Environment Canada Environnement Canada

ANNUAL REPORT ON THE FEDERAL-PROVINCIAL AGREEMENTS FOR THE EASTERN CANADA ACID RAIN PROGRAM

1994

Canada

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Introduction

This report marks a milestone year. It evaluates the progress made by the seven easternmost provinces to meet the 1994 targets in the Eastern Canada Acid Rain Control Program to cap sulphur dioxide (SO_2) emissions.

The Eastern Canada Acid Rain Control Program was initiated in 1985 and subsequently formalized in seven federal-provincial agreements. These agreements set out specific SO_2 emission reduction targets and timetables for each of the provinces. The provinces also agreed to participate in acid rain effects research, monitor ecosystems, and report on progress. For its part, the federal government undertook to seek reductions in transboundary flows of SO_2 from the United States, conduct a wide array of research activities, monitor and model deposition, support research and development projects for SO_2 reduction technologies, and control emissions from federal facilities.

The objective of the program was to limit the wet sulphate deposition to no more than 20 kilograms per hectare per year (kg/ha/yr) in the eastern provinces. This deposition rate was defined as the acceptable level for protection of moderately sensitive aquatic systems. As a first step toward achieving this target, SO_2 emissions in eastern Canada were capped at 2,300 kilotonnes by the year 1994.

All the provinces successfully met their individual SO_2 targets in 1994. Collectively they emitted 1,698 kilotonnes of SO_2, considerably below the 2,300 kilotonnes cap, and a 56 percent reduction from 1980 levels. Smelters accounted for 50 percent of SO_2 emissions in eastern Canada in 1994, and fossil fuelled-power plants accounted for 20 percent. The recent emission rates are shown in Table 1 and Figure 1, while Table 2 provides emissions data for the major sources.

The federal government has substantially met all its commitments in the Eastern Canada Acid Rain Program. In 1991, it signed a bilateral Air Quality Agreement with the United States which calls for a 9 million tonnes SO_2 emission reduction in the U.S. by the year 2000. With that reduction, the 20 kg target load for Canada is expected to be met. The federal government also monitors, models, and studies the effects of acid deposition in eastern Canada, and reports these findings every two years in the Air Quality Agreement Progress Reports. In 1994, the federal government began a "greening government program" which will look at, among other things, reducing emissions from federal facilities.

TABLE: 1

TOTAL SO_2 EMISSIONS BY PROVINCES (KILOTONNES)[1]

	1980	1990	1991	1992	1993	1994	1994
	Actual						Limits[4]
MANITOBA							
Primary Metals	463	500	543	555	521	388	___
Other	21	16	16	10	10	9	___
Total	484	516	559	565	531	397	550
ONTARIO							
Primary Metals	1096	730	695	506	465	250	490
Power Generation	396	195	167	157	97	106	175
Other	272	241	233	239	247	218	___
Total	1764	1166	1095	902	809	574	885
QUEBEC							
Primary Metals	641	189	210	218	213	199	___
Other	457	202	168	182	182	178	___
Total	1098	391	378	400	395	377	500
NEW BRUNSWICK							
Primary Metals	15	6	9	12	7	7	___
Power Generation	123	141	130	149	117	90	123
Other	80	34	33	32	32	31	
Total	218	181	172	193	156	128	175
NOVA SCOTIA							
Power Generation	125	143	144	143	146	133	145
Other	68	35	33	34	37	40	___
Total	193	178	177	177	183	173	189
NEWFOUNDLAND							
Power Generation	18	21	14	18	18	8	___
Other	38	36	48	57	76	37	___
Total	56	57	62	75	94	45	45
PRINCE EDWARD ISLAND							
Total [3]	5	3	4	4	4	4	5
EASTERN CANADA TOTAL							
Primary Metals	2215	1425	1457	1291	1206	844	___
Power Generation	662	500	455	467	378	337	___
Other	941	567	535	558	588	517	___
Total[2]	3818	2492	2447	2316	2172	1698	2349 [2]

1. Data for 1990 to 1994 are taken from annual reports by the provinces on their SO_2 control programs. The emissions levels represent the best estimate available at the time of writing the report. Note that even historic year estimates may be revised as better inventory data are made available.
2. The 1994 Eastern Canada Program target is 2,300 kilotonnes. The total of provincial objectives is currently being renegotiated from 2,349 kilotonnes to 2,300 Kilotonnes. Renegotiated federal-provincial agreements are in place with Quebec, New Brunswick and Nova Scotia.
3. This value includes a component of power generation emissions.
4. The revised emission limit reflects a renegotiated federal-provincial agreement.

