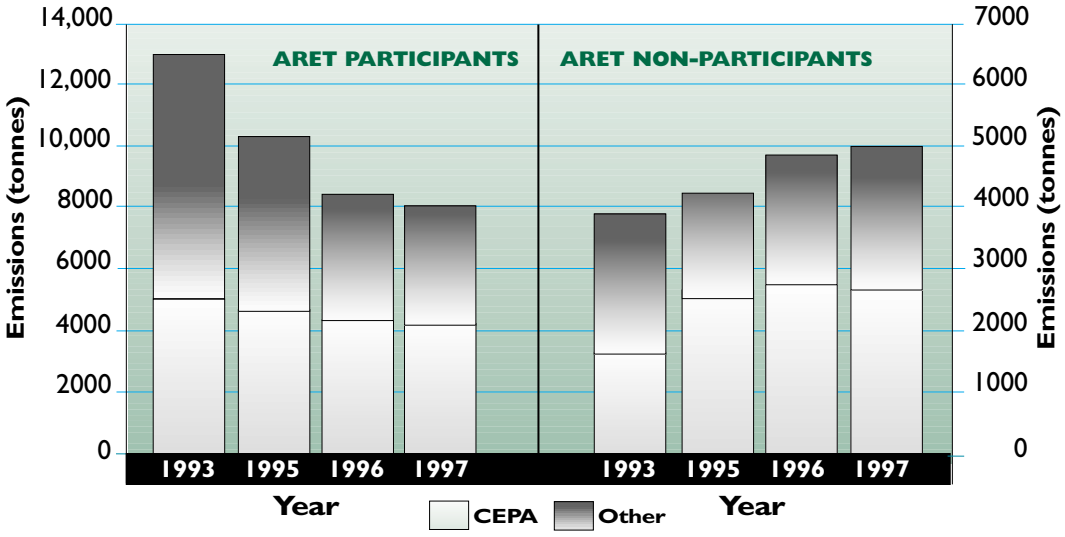
The National Pollutant Release Inventory **(NPRI)** is an inventory of releases of 176 substances from industry and other sources. Reporting to the NPRI is mandatory for operations which meet certain minimum production and release thresholds. In 1997, the most recent year for which NPRI data is available, there were 49 substances common to the ARET and NPRI lists.

Analysis comparing data submitted to NPRI for the 49 substances common to both programs is revealing (see figure 23). The analysis shows that emissions to air and water reported by ARET participants have decreased significantly from 1993 to 1997. Reductions reported are 23 per cent for those substances declared toxic under CEPA and 39 per cent for all common substances over the four years. This reflects the efforts made by ARET participants and their success in effectively reducing emission of toxic substances from their operations.

On the other hand, for the 49 common substances, emissions reported to the NPRI by companies not participating in the ARET program have increased. The increases are 67 per cent for the substances that have been declared toxic under CEPA, and 31 per cent overall for the substances common to ARET and NPRI. The analysis shows that there is still a significant potential for increased participation in the ARET program.

Several changes have been made to the NPRI program recently. A number of ARET substances have been added to the NPRI list. Reporting thresholds will also be lowered for some substances which are micropollutants (e.g. dioxins and furans) or are released in small quantities (e.g. mercury). These changes should help in identifying potential new participants for ARET and allow the effective tracking of emissions of these toxic substances.

FIGURE 23: Comparison of NPRI Reports by ARET Participants and ARET Non-Participants



ARET's Next Report

Environmental Leaders 4 will provide a summary of the achievements of ARET participants during the 1999 reporting year. The deadline for submitting 1999 data to be included in the next report is July 1, 2000. Questions about reporting or participation should be directed to the ARET Secretariat at 819-953-9086 or aret@ec.gc.ca.

Appendix I ARET SUBSTANCES

ARET SUBSTANCES LIST

Following is the ARET list of substances for action. These substances have been selected from a list of chemicals detected in the Canadian environment. There is evidence that these substances 1) may have the potential to have harmful effects on human, animal or plant life; 2) may tend to degrade very slowly in the environment; and/or 3) may tend to accumulate in living organisms.

This listing is meant to guide priorities, and is not meant to imply that actual harm is currently being caused by these substances. The ARET substances have been rank-ordered based on their intrinsic properties. Decisions concerning priority for action will be made by the managers of emitting facilities based on additional criteria specific to each situation.

The substances have been categorized by chemical grouping and are accompanied by a Chemical Abstract Service Registry Number (CASRN) for ease of use with WHMIS (Workplace Hazardous Materials Information System) and NPRI (National Pollutant Release Inventory) data management systems.

A Substance Selection Subcommittee report detailing the selection process, guidelines and criteria is available on the internet at www.ec.gc.ca/aret and from the ARET Secretariat.

SUBSTANCE SELECTION

Substances were selected for screening from the CESARS (Chemical Evaluation Search and Retrieval System) database maintained by the Ontario Ministry of Environment and Energy and the Michigan Department of Natural Resources. This database contains information on approximately 2,000 substances that have been used or detected in the Great Lakes Basin. There was sufficient information on 500 of the substances to permit screening for the ARET list.

In developing its substances list, the ARET Stakeholders Committee received advice and recommendations from two technical subcommittees. The Criteria Subcommittee proposed criteria and a process for screening and selecting candidate substances for action. The group's proposals were approved by the ARET Stakeholders Committee in February 1993. The Substance Selection Subcommittee applied the process to select candidates, and provided its recommended list in the fall of 1993. The final list of substances was approved by the ARET Stakeholders Committee in January 1994.

Both subcommittees included representatives from the labour and environmental communities, industry, and provincial and federal government departments. Subcommittee participants had expertise in environmental toxicology and hazardous substances.

The criteria used for screening substances were toxicity, persistence and bioaccumulation. Substances were selected on the basis of their intrinsic properties only; no consideration was given to quantities released, the medium of release or quantities in the environment. As a consequence, no inference can be made about their relative risk. In addition, the grouping of substances into lists is not meant to imply that all substances within a list are of equal priority since each list represents a broad range of scores for the criteria.

SELECTION CRITERIA

Substances were considered to be persistent if they failed to degrade in the environment to half their concentration within 50 days. Substances were considered to be bioaccumulative if test evidence demonstrated a bioconcentration factor (BCF) greater than 500.

For toxicity, up to six elements were considered in the scoring process, all with maximum scores of 10: acute lethality, chronic/sub-chronic toxicity (non-mammals), chronic/sub-chronic toxicity (plants), chronic/sub-chronic toxicity (mammals), teratogenicity and carcinogenicity. Where three or more toxicity scores were available for a substance, a normalized toxicity score (NTS) was calculated, with a maximum of 60. All substances with NTS over 40 were considered toxic for the ARET list. In addition, any substance with a score of 10 on any toxicity element was considered toxic for ARET.

Appendix 1 ARET SUBSTANCES

PESTICIDES EXCLUDED FROM ARET

The list provided by the Substance Selection Subcommittee included a number of registered pesticides. The ARET stakeholders decided that, since pesticides are regulated under the *Pest Control Products Act*, it was in general not appropriate to include pesticides on the ARET list. Where substances had both pesticide and non-pesticide uses or releases, they remained on the ARET list.

METALS TREATED DIFFERENTLY

Metals, by virtue of their elemental nature, were all considered as persistent for the purposes of the screening. Although the intent was to screen individual chemicals, this was not always possible, and for some metals a composite score based on the scores for various metal species resulted in a worst case scoring. Future actions or assessment should focus on specific metal compounds.

ARET LIST COMPARISON TO OTHER PROGRAMS

Almost half of the ARET substances are on the National Pollutant Release Inventory (NPRI) reporting list. Only one of ARET's List A-1 substances – 4,4'-methylenebis(2-chloroaniline) – was on the NPRI list in 1998. Facilities report to the NPRI only if their emissions exceed a threshold level, while there is no threshold for ARET reporting. ARET participants are encouraged to plan their actions based on their needs and priorities, and may choose not to report emissions of ARET substances for which no reduction in emissions is planned.

Twenty-two of the 45 substances declared toxic under the *Canadian Environmental Protection Act* (CEPA) are on the ARET list. Nine of the 25 candidates on the second Priority Substances List (PSL 2) are also on the ARET list. Voluntary actions under ARET on CEPA toxics are an important consideration in the selection and recommendation of control options by stakeholders in the Strategic Options Process established by Health Canada and Environment Canada to address CEPA toxic 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.

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
Dibenz(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

	CASRN
Nitro-PAHs	
1,6-dinitropyrene	42397-64-8
1,8-dinitropyrene	42397-65-9
Chlorinated organics	
Polychlorinated biphenyls (PCBs)	N/A
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

(consensus could not be reached on whether these substances meet all criteria)

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 "best effort" reduction in emissions.