FIGURE 1
SO_2 EMISSIONS IN EASTERN CANADA
1976 - 1994

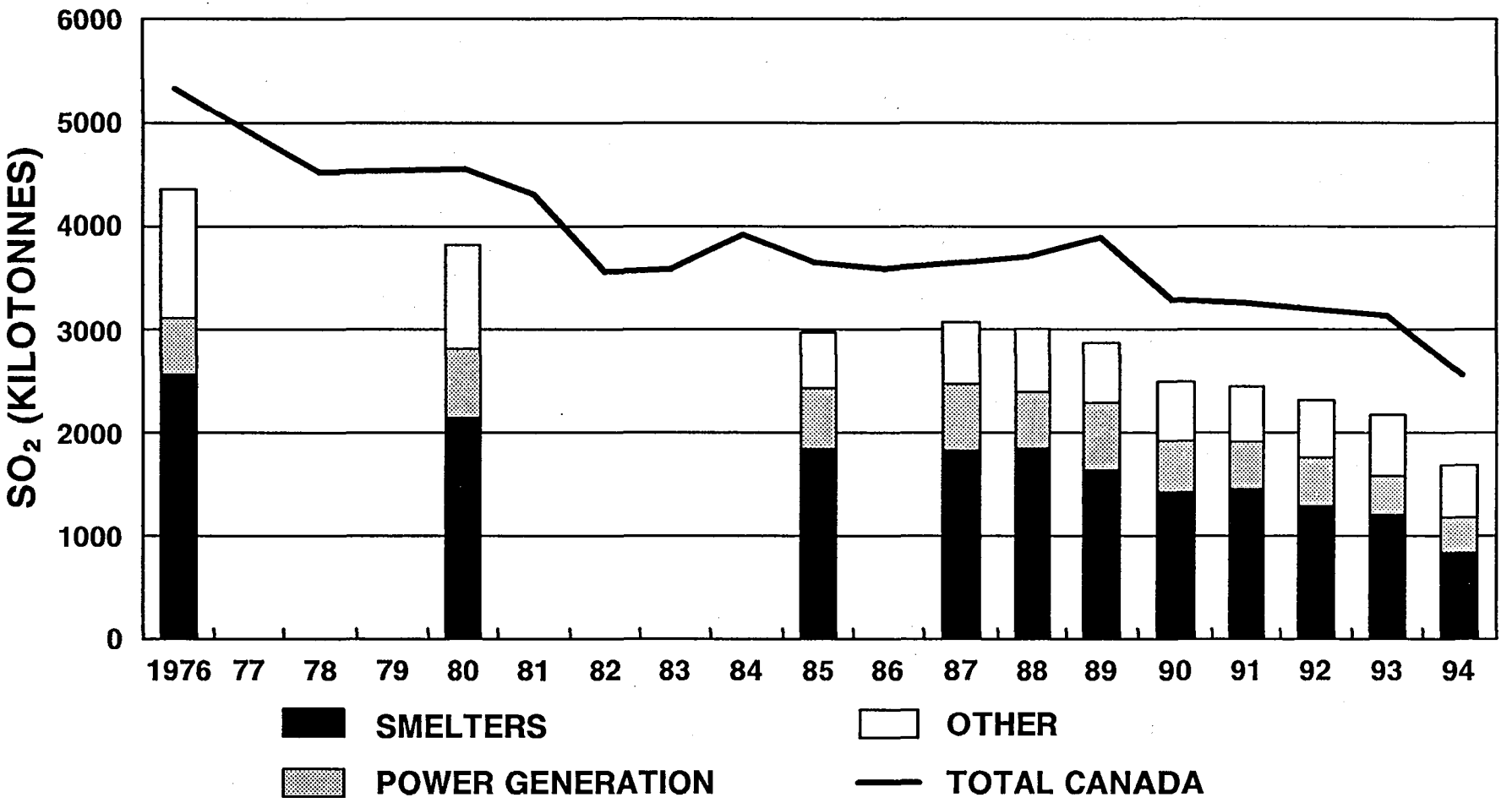

TABLE: 2

MINERAL EXTRACTION AND SMELTING: MAJOR SO_2 SOURCES (KILOTONNES)

	1980	1990	1991	1992	1993	1994	1994
	Actual						Limits
MANITOBA							
INCO (THOMPSON)	215	247	250	267	253	194	220
HBMS (FLIN FLON)	248	253	293	288	268	194	220
ONTARIO							
INCO (Copper Cliff)	812	617	572	416	358	162	265
FALCONBRIDGE (Sudbury)	123	70	70	54	57	54	100
ALGOMA (Wawa, Iron Ore)	161	43	53	36	50	34	125
QUEBEC							
NORANDA (Horne)	552	146	165	168	168	156	272
NORANDA (Murdochville)	91	43	45	50	45	43	65
NEW BRUNSWICK							
NORANDA (Belledune)	15	6	9	12	7	7	—

ELECTRIC POWER GENERATION: MAJOR SO_2 SOURCE

	1980	1990	1991	1992	1993	1994	1994
	Actual						Limits
ONTARIO HYDRO	396	195	167	157	97	106	175
NEW BRUNSWICK POWER	123	141	130	149	117	90	123
NOVA SCOTIA POWER	125	143	144	143	146	133	145

Provincial and Industrial Action

Manitoba (1994 target 550 kilotonnes)

Manitoba's SO_2 emissions were 398 kilotonnes in 1994, well below its 1994 target of 550 kilotonnes, due to process changes at two large point sources which account for about 98 percent of total provincial SO_2 emissions.

The two sources are the INCO Limited smelter at Thompson and the Hudson Bay Mining and Smelting Limited (HBM&S) smelter at Flin Flon. Manitoba regulations require that, as of January 1, 1994, each smelter not emit more than 220 kilotonnes of SO_2 annually. Both companies are also expected to conduct studies to further reduce SO_2 emissions from the levels specified after January 1, 1994.

Both companies have taken measures to ensure compliance with the regulations. INCO has been optimising its processes to reject the sulphur-bearing ore fraction (pyrrhotite rejection). The smelter relied heavily on pyrrhotite as an energy source. Consequently, this energy had to be replaced with increased use of electricity and petroleum coke additions to the furnaces, as necessary. Other options are currently being studied to assist the company in meeting the 1994 limits in the future.

HBM&S commissioned operation of its new zinc pressure leaching plant in September, 1993. The new plant uses two stages of pressure leaching to recover 98-99 percent of the zinc in concentrate form, reducing sulphur dioxide emissions by approximately 25 percent. Although some initial problems were encountered with particulate emissions, these emissions have now been reduced well below regulated limits. The copper smelter modernization continues to be on hold until further notice.

Two intermittent Manitoba Hydro Thermal Generating Stations and other miscellaneous sources accounted for the remaining 9 kilotonnes of SO_2 emissions.

Manitoba also continued to operate three daily precipitation monitoring sites in northern and eastern Manitoba. Wet sulphate deposition at these locations during 1994 ranged from 2.5 to 3.35 kg/ha/yr, well below the Eastern Canada guideline of 20 kg/ha/yr. No apparent major trend seems to be developing in these areas.

Annual SO_2 emissions are forecasted to be about 450 kilotonnes between 1995 and 2000.

Ontario (1994 limit 885 kilotonnes)

Ontario's SO_2 emissions were 574 kilotonnes in 1994, down 29 percent from 1993 levels and 35 percent below its 1994 limit. Four major corporate sources (three smelters and Ontario Hydro) accounted for 62 percent of total SO_2 emissions.

INCO Ltd.'s emissions for 1994 were 162 kilotonnes, almost 40 percent below its regulated limit of 265 kilotonnes, as a result of the $612 million SO_2 Abatement Program and a production shutdown due to softer nickel markets. The new bulk smelting technology and associated acid plant to capture SO_2 in the flue gas are working as expected, but there are still some minor technical problems to be resolved. Provincial regulations further require INCO to examine the feasibility of reducing its 265 kilotonne limit to 175 kilotonnes.