	CASRN
*1,4 dichlorobenzene	106-46-7
**Cadmium (and inorganic compounds)	N/A

*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 $CdCO_3$, $CdCO_2$, CdC_{l2}, CdO, and $CdSO_4$. The concept of virtual elimination of dischrges 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 and bioaccumulation)

	CASRN
PAHs	
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).

LIST B-2

(meet or exceed criteria for toxicity and persistence)

	CASRN
PAHs	
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
Chlorodibromomethane	124-48-1
Chloroform	67-66-3
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 (soluble or inorganic)	N/A*
Copper (inorganic salts)	N/A*
**Lead (all forms except alkyl)	N/A*
***Mercury (elemental and inorganic)	N/A*
Nickel (inorganic, inhalable or soluble)	N/A*
Silver (soluble inorganic or ionic)	N/A*
Uranium (inorganic, inhalable or soluble)	N/A*
Zinc (inorganic, inhalable or 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

LIST B-3

(meet or exceed criteria for toxicity)

	CASRN
Chlorinated organics	
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
Benzidine	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 butadiane	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

*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

Appendix 2 EMISSIONS BY FACILITY

ARET Accelerated Reduction/Elimination of Toxics

COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
3M CANADA COMPANY								
London Facility	OTH	8.5	8.5	8.1	8.2	▼3%	7.0	▼17%
Perth Plants	OTH	66	66	43	38	▼43%	37	▼44%
ABITIBI-CONSOLIDATED INC.								
* Alma Division	A-1	0.13	0.13	nd	nd	▼100%	nd	▼100%
	OTH	6.9	6.9	2.0	2.0	▼70%	1.0	▼85%
* Beaupré Paper Mill	A-1	$1.1x10^{-3}$	$1.1x10^{-3}$	nd	nd	▼100%	nd	▼100%
	OTH	2.6	2.6	1.9	1.0	▼60%	1.9	▼25%
* Belgo Division	OTH	216	216	nd	nd	▼100%	nd	▼100%
* Fort Frances Division	A-1	$7.1x10^{-6}$	nm	nm	nm	▼100%	nm	▼100%
	OTH	127	26	33	18	▼86%	21	▼84%
* Fort William Division	A-1	$8.7x10^{-7}$	$8.7x10^{-7}$	$8.7x10^{-7}$	nd	▼100%	nd	▼100%
	OTH	5.2	5.2	0.82	0.33	▼94%	0.039	▼99%
* Iroquois Falls Division	A-1	$5.9x10^{-7}$	$3.0x10^{-10}$	nd	nd	▼100%	nd	▼100%
	OTH	1.0	1.2	0.15	0.089	▼91%	0.48	▼54%
Kénogami Paper Mill	A-1	$2.4x10^{-3}$	$2.4x10^{-3}$	$2.4x10^{-3}$	$2.4x10^{-3}$	▼0%	0	▼100%
	OTH	8.0	8.0	4.9	4.7	▼41%	3.5	▼56%
Kenora Division	OTH	1.8	1.8	3.6	1.8	▼2%	2.4	▲29%
* La Compagnie Gaspésia Ltée	OTH	6.5	6.5	1.9	$8.0x10^{-3}$	▼100%	0.71	▼89%
* Laurentides Division	OTH	129	117	16	9.2	▼93%	17	▼87%
Port Alfred Division	OTH	279	267	212	169	▼39%	171	▼39%
* Wayagamack Division	A-1	0.025	0.014	0.012	nd	▼100%	nd	▼100%
	OTH	315	159	91	18	▼94%	25	▼92%
*** ADVANCED MONOBLOC**	OTH	147	147	4.29	0	▼100%	0	▼100%
AIR CANADA	OTH	29	29	29	29	▼0%	14	▼50%
ALCAN PRIMARY METAL GROUP								
Arvida Aluminum Smelter	A-1	466	180	191	208	▼55%	110	▼76%
	OTH	1.8	0.50	0.37	0.29	▼84%	0.40	▼78%
Beauharnois Aluminum Smelter	A-1	110	50	53	46	▼59%	30	▼73%
Isle-Maligne Aluminum Smelter	A-1	150	80	81	82	▼45%	50	▼67%
Shawinigan Aluminum Smelter	A-1	170	95	98	99	▼42%	50	▼71%
* Vaudreuil Chemical Works	A-1	0.57	0.010	0.010	0.010	▼98%	0.010	▼98%
	OTH	0.40	0.075	0.049	0.022	▼95%	0.035	▼91%
ALGOMA STEEL INC.	A-1	84	84	18	12	▼86%	12	▼86%
	OTH	371	369	180	191	▼49%	95	▼74%
ASHLAND CANADA INC.	OTH	1.4	1.2	1.4	1.1	▼21%	1.2	▼15%
ATLAS SPECIALTY STEELS	OTH	15	6.7	1.4	0.67	▼96%	0.20	▼99%
*** ATLAS STAINLESS STEELS**	OTH	95	62	24	21	▼78%	26	▼72%
AUR RESOURCES	OTH	0.51	no	0.56	0.35	▼31%	0.51	▼0%
*** BARRICK GOLD CORPORATION**	OTH	8.1	1.0	0.63	0.24	▼97%	4.0	▼51%
BASF CANADA LIMITED								
* Brantford (CLOSED)	OTH	1.6	1.6	0.20	0.074	▼95%	no	▼100%
Sarnia (CLOSED)	OTH	2.1	2.1	no	no	▼100%	no	▼100%
* Toronto	OTH	0.41	0.41	0.012	0	▼100%	0.20	▼51%
* Windsor	OTH	3.9	3.9	0.77	0.60	▼85%	4.1	▲5%
BATTLE MOUNTAIN CANADA LTD.								
* Golden Giant Mine	OTH	83	122	100	24	▼71%	25	▼70%
* Holloway Mine	OTH	0.043	no	0.13	0.016	▼64%	0.015	▼66%
* Silidor Mine (CLOSED)	OTH	0.017	0.023	$2.3x10^{-3}$	no	▼100%	no	▼100%
*** BAYER INC.**	OTH	554	554	84	70	▼87%	66	▼88%
BENJAMIN MOORE & CO., LIMITED								
Montréal Facility	OTH	1.6	1.6	0.50	0.50	▼68%	2.8	▲77%
Toronto Facility	OTH	0.62	0.62	0.62	0.62	▼0%	0.32	▼49%
Vancouver Facility	OTH	0.029	0.029	0.029	0.029	▼0%	0.018	▼38%
*** BILLITON METALS CANADA INC.**	OTH	19	2.5	2.0	3.3	▼83%	2.9	▼85%
BOLIDEN WESTMIN (CANADA) LIMITED								
* Myra Falls Operation	OTH	4.1	1.8	0.84	0.65	▼84%	1.8	▼55%
* Premier Gold Operation	OTH	1.4	1.4	0.14	0.66	▼54%	0.23	▼84%

na — not available, nd — non-detectable, nm — non-measurable, no — facility not in operation, OTH — total of lists A-2, B-1, B-2 and B-3

* Facilities marked with an asterisk have achieved ARET goals for all substance categories for which they report.

COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
BOWATER MERSEY PAPER COMPANY LTD.								
	OTH	8.7	8.7	0.53	0.75	▼91%	1.5	▼83%
BOWATER PULP AND PAPER CANADA INC.								
Dalhousie Operations	A-1	$1.8x10^{-3}$	na	na	$1.8x10^{-3}$	▼0%	$1.8x10^{-3}$	▼0%
* Dryden Operations	OTH	316	280	154	154	▼51%	na	na
Gatineau Operations	A-1	$2.6x10^{-7}$	na	na	na	na	na	na
	OTH	0.19	na	na	na	na	na	na
* Gold River Operations	OTH	276	86	127	127	▼54%	na	na
Thunder Bay Operations	A-1	0.74	na	$7.2x10^{-3}$	$7.2x10^{-3}$	▼99%	na	na
	OTH	1 051	962	1 264	1 267	▲21%	1 183	▲13%
BRIDGESTONE/FIRESTONE CANADA INC.								
	OTH	1.1	1.1	1.2	0.55	▼49%	0	▼100%
CAMBIOR INC.								
Bouchard-Hébert Mine	OTH	0.17	0.10	0.35	0.18	▲8%	0.20	▲20%
Doyon Mine	OTH	0.072	na	na	0.072	▼0%	0.072	▼0%
Géant Dormant Mine	OTH	0.37	0.035	0.24	0.23	▼38%	0.14	▼62%
* Gonzague-Langlois Mine	OTH	0.55	0.50	0.15	0.14	▼75%	0.15	▼73%
Mouska Mine	OTH	0.030	na	0.030	0.030	▼0%	0.030	▼0%
Yvan Vézina Plant	OTH	0.072	$8.0x10^{-3}$	0.079	0.041	▼43%	0.050	▼31%
CANADA COLORS & CHEMICALS LIMITED								
* Brampton	OTH	0.27	0.27	0.12	0.12	▼56%	0.12	▼56%
* Colborne	OTH	$1.0x10^{-3}$	$1.0x10^{-3}$	0	0	▼100%	0	▼100%
St- Laurent	OTH	0.067	0.067	0.70	0.70	▲939%	0.70	▲939%
* Delta	OTH	$1.0x10^{-3}$	$1.0x10^{-3}$	0	0	▼100%	0	▼100%
CANADIAN FOREST PRODUCTS LTD.								
* Howe Sound Pulp & Paper Ltd.	A-1	0.26	nd	$7.8x10^{-8}$	$7.2x10^{-8}$	▼100%	nd	▼100%
	OTH	88	5.9	7.7	7.9	▼91%	7.7	▼91%
* Prince George Pulp & Paper Mills	A-1	0.060	0.015	$9.0x10^{-7}$	$6.2x10^{-7}$	▼100%	$3.3x10^{-7}$	▼100%
	OTH	438	95	19	16	▼96%	14	▼97%
CARIBOO PULP AND PAPER COMPANY								
	OTH	65	48	34	33	▼49%	24	▼63%
CASCO IMPREGNATED PAPERS, INC.	OTH	3.7	3.7	5.7	4.6	▲25%	2.9	▼22%
CELANESE CANADA INC.								
Millhaven Site	OTH	48	50	36	26	▼47%	3.4	▼93%
* Edmonton Plant	OTH	245	116	108	87	▼64%	87	▼64%
CHINOOK GROUP	A-1	$4.8x10^{-9}$	$4.8x10^{-9}$	$3.3x10^{-11}$	$7.4x10^{-10}$	▼85%	0	▼100%
	OTH	0.094	0.094	4.0	4.3	▲4460%	2.6	▲2674%
*** CO-STEEL LASCO**	OTH	29	29	14	13	▼54%	14	▼51%
*** COMINCO LTD.**	OTH	862	280	212	163	▼81%	159	▼82%
*** CRESTBROOK FOREST INDUSTRIES**	A-1	$2.7x10^{-6}$	$2.7x10^{-6}$	$1.7x10^{-7}$	$2.5x10^{-7}$	▼91%	nd	▼100%
	OTH	375	375	27	24	▼94%	26	▼93%
CROWN CORK & SEAL CANADA INC.								
Plant 233 (Concord)	OTH	46	46	37	32	▼30%	23	▼50%
Plant 234 (Montréal)	OTH	0.26	0.26	0.29	0.39	▲48%	0.10	▼62%
Plant 244 (Concord)	OTH	4.3	4.3	6.3	19	▲336%	1.0	▼77%
* Plant 246 (St. Laurent)	OTH	0.21	0.21	$2.0x10^{-3}$	$2.0x10^{-3}$	▼99%	0	▼100%
* Plant 250 (Winnipeg)	OTH	0.087	0.087	0	0	▼100%	0	▼100%
* Plant 257 (Chatham)	OTH	1.1	na	0.11	0.15	▼87%	0.10	▼91%
CYTEC CANADA INC.	OTH	0.037	0.037	0.052	0.052	▲41%	0	▼100%
DAIMLERCHRYSLER CANADA INC.	OTH	116	116	162	64	▼44%	50	▼56%
*** DAISHOWA INC.**	OTH	236	162	0.20	0.20	▼100%	0.97	▼100%
DELMAR INC.	OTH	33	33	39	39	▲16%	17	▼50%
DOFASCO INCORPORATED	A-1	52	44	36	42	▼20%	31	▼41%
	OTH	1 473	1 573	769	686	▼53%	554	▼62%
DOMTAR INC.								
Cornwall Facility	A-1	3.0	3.0	0.69	0.69	▼77%	2.9	▼5%
	OTH	237	204	165	165	▼30%	154	▼35%
Espanola Division (formerly E.B. Eddy)	A-1	0.13	0.13	0.11	0.11	▼13%	0.21	▲60%

na — not available, nd — non-detectable, nm — non-measurable, OTH — total of lists A2, B-1, B-2 and B-3.
* Facilities marked with an asterisk have achieved ARET goals for all substance categories for which they report.

COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
DOMTAR INC. (continued)								
	OTH	255	255	202	202	▼21%	122	▼52%
Island Paper Mills Division (formerly E.B. Eddy)								
	OTH	2.3	2.3	2.3	2.3	▼0%	0.80	▼65%
Lebel-sur-Quevillon Facility	A-1	0.058	0.042	9.0×10^{-3}	9.0×10^{-3}	▼84%	0.031	▼47%
	OTH	1 446	1 408	143	143	▼90%	44	▼97%
Ottawa/Hull Division (formerly E.B. Eddy)	A-1	6.0×10^{-3}	6.0×10^{-3}	6.0×10^{-3}	6.0×10^{-3}	▼0%	6.0×10^{-4}	▼90%
	OTH	1.6	1.6	1.6	1.6	▼0%	1.1	▼34%
St. Catharines Facility	A-1	2.0×10^{-4}	2.0×10^{-4}	2.0×10^{-4}	2.0×10^{-4}	▼0%	2.0×10^{-4}	▼0%
	OTH	0.11	0.11	0.039	0.039	▼63%	0.10	▼4%
Windsor Facility	A-1	0.059	0.059	0.11	0.11	▲80%	0.042	▼29%
	OTH	731	725	50	50	▼93%	32	▼96%
DONOHUE FOREST PRODUCTS INC.	A-1	4.6×10^{-3}	4.6×10^{-3}	3.6×10^{-9}	3.4×10^{-9}	▼100%	3.6×10^{-9}	▼100%
	OTH	6.7	6.7	4.0	4.5	▼33%	4.0	▼41%
DOW CHEMICAL CANADA INC.								
Fort Saskatchewan Site	A-1	1.7×10^{-6}	1.7×10^{-6}	1.7×10^{-6}	5.0×10^{-7}	▼71%	2.0×10^{-7}	▼88%
	OTH	92	50	39	62	▼33%	43	▼54%
* Sarnia Site	A-1	2.1×10^{-3}	1.9×10^{-9}	0	0	▼100%	0	▼100%
	OTH	200	60	19	15	▼93%	3.3	▼98%
*Varennes Site	OTH	25	13	0.28	1.9	▼92%	0.28	▼99%
West Coast Distribution Centre	OTH	1.9	1.9	2.4	2.4	▲25%	2.4	▲26%
DUPONT CANADA INC.								
* Ajax Manufacturing Operation	OTH	2.5	2.5	1.4	1.0	▼58%	1.0	▼59%
Maitland Manufacturing Operation	OTH	11	6.5	9.6	8.8	▼19%	10	▼6%
*** ECHO BAY MINES LTD.**	OTH	0.83	0.31	0.88	0.025	▼97%	0.20	▼76%
EKA NOBEL CANADA INC.								
* Magog Site	OTH	0.010	2.8×10^{-3}	1.5×10^{-3}	1.2×10^{-3}	▼88%	3.0×10^{-3}	▼71%
*Valleyfield Site	OTH	3.7×10^{-3}	1.7×10^{-3}	3.5×10^{-4}	1.0×10^{-4}	▼97%	1.0×10^{-3}	▼73%
ELASTOCRAFT LTD.	OTH	98	98	98	98	▼0%	49	▼50%
*** ETHYL CANADA INC.**	OTH	31	18	0.065	0.061	▼100%	0.35	▼99%
*** F. F. SOUCY INC.**	OTH	11	11	2.6	2.2	▼81%	2.4	▼79%
FALCONBRIDGE LIMITED								
Kidd Metallurgical Division	OTH	257	245	164	178	▼31%	69	▼73%
Kidd Mining Division	OTH	5.3	2.6	3.2	3.0	▼43%	2.1	▼61%
Raglan Project	OTH	0.27	no	no	0.27	▼0%	0.27	▼0%
* Sudbury Operations	OTH	184	85	75	52	▼71%	39	▼79%
FLETCHER CHALLENGE CANADA LIMITED								
Crofton Pulp and Paper	A-1	0.044	0.044	0.044	0.044	▼0%	0.044	▼0%
	OTH	785	610	154	239	▼70%	357	▼54%
Elk Falls Pulp and Paper	A-1	0.064	0.064	0.032	0.032	▼50%	0.064	▼0%
	OTH	1 142	872	232	232	▼80%	436	▼62%
* Mackenzie Pulp	A-1	3.2×10^{-5}	6.5×10^{-7}	nd	nd	▼100%	nd	▼100%
	OTH	153	39	14	14	▼91%	15	▼90%
FLYING COLOURS CORP.	OTH	4.7	4.7	13	13	▲182%	2.3	▼50%
*** FORT JAMES-MARATHON, LTD.**	A-1	0.15	0.15	na	nd	▼100%	nd	▼100%
	OTH	1 547	35	136	81	▼95%	81	▼95%
GATES CANADA LIMITED								
Belt Processing Plant	OTH	0.025	0.025	0.039	0.039	▲59%	0.011	▼54%
Hose Processing Plant	OTH	0.25	0.25	0.14	0.14	▼44%	0.16	▼36%
GENERAL ELECTRIC CANADA INC.								
* GE Industrial Control Systems	OTH	45	3.0	0.72	0.72	▼98%	1.5	▼97%
GE Lighting	OTH	19	19	23	23	▲23%	25	▲36%
* GE Meters	OTH	10	10	0	0	▼100%	0	▼100%
GE Plastics Canada	OTH	3.4	3.4	1.5	1.7	▼51%	2.6	▼25%
* Nuclear Products Dept.	OTH	2.0	2.0	0.012	0.012	▼99%	6.0×10^{-3}	▼100%
GENFAST MANUFACTURING CO. (formerly Stelco Fasteners)	OTH	0.019	0.018	0.059	0.059	▲205%	0.016	▼19%
GERDAU COURTICE STEEL INC.	OTH	7.6	7.6	10	10	▲35%	7.6	▼0%