Falconbridge Ltd. emitted 54 kilotonnes of SO_2 in 1994 from its nickel/copper smelter, substantially below its 100 kilotonne limit. The company completed all planned modifications to its smelter in 1993 at a cost of $37 million, and in 1994 completed rebuilding the #2 electric furnace for another $12.6 million, which will lead to appreciable savings as a result of improved productivity and energy conservation. As a result of these and other process changes, Falconbridge is confident that it will be able to attain its voluntary SO_2 target of 75 kilotonnes at full smelter production capacity before 1998.

At 34 kilotonnes, Algoma Steel Inc.'s 1994 SO_2 emissions from the Wawa iron ore sinter plant were again well below its 1994 limit of 125 kilotonnes. The company continues to use low sulphur feed and has permanently reduced production by 50 percent to about 1.0 million tonnes of sinter per year. As a result, Algoma Steel anticipates that SO_2 emissions from the Wawa plant will level off at about 60 kilotonnes at full production capacity.

In 1994, Ontario Hydro's SO_2 emissions were up slightly from 1993 levels to 106 kilotonnes, but still considerably under its 175 kilotonne limit. In 1994, Hydro commissioned two flue gas desulphurization scrubbers at the coal-fired Lambton station at a cost of $537 million. The scrubbers are operating at about 90 percent SO_2 removal efficiency and have significantly reduced SO_2 and nitrogen oxides emissions from the power generating station. Hydro expects to remain under its 175 kilotonne limit from 1994 onwards.

Ontario continues to monitor acid rain impacts through a network of monitoring stations, consisting of 17 cumulative 28-day sampling sites throughout the province with one daily site at Dorset, near Algonquin Park, to evaluate the effectiveness of the Canadian and United States SO_2 control programs.

Spatial patterns of wet sulphate deposition in Ontario have displayed two distinct features over the period 1981-1993. Firstly, until 1985 most of south-central Ontario typically experienced 30-40 kg/ha/yr wet sulphate deposition. By 1993 however, deposition in excess of 30 kg/ha/yr was limited to an area extending about 50 km north along the shore of Lake Erie. Secondly, although wet sulphate deposition at most monitoring sites has decreased typically by 2 percent per year, the area receiving up to 20 kg/ha/yr has not noticeably changed in size, contrary to expectations. However, this pattern is expected to change once SO_2 emissions have been reduced in the United States by the year 2000.

Quebec (1994 objective 500 kilotonnes)

In 1993, Quebec signed a new federal-provincial agreement that reduced its 1994 SO_2 emissions target from 600 kilotonnes to 500 kilotonnes. It successfully met that target, with provincial SO_2 emissions of only 377 kilotonnes, more than 100 kilotonnes below its objective.

In Quebec, copper smelters account for a large percentage of total provincial SO_2 emissions. In 1994, Noranda Metallurgy's Horne smelter emitted 156 kilotonnes of SO_2, considerably below its emission cap of 272 kilotonnes. Despite the fact that SO_2 emissions from this smelter are below the regulatory limit, Noranda has announced its intention to further reduce SO_2 and particulate emissions by early in the next century. The announced reduction will be achieved through the treatment of gases exiting the converters in the existing sulphuric acid plant. The Horne smelter has implemented a technology development program aimed at rationalizing the volume of gas to be treated. The program will result in modifications to existing converters or the incorporation of several existing converters into a single conversion vessel. Noranda intends to meet its commitment to capture 90% of the sulphur used in the process beginning in the year 2002. The other copper smelter in Quebec, Noranda's Murdochville smelter, emitted 43 kilotonnes of SO_2 in 1994, unchanged from 1993.

Aluminium production is the second largest source of SO_2 emissions in Quebec. The sulphur released from the petroleum coke used in the reduction of the alumina accounts for virtually all emissions from this sector. SO_2 emissions are closely tied to the quality of the coke used and to production, which was approximately 2 million tonnes of aluminium in 1994. Annual SO_2 emissions increased by 5,000 tonnes to 43,000 tonnes in 1993, and have since remained unchanged. SO_2 emissions from all other sectors varied slightly, but the net result was insignificant by comparison with total provincial emissions.

The transportation sector accounted for approximately 30,000 tonnes of SO_2 in 1994.

Quebec is conducting a precipitation sampling program that covers the entire province. Through a rationalization study, it has been possible to reduce the number of sites to 39, which are representative of the extent of acid deposition, and to monitor trends.