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COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
GERDAU MRM STEEL	OTH	16	16	19	9.6	▼41%	9.8	▼39%
*** H.L. BLACHFORD LTD.**	OTH	0.66	0.66	$9.6x10^{-3}$	$9.6x10^{-3}$	▼99%	0	▼100%
HARMAC PACIFIC INC.	A-1	$3.0x10^{-6}$	$5.4x10^{-7}$	$1.4x10^{-6}$	$1.7x10^{-6}$	▼43%	$5.7x10^{-7}$	▼81%
	OTH	112	66	102	98	▼13%	59	▼48%
*** HERCULES CANADA INC.**	OTH	0.32	0	0	0	▼100%	0	▼100%
HIGHLAND VALLEY COPPER	OTH	1.7	na	1.7	1.7	▼0%	1.0	▼40%
*** HOMESTAKE CANADA INC.**	OTH	20	1.1	1.9	1.3	▼94%	3.8	▼81%
*** HUDSON BAY MINING & SMELTING COMPANY LTD.**	OTH	2 037	1 662	713	395	▼81%	329	▼84%
*** HUNTSMAN CORPORATION CANADA INC.**	OTH	39	39	3.2	3.9	▼90%	1.4	▼97%
HYDRO AGRI CANADA (formerly Nutrite)	OTH	0.048	0.048	0.046	0.036	▼25%	0.036	▼25%
HYDRO QUÉBEC	A-1	0.38	0.38	0.27	0.27	▼28%	0.25	▼33%
	OTH	9.8	9.8	5.2	5.2	▼47%	3.2	▼67%
*** IBM CANADA LTD.**	OTH	105	31	3.9	4.4	▼96%	7.8	▼93%
ICI CANADA INC.								
Cornwall Chemicals Ltd. (CLOSED)	OTH	35	41	no	no	▼100%	no	▼100%
ICI Explosives	OTH	4.4	6.7	6.0	6.0	▲36%	3.5	▼22%
* ICI Forest Products (CLOSED)	OTH	0.12	0.065	0.010	0.010	▼92%	$3.0x10^{-3}$	▼97%
IMPERIAL OIL LIMITED	OTH	445	445	255	211	▼52%	192	▼57%
*** INCO LIMITED**	OTH	2 006	853	596	710	▼65%	818	▼59%
*** INMET MINING CORPORATION**	OTH	0.18	0.16	0.16	0.064	▼64%	0.089	▼50%
IRVING PULP & PAPER, LTD.	OTH	71	71	73	76	▲7%	55	▼22%
*** IVACO ROLLING MILLS LIMITED PARTNERSHIP**	OTH	27	12	5.8	5.8	▼78%	5.8	▼78%
KIMBERLY-CLARK CORPORATION								
* Kimberly-Clark Nova Scotia	A-1	$1.0x10^{-5}$	$5.2x10^{-7}$	nd	nd	▼100%	nd	▼100%
	OTH	794	281	116	60	▼92%	47	▼94%
Terrace Bay Pulp	A-1	$5.1x10^{-6}$	$3.1x10^{-6}$	nd	nd	▼100%	nd	▼100%
	OTH	71	71	57	32	▼54%	32	▼54%
KODAK CANADA INC.	OTH	0.30	0.25	0.29	0.22	▼27%	0.15	▼50%
*** KRONOS CANADA, INC.**	OTH	4.9	1.9	0.90	0.20	▼96%	1.1	▼78%
KRUGER INC.								
* Corner Brook Pulp & Paper Ltd.	OTH	4.5	4.5	nd	nd	▼100%	nd	▼100%
* Kruger Inc. & Kruger PTR Inc.	OTH	0.089	0.089	nd	nd	▼100%	nd	▼100%
* Kruger Inc. & Kruger Urban Forest Products	OTH	0.014	0.014	nd	nd	▼100%	nd	▼100%
*** LUBRIZOL CANADA LIMITED**	OTH	0.42	0.023	$4.0x10^{-3}$	$1.0x10^{-3}$	▼100%	$1.0x10^{-3}$	▼100%
MACMILLAN BLOEDEL LTD.	OTH	20	20	20	20	▼0%	20	▼0%
METHANEX CORPORATION								
* Kitimat Methanol Plant	OTH	0.10	0.10	0	0	▼100%	0.10	▼0%
* Medicine Hat Methanol Plant	OTH	2.7	2.3	0.34	0.22	▼92%	0.56	▼79%
MICHELIN NORTH AMERICA (CANADA) INC.								
Bridgewater Facility	OTH	3.1	3.1	1.7	1.7	▼46%	1.3	▼59%
* Granton Facility	OTH	17	17	2.3	3.1	▼82%	3.4	▼80%
Waterville Facility	OTH	1.6	1.6	1.1	1.1	▼31%	0.67	▼58%
*** MONTELL CANADA INC.**	OTH	0.42	0.14	0	0	▼100%	0	▼100%
NACAN PRODUCTS LIMITED								
Boucherville Plant	OTH	0.070	0.058	0.065	0.054	▼23%	0.018	▼74%
*Vancouver Plant	OTH	0.022	0.018	$6.4x10^{-3}$	$6.0x10^{-3}$	▼73%	$5.0x10^{-3}$	▼77%
*** NALCO CANADA INC.**	OTH	1.8	1.5	0.31	0.37	▼80%	0.20	▼89%
*** NALCO/EXXON ENERGY CHEMICALS CANADA INC.**	OTH	$1.4x10^{-4}$	$1.4x10^{-4}$	$9.0x10^{-6}$	$7.0x10^{-6}$	▼95%	$9.0x10^{-6}$	▼94%
NATURAL RESOURCES CANADA	A-1	$1.1x10^{-3}$	$1.1x10^{-3}$	$1.1x10^{-3}$	$1.1x10^{-3}$	▼1%	$1.1x10^{-3}$	▼1%
	OTH	1.5	1.5	1.4	1.4	▼3%	1.3	▼15%
*** NESTE RESINS CANADA**	OTH	111	17	14	14	▼88%	17	▼85%

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Appendix 2 EMISSIONS BY FACILITY

ARET Accelerated Reduction/Elimination of Toxics

COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
NEXFOR INC.								
Edmunston Sulphite Pulp	OTH	14	14	10	10	▼29%	3.2	▼77%
* La Sarre Oriented Strandboard	OTH	27	27	11	13	▼53%	21	▼22%
* Masson Newsprint	OTH	25	25	nd	nd	▼100%	2.53	▼90%
Prince George Kraft Pulp	OTH	94	88	66	50	▼47%	63	▼33%
* Thurso Kraft Pulp	OTH	8.9	8.9	0.10	nd	▼100%	0.90	▼90%
* Val d'Or Oriented Strandboard	OTH	91	99	46	30	▼67%	46	▼50%
NORAMPAC INC.								
Red Rock Mill	A-1	0.097	0.097	0.057	0.057	▼41%	0.057	▼41%
	OTH	98	85	47	47	▼53%	47	▼53%
Trenton Mill	OTH	20	20	19	19	▼7%	27	▲33%
NORANDA INC.								
* Brunswick Mining Division	OTH	51	29	17	15	▼71%	21	▼59%
* Brunswick Smelting Division	OTH	75	33	20	25	▼67%	19	▼74%
* Canadian Electrolytic Zinc	OTH	184	153	106	94	▼49%	35	▼81%
* CCR Refinery	OTH	31	6.8	6.0	7.3	▼76%	3.6	▼88%
* CLOSED Sites: Boss, Bell, Mattabi, Brenda, Geco, Belledune Fert.	OTH	23	13	0.54	3.3	▼86%	4.5	▼80%
* Gaspé Mines	OTH	259	54	23	35	▼87%	27	▼90%
* General Smelting of Canada	OTH	3.8×10^{-3}	na	8.8×10^{-3}	0	▼100%	0.10	▲2614%
* Heath Steele Division	OTH	47	16	7.1	6.3	▼87%	6.2	▼87%
* Horne Smelter	OTH	1 591	492	485	376	▼76%	547	▼66%
* Matagami Division	OTH	10	2.6	2.9	0.80	▼92%	3.0	▼71%
NOVA CHEMICALS LTD.								
Corunna Site	OTH	99	99	65	52	▼48%	32	▼68%
* Joffre Manufacturing Site	OTH	37	31	21	15	▼59%	9.9	▼73%
* Saint Clair River Site	OTH	6.4	6.4	0	0	▼100%	0	▼100%
* Sarnia Site	OTH	267	231	28	35	▼87%	25	▼91%
NOVA SCOTIA POWER, INC.	A-1	4.4×10^{-3}	4.4×10^{-3}	4.4×10^{-3}	4.4×10^{-3}	▼0%	3.1×10^{-3}	▼30%
	OTH	5.0	5.0	5.0	5.0	▼0%	3.4	▼33%
NOVOPHARM LIMITED								
Plant 101 (Toronto)	OTH	418	409	313	274	▼34%	50	▼88%
Plant 102 (Toronto)	OTH	0.016	0.016	0.099	0.057	▲262%	0.083	▲425%
Plant 106 (Markham)	OTH	73	97	227	169	▲131%	75	▲3%
* Plant 107 (Markham)	OTH	21	10	0	0	▼100%	0	▼100%
* Plant 112 (Toronto)	OTH	14	7.9	0	0	▼100%	0	▼100%
Plant 118 (Stouffville)	OTH	0	0	0	0.035	na	0.50	na
ONTARIO POWER GENERATION INC.								
	OTH	99	83	42	39	▼61%	38	▼62%
OXYCHEM DUREZ CANADA	OTH	2.1	1.7	3.7	3.8	▲78%	0.19	▼91%
PACIFICA PAPERS	A-1	0.035	0.012	0.012	0.012	▼66%	0.012	▼66%
	OTH	268	90	90	90	▼66%	90	▼66%
PERKINS PAPERS LTD.	A-1	1.9×10^{-9}	1.9×10^{-9}	1.9×10^{-9}	1.9×10^{-9}	▼0%	1.9×10^{-9}	▼0%
	OTH	0.38	0.38	0.38	0.38	▼0%	0.38	▼0%
PETRO-CANADA	OTH	125	125	75	67	▼46%	61	▼51%
PÉTROMONT INC.								
* East Montréal Site	OTH	84	84	no	no	▼100%	no	▼100%
Varennes Site	OTH	57	57	34	37	▼34%	29	▼49%
*** PLACER DOME (CLA) LIMITED**	OTH	142	13	3.7	3.5	▼98%	10	▼93%
*** PLASTMO LTD.**	OTH	0.10	0.10	0.030	0	▼100%	0	▼100%
*** PPG CANADA INC.**	OTH	0.013	3.3×10^{-3}	5.3×10^{-4}	9.0×10^{-4}	▼93%	nd	▼100%
*** RECOCHEM INC.**	OTH	26	25	8.0	8.0	▼69%	5.0	▼81%
REPAP NEW BRUNSWICK INC.	A-1	2.5×10^{-5}	nd	6.5×10^{-8}	2.3×10^{-7}	▼99%	nd	▼100%
	OTH	1 438	90	106	104	▼93%	104	▼93%
RHODIA CANADA INC.								
Mississauga Plant	OTH	36	5.9	1.7	1.6	▼96%	0.27	▼99%
*St. Catharines Plant	OTH	1.0×10^{-3}	na	0	0	▼100%	0	▼100%
* Valleyfield Plant	OTH	6.5	6.5	0	0	▼100%	0	▼100%

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COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
RIO ALGOM LIMITED	OTH	16	15	15	8.4	▼46%	15	▼2%
*** ROHM AND HAAS CANADA INC.**	OTH	0.77	0.73	0.060	0.050	▼93%	0.060	▼92%
*** SAFETY-KLEEN CANADA INC.**	OTH	0.91	0.91	0.049	0.049	▼95%	0.36	▼60%
*** SASKATOON CHEMICALS LTD.**	OTH	$1.6x10^{-4}$	$1.6x10^{-4}$	$2.0x10^{-5}$	$2.0x10^{-5}$	▼88%	0	▼100%
SHELL CANADA LIMITED	OTH	814	465	259	180	▼78%	194	▼76%
SHELL CHEMICALS CANADA LIMITED	OTH	36	32	33	24	▼34%	20	▼44%
SHERRITT INTERNATIONAL CORPORATION	OTH	2.1	2.1	0.20	0.20	▼90%	0.20	▼90%
*** SHRADER CANADA LTD.**	OTH	0.39	0.39	0.13	0.13	▼67%	0.20	▼49%
*** SKEENA CELLULOSE INC.**	OTH	800	1.0	1.0	1.0	▼100%	1.0	▼100%
*** SLATER STEELS INC.**	OTH	74	8.6	8.4	9.3	▼88%	2.6	▼96%
*** SOLUTIA CANADA INC.** (formerly Monsanto)								
	A-1	$4.0x10^{-3}$	0	0	0	▼100%	0	▼100%
	OTH	300	57	24	3.3	▼99%	3.0	▼99%
*** SPEXEL INC.**	A-1	$2.0x10^{-4}$	$2.0x10^{-4}$	0	0	▼100%	$2.0x10^{-4}$	▼0%
	OTH	24	1.8	$2.3x10^{-4}$	$3.0x10^{-4}$	▼100%	$7.8x10^{-4}$	▼100%
SPRUCE FALLS INC.	A-1	$3.5x10^{-3}$	na	$5.6x10^{-3}$	$4.7x10^{-3}$	▲34%	nd	▼100%
	OTH	0.41	na	0.38	0.38	▼8%	0.38	▼7%
*** ST. ANNE NACKAWIC PULP COMPANY LTD.**	OTH	702	702	346	148	▼79%	118	▼83%
ST. LAURENT PAPERBOARD INC.								
* La Tuque Plant	A-1	1.3	1.2	0.27	0.043	▼97%	0.043	▼97%
	OTH	300	300	91	83	▼72%	69	▼77%
Matane Plant	OTH	21	21	16	11	▼47%	11	▼47%
* Thunder Bay Packaging Mill	OTH	1.5	1.5	0.11	0.091	▼94%	0.091	▼94%
STELCO INC.								
AltaSteel Ltd.	OTH	3.8	3.8	13	7.0	▲86%	6.3	▲67%
* CHT Steel Company Inc.	OTH	$1.1x10^{-3}$	$1.1x10^{-3}$	$1.0x10^{-5}$	0	▼100%	0	▼100%
Frost Wire Products Ltd.	OTH	0.22	0.22	0.23	0.23	▲3%	0.16	▼28%
Hilton Works	A-1	45	45	33	9.4	▼79%	22	▼50%
	OTH	857	857	830	985	▲15%	424	▼51%
Lake Erie Steel Company Ltd.	A-1	16	16	14	4.9	▼69%	8.6	▼45%
	OTH	935	935	667	901	▼4%	649	▼31%
Stelco McMaster Ltd.	OTH	7.3	7.3	17	17	▲129%	8.01	▲10%
* Stelfil Ltd.	OTH	2.6	2.6	0.29	0.32	▼88%	0.38	▼85%
Stelpipe Ltd.	OTH	0.82	0.58	0.55	28	▲3284%	28	▲3328%
Stelwire Ltd., Burlington Works	OTH	0.14	0.14	0.047	0.063	▼56%	0.029	▼80%
Stelwire Ltd., Parkdale Works	OTH	5.4	0.70	0.83	0.91	▼83%	0.91	▼83%
Welland Pipe Ltd.	OTH	0.068	0.068	0.24	0.29	▲320%	0.22	▲222%
*** STEPAN CANADA INC.**	OTH	0.79	0.79	0.12	0.12	▼85%	0.12	▼85%
*** STERLING PULP CHEMICALS, LTD.**	OTH	2.2	2.2	0.050	$9.0x10^{-3}$	▼100%	0.18	▼92%
*** STORAENSO NORTH AMERICA**	OTH	231	221	190	32	▼86%	0	▼100%
*** STRATHCONA PAPER COMPANY**	OTH	$7.7x10^{-3}$	$7.7x10^{-3}$	nd	$9.0x10^{-5}$	▼99%	$1.0x10^{-4}$	▼99%
*** SUNCOR-SUNOCO GROUP**	OTH	49	49	18	17	▼65%	23	▼53%
*** SUZORITE MICA PRODUCTS INC.**	OTH	60	60	33	15	▼75%	15	▼75%
*** SYDNEY STEEL CORPORATION**	OTH	1.3	1.3	0.27	0.55	▼57%	0.64	▼50%
SYNCRUDE CANADA LTD.	OTH	1 048	352	239	267	▼75%	253	▼76%
SYNERGISTICS	OTH	0.75	0.75	0.75	0.75	▼0%	0.75	▼0%
TEMBEC INC.	OTH	16	16	11	9.1	▼44%	nd	▼100%
*** THE COBALT REFINERY COMPANY**	OTH	15	15	1.9	1.9	▼87%	4.0	▼72%
TRANSALTA UTILITIES CORPORATION								
	A-1	0.015	0.015	0.015	0.015	▼0%	0.015	▼0%
	OTH	2.4	2.4	2.1	2.1	▼14%	2.2	▼8%
*** ULTRAMAR LTD.**	OTH	33	33	14	14	▼59%	12	▼65%
*** UNION CARBIDE CANADA INC.**	OTH	20	11	5.4	4.6	▼77%	5.2	▼74%
UNIROYAL CHEMICAL LTD.	OTH	1.5	1.5	1.4	1.0	▼34%	0.73	▼52%
VFT INC.	A-1	1.7	1.3	0.71	0.71	▼58%	0.33	▼81%
	OTH	16	15	6.6	9.8	▼41%	4.3	▼74%