New Brunswick (1994 target 175 kilotonnes)

New Brunswick's SO_2 emissions decreased by about 18 percent from 1983 to 128 kilotonnes in 1994, well below its 1994 target of 175 kilotonnes.

With emissions of 90 kilotonnes, New Brunswick Power accounted for 70 percent of SO_2 emissions in 1994. NB Power operates two large gas turbine stations, five major thermal plants, and some smaller facilities. Both Belledune and the Dalhousie station, retrofitted to burn Orimulsion™ fuel, are fitted with scrubbers. The main components of NB Power's emission strategy have been base loading the coal-fired unit at Belledune and the Orimulsion™-fired unit at Dalhousie, the use of 1 percent sulphur fuel oil at the Courtenay Bay station, and implementation of demand side management programs and an Industrial Cogeneration Program.

A portion of the emission fluctuation in New Brunswick is a result of electric power interconnections with other jurisdictions, e.g., Prince Edward Island, Quebec, Nova Scotia, and the United States, helping to minimize the use of fossil fuelled-thermal units in the region.

Pulp mills, which accounted for about 10 percent of SO_2 emissions in 1994, were modernized during the 1980's, cutting emissions permanently and ensuring that their collective SO_2 releases will remain below 20 kilotonnes per year well into the future.

Irving Oil, the largest oil refinery in Canada, operated at high capacity while meeting a new annual emission cap of 9,500 tonnes. Irving Oil has increased production of low sulphur diesel fuel that will result in a net decrease in SO_2 emissions in the region of some 3,000 tonnes per year. However, it has resulted in a local increase of SO_2 emissions from the refinery by 1,000 tonnes per year. This increase was restricted to the winter months to reduce the impact on summer air quality, although not without controversy. The refinery has also installed three additional SO_2 air monitors and will complete a stack monitoring survey in 1995.

In cooperation with NB Power and Environment Canada, New Brunswick operates an extensive acid deposition network which provides an understanding of the deposition pattern and levels in the province. In all areas, deposition is above the 8 kg/ha/yr critical load for acid-sensitive areas. In 1994, excess sulphate deposition ranged from 9 to 19 kg/ha/yr. Deposition has generally decreased across New Brunswick since 1990; however, 1994 levels were higher than in the previous two years.

Nova Scotia (1994 target 189 kilotonnes)

Nova Scotia's SO_2 emissions in 1994 were 173 kilotonnes, down slightly from 1993 levels, and under its target. The 189 kilotonne target reflects the new federal-provincial acid rain agreement signed in May 1993, which reduced the previous target by another 15 kilotonnes.

The major source of SO_2 emissions in 1994, accounting for 77 percent of the provincial total, was Nova Scotia Power. Its SO_2 emissions were reduced by over 10 kilotonnes from 1993 primarily due to commissioning of the Point Aconi generating station, the world's largest circulating fluidized-bed coal burning power plant (165 MW). The plant is designed to capture 90 percent of the sulphur in the fuel and simultaneously reduce nitrogen oxides emissions. The utility has also publicly stated its corporate objective of further reducing emissions to about 90 kilotonnes annually after the year 2000.

Emissions from oil and gas refining, which accounted for 5 percent of SO_2 emissions, also decreased in 1994 due to the closure of the Ultramar Refinery.

Nova Scotia Department of the Environment continued to operate a precipitation monitoring site in East River-St. Mary's Pictou County in addition to the two Environment Canada operated monitoring stations at Kejimkujik National Park and Jackson. Based on the monitoring data, sulphate deposition (although variable from year to year) appears to generally be on a downward trend. Preliminary data for 1994 gives a sulphate deposition of 11.37 kg/ha/yr for Kejimkujik and 8.51kg/ha/yr for Jackson. These levels are well below the 20 kg/h/yr level established as the goal for protecting moderately sensitive aquatic areas. However, like New Brunswick, the province has very acid-sensitive ecosystems and the critical loads to protect them are approximately 8/kg/ha/yr.

Newfoundland (1994 target 45 kilotonnes)

Newfoundland's SO_2 emissions were down sharply in 1994 to 45 kilotonnes due to temporary shut-downs at the oil-fired Holyrood Thermal Generating Station and the Come By Chance oil refinery.