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Appendix 2 EMISSIONS BY FACILITY

ARET Accelerated Reduction/Elimination of Toxics

COMPANY/Facility	Category	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
VITAFOAM PRODUCTS CANADA LTD.								
	OTH	294	250	286	286	▼3%	138	▼53%
***WELDWOOD OF CANADA LIMITED**	A-1	0.15	$3.8x10^{-3}$	$3.9x10^{-3}$	$3.8x10^{-3}$	▼98%	$3.9x10^{-3}$	▼97%
	OTH	234	70	35	52	▼78%	27	▼89%
WEYERHAEUSER CANADA LTD.								
* Grande Prairie Operation	A-1	2.8x10-6	$4.4x10^{-7}$	$1.3x10^{-7}$	$2.8x10^{-8}$	▼99%	$8.0x10^{-8}$	▼97%
	OTH	21	15	4.5	5.0	▼76%	4.0	▼81%
* Kamloops Pulp Mill	A-1	$2.0x10^{-5}$	4.5x10-6	$4.4x10^{-7}$	nd	▼100%	nd	▼100%
	OTH	313	102	52	37	▼88%	45	▼86%
* Prince Albert Pulp & Paper	A-1	$5.2x10^{-5}$	$2.8x10^{-7}$	$1.7x10^{-7}$	$1.0x10^{-7}$	▼100%	$4.0x10^{-7}$	▼99%
	OTH	3 580	3 982	1 388	1 049	▼71%	326	▼91%
WITCO CANADA INC.								
* Upton Road Plant	OTH	$7.2x10^{-3}$	$7.2x10^{-3}$	0	0	▼100%	0	▼100%
*West Hill Plant	OTH	$5.1x10^{-3}$	$5.1x10^{-3}$	0	0	▼100%	0	▼100%
***WYETH-AYERST CANADA INC.**	OTH	45	45	19	19	▼59%	5.0	▼89%
***ZEP MANUFACTURING OF CANADA**								
	OTH	$2.0x10^{-3}$	$2.0x10^{-3}$	0	0	▼100%	0	▼100%

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Appendix 3 EMISSIONS BY SUBSTANCE

ARET Accelerated Reduction/Elimination of Toxics

SUBSTANCE	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
LIST A-1 SUBSTANCES							
PAHs A-1 (not speciated)	905	411	425	437	▼52%	244	▼73%
Fluoranthene	66	65	23	14	▼80%	17	▼74%
Phenanthrene	28	26	20	17	▼41%	16	▼44%
Pyrene	22	21	18	11	▼50%	14	▼39%
Chrysene	21	21	8.2	4.8	▼77%	6.0	▼72%
Benz(a)anthracene	15	14	4.1	3.7	▼75%	3.3	▼78%
Benzo(a)pyrene	10	10	6.2	3.7	▼65%	3.9	▼63%
Benzo(k)fluoranthene	6.5	6.4	5.8	2.4	▼62%	3.2	▼50%
Dibenz(a,h)anthracene	6.2	6.1	1.2	1.0	▼85%	1.3	▼78%
Indeno(1,2,3-c,d)pyrene	6.0	5.8	1.6	1.5	▼75%	1.3	▼78%
Benzo(e)pyrene	5.9	5.7	5.8	3.3	▼44%	3.1	▼47%
Benzo(g,h,i)perylene	4.5	4.3	3.6	1.9	▼58%	2.6	▼41%
Dibenzo(a,i)pyrene	1.5	1.3	1.0	1.2	▼20%	0.88	▼40%
Benzo(b)fluoranthene	1.3	1.1	2.1	1.8	▲33%	0.76	▼43%
Perylene	0.68	0.58	0.47	0.55	▼20%	0.41	▼40%
* Pentachlorophenol	0.57	0.053	3.9×10^{-3}	3.8×10^{-3}	▼99%	3.9×10^{-3}	▼99%
Benzo(j)fluoranthene	0.41	0.34	0.28	0.32	▼22%	0.24	▼42%
* Hexachlorobenzene	0.069	0.067	8.7×10^{-7}	0	▼100%	0	▼100%
Dibenz(a,j)acridine	0.040	0.040	0.080	0.050	▲25%	4.0×10^{-3}	▼90%
7H-dibenzo(c,g)carbazole	0.040	0.040	nd	nd	na	4.0×10^{-3}	▼90%
* 2,3,7,8-tetrachlorodibenzofuran	9.0×10^{-4}	2.5×10^{-5}	7.1×10^{-6}	5.3×10^{-6}	▼99%	6.1×10^{-6}	▼99%
* Octachlorostyrene	7.0×10^{-4}	0	0	0	▼100%	0	▼100%
* 2,3,7,8-TCDF/TCDD	1.9×10^{-4}	3.5×10^{-7}	3.5×10^{-7}	3.5×10^{-7}	▼100%	3.5×10^{-7}	▼100%
* 2,3,7,8-tetrachlorodibenzo-p-dioxin	1.5×10^{-4}	3.2×10^{-6}	5.5×10^{-7}	7.2×10^{-7}	▼100%	3.2×10^{-7}	▼100%
* PCBs	3.8×10^{-5}	0	0	0	▼100%	0	▼100%
TOTAL EMISSIONS A-1	**1 102**	**600**	**526**	**504**	**▼54%**	**318**	**▼71%**
LIST A-2 SUBSTANCES							
* Cadmium (and inorganic compounds)	126	90	48	40	▼68%	17	▼87%
* 1,4-dichlorobenzene	28	26	8.3	8.2	▼70%	5.2	▼81%
TOTAL EMISSIONS A-2	**154**	**116**	**56**	**49**	**▼68%**	**22**	**▼86%**

na - not available, nd - non-detectable

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*For substances indicated in green, the ARET short-term target has already been met or exceeded.

Appendix 3 EMISSIONS BY SUBSTANCE

aRET Accelerated Reduction/Elimination of Toxics

SUBSTANCE	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
LIST B-1 SUBSTANCES							
bis(2-ethylhexyl)phthalate	21	1.5	12	12	▼41%	1.2	▼94%
* Anthracene	16	14	10	5.5	▼65%	6.3	▼60%
* Tetraethyl lead	15	8.7	0.56	0.10	▼99%	0.31	▼98%
* 2,4,6-trichlorophenol	5.0	0.97	0.042	$6.8x10^{-3}$	▼100%	$4.1x10^{-3}$	▼100%
Dimethylnaphthalene	2.7	2.5	2.6	2.1	▼22%	2.1	▼21%
* PAHs B-1 (not speciated)	1.8	1.7	0.53	0.19	▼90%	0.14	▼92%
Hexachlorocyclopentadiene	$6.0x10^{-3}$	$6.0x10^{-3}$	$6.0x10^{-3}$	$6.0x10^{-3}$	▼0%	$6.0x10^{-3}$	▼0%
TOTAL EMISSIONS B-1	**61**	**30**	**26**	**20**	**▼67%**	**10.1**	**▼83%**
LIST B-2 SUBSTANCES							
* Zinc (inorganic, inhalable or soluble)	3 321	1 613	985	719	▼78%	655	▼80%
* Lead (all forms except alkyl)	1 896	1 139	647	574	▼70%	516	▼73%
* Nickel (inorganic, inhalable or soluble)	1 418	579	374	363	▼74%	581	▼59%
* Copper (inorganic salts)	1 105	789	498	504	▼54%	494	▼55%
Methylene chloride	1 088	1 058	1 055	937	▼14%	372	▼66%
* Chloroform	752	416	176	157	▼79%	80	▼89%
* Arsenic (inorganic)	342	119	165	173	▼50%	83	▼76%
* 1,1,2,2-tetrachloroethylene	266	178	7.9	4.7	▼98%	8.2	▼97%
* Cyanides	242	157	121	37	▼85%	48	▼80%
* Ethylene oxide	145	104	19	17	▼88%	13	▼91%
* Carbon tetrachloride	81	39	0.39	0.78	▼99%	0.68	▼99%
* 1,2-dichloroethane	70	20	20	27	▼62%	23	▼67%
* 1,4-dioxane	34	24	4.0	3.0	▼91%	1.8	▼95%
* Mercury (elemental and inorganic)	29	11	3.2	3.5	▼88%	3.9	▼87%
* Chromium (Cr6+)	26	24	10	7.9	▼70%	5.3	▼80%
Cobalt (inorganic or soluble)	13	11	11	10	▼21%	11	▼11%
* Benzo(b)fluorene	2.9	2.9	2.6	1.2	▼60%	1.9	▼34%
* Benzo(a)fluorene	2.6	2.6	2.3	0.95	▼63%	1.7	▼34%
Silver (soluble inorganic or ionic)	1.8	0.76	1.1	1.5	▼13%	0.64	▼64%
* 2,3,4,6-tetrachlorophenol	0.43	0.14	$3.9x10^{-3}$	$3.8x10^{-3}$	▼99%	0.038	▼91%
Chlorodibromomethane	0.30	0.30	0.30	0.30	▼1%	0.30	▼1%
* 4,6-dinitro-o-cresol	0.29	0.28	0	0	▼100%	0	▼100%
Uranium (inorganic, inhalable or soluble)	0.14	0.14	0.14	0.14	▲0%	0.14	▼0%
* Beryllium	0.13	0.094	0.066	0.063	▼51%	0.061	▼52%
* Bromodichloromethane	0.12	0.077	0.034	0.042	▼65%	0.012	▼90%
Dibenz(a,h)acridine	0.030	0.030	0.030	0.020	▼33%	0.030	▼0%
* alpha-chlorotoluene	0.020	0.020	0.010	$8.0x10^{-3}$	▼60%	0.010	▼50%
* PAHs B-2 (not speciated)	0.020	0.014	$7.9x10^{-3}$	$7.9x10^{-3}$	▼60%	$3.8x10^{-3}$	▼81%
bis(2-chloroethyl)ether	0.016	0	$8.0x10^{-3}$	0.011	▼31%	0.010	▼38%
* Thiourea	$1.0x10^{-3}$	$1.0x10^{-3}$	0	0	▼100%	0	▼100%
TOTAL EMISSIONS B-2	**10 836**	**6 290**	**4 104**	**3 543**	**▼67%**	**2 901**	**▼73%**

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*For substances indicated in green, the ARET short-term target has already been met or exceeded.

SUBSTANCE	Base Year Emissions (tonnes)	1993 Emissions (tonnes)	1997 Emissions (tonnes)	1998 Emissions (tonnes)	1998 Reductions From Base	2000 Projected Emissions (tonnes)	2000 Reductions From Base
LIST B-3 SUBSTANCES							
* Hydrogen sulphide	17 152	12 058	5 897	5 639	▼67%	3 990	▼77%
* Benzene	3 830	2 880	1 541	1 374	▼64%	948	▼75%
* Formaldehyde	2 068	1 766	592	506	▼76%	669	▼68%
* Chlorine dioxide	2 040	1 661	832	616	▼70%	426	▼79%
* Ethanol	570	301	231	132	▼77%	104	▼82%
* Acetaldehyde	428	244	213	183	▼57%	110	▼74%
* 1,3-butadiene	367	316	113	106	▼71%	91	▼75%
* Phenol	313	251	163	150	▼52%	175	▼44%
Methyl isobutyl ketone	282	263	143	152	▼46%	157	▼44%
* 1,1,2-trichloroethylene	126	45	25	22	▼83%	26	▼79%
* Acrylonitrile	24	22	7.4	6.2	▼75%	7.0	▼71%
Acrolein	14	9.1	22	22	▲58%	17	▲25%
* Hydrazine	5.9	5.9	3.7	2.8	▼54%	2.1	▼65%
* Acrylamide	1.7	1.7	0.29	0.23	▼87%	0.24	▼86%
* Quinoline	1.6	1.3	0.94	0.20	▼87%	0.95	▼39%
* 2,4-dinitrotoluene	1.5	$1.0x10^{-3}$	$1.0x10^{-3}$	$1.0x10^{-3}$	▼100%	$1.0x10^{-3}$	▼100%
* 2,4-dichlorophenol	1.4	1.0	0.021	0.012	▼99%	$9.0x10^{-3}$	▼99%
* Ethylene dibromide	1.4	1.3	$6.0x10^{-3}$	$6.0x10^{-3}$	▼100%	0.010	▼99%
* Aniline	1.1	$6.1x10^{-3}$	0.012	0.032	▼97%	0.038	▼97%
* 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	$6.1x10^{-3}$	$2.8x10^{-3}$	$2.8x10^{-3}$	▼94%	$8.7x10^{-5}$	▼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	$6.0x10^{-3}$	$6.0x10^{-3}$	$4.0x10^{-3}$	$6.0x10^{-3}$	▼0%	$4.0x10^{-3}$	▼33%
Vinyl bromide	$1.0x10^{-3}$	$1.0x10^{-3}$	$1.0x10^{-3}$	$1.0x10^{-3}$	▼0%	$1.0x10^{-3}$	▼0%
Acetamide	$1.0x10^{-3}$	$1.0x10^{-3}$	$1.0x10^{-3}$	$1.0x10^{-3}$	▼0%	$1.0x10^{-3}$	▼0%
2,6-dimethylphenol	$6.4x10^{-5}$	na	na	$6.4x10^{-5}$	▼0%	0	▼100%
Ethylene thiourea	0	0	0	0	na	0	na
Tetramethylthiuram disulphide	0	0	$1.8x10^{-3}$	$1.8x10^{-3}$	na	$1.8x10^{-3}$	na
TOTAL EMISSIONS B-3	**27 231**	**19 828**	**9 784**	**8 911**	**▼67%**	**6 724**	**▼75%**

na - not available
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Holloway Mine, ON
Silidor Mine (CLOSED), Rouyn-Noranda, QC

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Premier Gold Operation, Stewart, BC

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Doyon Mine, Doyon, QC
Géant Dormant Mine, Val d'Or, QC
Gonzague-Langlois Mine, Val d'Or, QC
Mouska Mine, Val d'Or, QC
Yvan Vézina Plant, Destor, QC

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Lupin Operation, NT

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Highland Valley Copper, Logan Lake, BC

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Flin Flon Smelter Complex, MB

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INMET Mining Corporation
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Winston Lake Mine, Schreiber, ON

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Brunswick Smelting Division, Belledune, NB
Canadian Electrolytic Zinc, Valleyfield, QC
CCR Refinery, Montréal East, QC
CLOSED Sites: Boss, Bell, Mattabi, Brenda, Geco, Belledune Fert.
Gaspé Mines, Murdochville, QC
General Smelting of Canada, Lachine, QC
Heath Steele Division, Miramichi, NB
Horne Smelter, Rouyn-Noranda, QC
Matagami Division, QC

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Rio Kemptville Tin, Yarmouth, NS
Poirier Mines, QC

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Corefco Refinery, Fort Saskatchewan, AB

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Manufacturing and Oil Production and Refining Operations

Petro-Canada
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Downstream Petroleum Operations

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Petroleum Operations

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Ultramar Ltd.
Pierre Pelletier (Directeur, Affaires environnementales)
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St.-Romuald Refinery, QC

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Vancouver Facility, BC

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Foam Manufacturing Operation, Mississauga, ON

Flying Colours Corp.
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Aircraft Refurbishing Operation, Peterborough, ON

Gates Canada Limited
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Hose Processing Plant, Brantford, ON

General Electric Canada Inc.
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GE Industrial Control Systems, Peterborough, ON
GE Lighting, Oakville, ON
GE Meters, Québec, QC
GE Plastics Canada, Cobourg, ON
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Bromont Technology Plant, QC

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ICI Explosives, Brownsburg, QC
ICI Forest Products (CLOSED), Cornwall, ON

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Granton Facility, New Glasgow, NS
Waterville Facility, Kentville, NS

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Plant 101, Toronto, ON
Plant 102, Toronto, ON
Plant 106, Markham, ON
Plant 107, Markham, ON
Plant 112, Toronto, ON
Plant 118, Stouffville, ON

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Brampton, ON

Procter & Gamble Inc.
Kevin Mahoney (Regulatory Affairs Manager)
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Rauscher Plating Limited
Gary Rauscher (President)
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Saint John Shipbuilding Limited
Alan Phillips (Manager, Health & Safety)
Tel: (506) 633-4444 Fax: (506) 632-5915
Saint John, NB

Suzorite Mica Products Inc.
Joseph Antonacci (Technical Director)
Tel: (450) 655-2450 Fax: (450) 655-9942
Mica Production Facility, Boucherville, QC

Theratronics International Limited
Donna Rickard (OHN and Safety Officer)
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Appendix 4 LIST OF ARET PARTICIPANTS

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Bob Lamoureux (Materials Manager)
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Waltec Plastics (CLOSED), Midland, ON

Wyeth-Ayerst Canada Inc.
Douglas MacKenzie (Manager, HSE Compliance)
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Pharmaceutical Manufacturing Plant, St. -Laurent, QC

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Belgo Division, Shawinigan, QC
Fort Frances Division, ON
Fort William Division, Thunder Bay, ON
Iroquois Falls Division, ON
Kénogami Paper Mill, Jonquière, QC
Kenora Division, ON
La Compagnie Gaspésia Ltd., Chandler, QC
Laurentide Division, Grand-Mère, QC
Port Alfred Division, La Baie, QC
Stephenville Division, NF
Wayagamack Division, QC

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Gatineau Operations, QC
Gold River Operations, BC
Thunder Bay Operations, ON

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Cascades Cabano Papers, QC

Cascades Inc.
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Cascades Plastics, Kingsey Falls, QC
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Cascades Lupel Inc., Cap-de-la-Madeleine, QC

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Cobourg Plant, ON

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Pulp Mill Division, Skoockumchuck, BC

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Quebec Division, Québec, QC

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Désencrage Cascades, Breakeyville, QC

Désencrage CMD
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Island Paper Mills Division, New Westminster, BC
Lebel-sur-Quevillon Facility, QC
Ottawa/Hull Division, ON
St. Catharines Facility, ON
Windsor Facility, ON

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Kruger Inc. & Kruger PTR Inc., Trois-Rivières, QC
Kruger Inc. & Kruger Urban Forest Products, Bromptonville, QC

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Paper mills: Powell River and Port Alberni, BC

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Edmunston Sulphite Pulp, NB
La Sarre Oriented Strandboard, QC
Masson Newsprint, QC
Prince George Kraft Pulp, BC
Thurso Kraft Pulp, QC
Val d'Or Oriented Strandboard, QC

Norampac Inc.
Red Rock Mill, Red Rock, ON
Trenton Mill, Trenton, ON

Perkins Papers Ltd.
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Candiac Tissue Mill, Laval, QC

Repap New Brunswick Inc.
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Kraft/Paper Division, Miramichi, NB

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Napanee, ON

Tembec Inc.
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STEEL

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Steelworks & Tubular Business, Sault Ste. Marie, ON

Atlas Specialty Steels, Division of Atlas Steels Inc.
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Atlas Stainless Steels, Division of Atlas Steels Inc.
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Tracy Facility, QC

Co-Steel Lasco
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Dofasco Incorporated
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Hamilton Specialty Bar, ON

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Frost Wire Products Ltd., Hamilton, ON
Hilton Works, Hamilton, ON
Lake Erie Steel Company Ltd., Nanticoke, ON
Stelco McMaster Ltd., Contrecoeur, QC
Stelfil Ltd., Lachine, QC
Stelpipe Ltd., Welland, ON
Stelwire Ltd., Burlington Works, ON
Stelwire Ltd., Parkdale Works, Hamilton, ON
Welland Pipe Ltd., ON

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Joel MacLean (Manager, Environmental & Energy)
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Sydney Steel Mill, NS

Appendix 5 OTHER ARET PARTICIPANTS AND SUPPORTERS

The following companies and organizations submitted qualitative action plans outlining their commitments to reduce emission of ARET substances. Contact information for these companies can be found in Appendix 4.

Alberta Power Limited
British Columbia Hydro and Power Authority
Department of National Defence
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
Winnipeg Hydro

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

Agriculture and Agri-Food Canada
Air Products Canada Ltd.
Akzo Nobel Chemicals Ltd.
Albarrie Canada Ltd.
Albright & Wilson Americas
Alcatel Cable
Allied Signal Canada Inc.
Alpha/Owens Corning Canada
Aluminerie Alouette Inc.
Aluminerie de Bécancour Inc.
Aluminerie Lauralco Inc., A Division of Alumax
Amway of Canada, Ltd.
Armstrong Manufacturing Company
Aromatics & Flavours Inc.
ASL Analytical Service Laboratories Ltd.
A.S. Paterson Company Limited
Azco Industries Ltd.
* Bennett Fleet (Chambly) Inc.
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-Plasticharge International Inc.
Cascades Joliette Inc.
Cascades Jonquière Inc.
Cascades Sealed Air Inc.
CCH Canadian Limited
CCL Custom Manufacturing, Islington Plant
CCL Custom Manufacturing, Rexdale Plant
CDM Laminates Inc.
Chemprox Chemicals Inc.
* Chetwynd Pulp Company
Church & Dwight Ltd./Ltée
Churchill Falls (Labrador) Corporation Limited
City of Calgary Electric System
Consolidated Bottle Co.
Consumers Gas
Cryovac Division, W.R. Grace & Co. of Canada Ltd.
Degussa Catalyst Ltd.
Denison Mines Limited
Diavik Diamond Mines (formerly Kennecott)
Diversey Lever Inc.
* Donohue Forest Products Inc. (Amos, Baie-Comeau, Clermont, Thorold)
* Donohue Malbaie Inc.
* Donohue Matane 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
* Glassine Canada
Golden Knight Resources
Greif Containers Inc.
Haarmann & Reimer
Health Canada
Helmitin Canada Inc.
Henkel Canada Limited
Hillsborough Resources Limited
Home Hardware Paint & Chemical Division
Huls Canada Inc.
Huntsman Chemical Company of Canada Inc.
Industry Canada
Iron Ore Company of 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.
Laidlaw Environmental Services Ltd.
* Lake Utopia Paper
Lawson Products Inc.
Lever Industrial
Lever Ponds, A Division of U L Canada Inc.
Louisiana Pacific Canada Ltd.
LPM Technologies Inc.
* MacMillan Bloedel - Sturgeon Falls Mill
Manta Industries Limited
Marsulex Inc.
Mazarin Mining Corporation / AlumiCa inc.
MDS Nordion Inc.
Millar Western Forest Products - Whitecourt Pulp
* Minas Basin Pulp & Power Co. Ltd.
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.
* Ontario Hydro Service Company
Outokumpu Mines Ltd.
Petresa Canada Inc.
Pioneer Chemicals Canada Inc.
Potacan Mining Company
Precision Valve Canada Ltd.
Prospec Chemicals
QIT/Fer et titane Inc.
Quebec Cartier Mining Company
Raisio Chemicals Canada Inc. (formerly Diachem)
Raylo Chemicals, A Laporte Organics Company
Reichhold Limited, Port Moody
Reichhold Limited, Weston
Reynolds Metals Ltd.
Rochester Midland Limited
RohMax Canada Co.
Scholle Canada Ltd.
Serrener Group Inc.
Sika Canada Inc.
* Slave Lake Pulp
* SmithKline Beecham Pharma Inc.
* Sonoco Ltd.
St-Jean Photochemicals Inc.
Stablex Canada Inc.
Sulzer Canada Inc.
Teck Corporation
The Power Commission of the City of Saint John
The Sherwin-Williams Company
The Yukon Electrical Company Limited
Toronto Hydro
Trojan Technologies Inc.
* Uniforêt Scierie-Pâte Inc., Pulp Division
Wajax Fluid Power (formerly Hydracine Fluid Power)
Water and Earth Science Associates Ltd.
* Weldwood Canada - HI-ATHA Sawmill Division
Win Chemicals Limited
WMC International Limited - Americas Division

The following companies submitted ARET action plans in the past, but were unable to supply 1998 emission data in time for inclusion in this report. For these companies, it has been assumed that 1998 emissions remained constant at the previous reporting year's level for the purposes of calculation. These companies together represent 6% of the total emissions reported to ARET in 1997.

Domtar
Gerdau Courtice Steel
Hydro Québec
Vitafoam
Wyeth-Ayerst

The following companies have committed to submitting ARET action plans in the future.

Air Canada
Duo-Fast Industries
Foamex
Valle Foam

* New companies are highlighted in green.

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