SO_2 emissions from Holyrood decreased by 49 percent from 1993 levels to 8 kilotonnes because of reduced power production at the plant. This year-to-year variability in emissions is normal and reflects the fact that the station supplies energy whenever annual rainfall is too low for hydroelectric sources to meet demand. Newfoundland Hydro has committed to limit emissions from this facility to a maximum of 25 kilotonnes per year in a normal rainfall year, as of 1991.

The Come By Chance oil refinery, which was the single largest source of SO_2 in the province in 1994, emitted 19 kilotonnes of SO_2, down 69 percent from 1993 levels. The large decrease was a result of an extended shut-down. The refinery, which came under new ownership in 1994, has returned to operation and emissions are expected to be approximately 25 kilotonnes in 1995, increasing to about 40 kilotonnes before dropping back to 25 kilotonnes in 2001.

In 1994, Newfoundland operated seven acid rain monitoring sites on the island portion of the province in cooperation with Environment Canada. Wet sulphate deposition in Newfoundland appears to have levelled off or to be decreasing slightly. With the excpetion of one site on the southwest coast, deposition is below the 20 kg/ha/yr target for the preservation of moderately sensitive areas. To decrease wet sulphate deposition to below the 8 kg/ha/yr critical load value as defined in the *1990 Long-Range Transport of Air Pollutants and Acid Deposition Assessment Report* (part 4), a further decrease will be required in transboundary flows.

Provincial SO_2 emissions through the next couple of years are expected to return to levels above the 45 kilotonne target, in the 55 to 70 kilotonne range. However, the continuing emission control program (agreements with industry) is expected to induce a downward trend in SO_2 emissions towards the 45 kilotonne target by the year 2000. Longer term projections are difficult to make due to the possibility of major changes in the industrial base, largely as a result of Hibernia, other offshore activities, and possible mining developments in Labrador.

Prince Edward Island (1994 objective 5 kilotonnes)

Virtually all of Prince Edward Island's SO_2 emissions result from the combustion of fossil fuels. Total emissions in 1994 were 4 kilotonnes. This value includes a component of power-generation emissions which contributed 0.8 kilotonne.

Emissions of SO_2 from electrical power generation fluctuate due to the variability of economy energy purchases from New Brunswick, and the subsequent need to supplement these purchases with on-island generation. While electrical consumption increased slightly in 1994, electrical generation within the province decreased by 26 percent to 48 GWh resulting in a small emission reduction. Maritime Electric, the province's major electrical utility, expects to be able to continue to purchase large quantities of economy energy during the next five years. Therefore, barring unusual conditions or unforeseen circumstances, emissions from Maritime Electric are forecast to remain below 840 tonnes per year.

Emissions of sulphur dioxide have remained below the 5 kilotonne target during the entire period of the 1987 federal-provincial agreement, and are expected to do so in 1995; however, the province may have difficulty in maintaining emissions below this level in subsequent years.

Policy and Science Highlights

1994 was an important year in terms of new policy and science developments:

- The federal government signed the second United Nations Economic Commission for Europe Sulphur Protocol in June, 1994. Once ratified, the protocol will commit signatory countries to working towards achieving critical loads, that level of sulphate deposition which will not harm the environment. This is the first international protocol to take a critical loads approach to reducing emissions as opposed to previous protocols which called for cuts across the board regardless of regional environmental sensitivities.

  Critical loads across Canada vary tremendously depending on the ability of different ecosystems to neutralize acid deposition. The Canadian Shield, for example, is highly sensitive. As a result, the protocol establishes a Sulphur Oxide Management Area in southeastern Canada and caps annual emissions there at 1.75 million tonnes of SO_2, a logical follow-up to the Eastern Canada Acid Rain Program which expires in the year 2000.

- To fulfil its obligations in the new protocol and to protect acid-sensitive areas, human health, and visibility, the federal government and provinces began working with stakeholders in 1994 to develop a new National Strategy on Acidifying Emissions for post year-2000. New Brunswick co-chairs this multistakeholder task group with the federal government. The new strategy will be based on the progress to-date and the re-evaluation of critical loads for Canada.

- The Canada-U.S. Air Quality Committee published the 1994 Progress Report on the Canada-United States Air Quality Agreement. It reports on the status of the Canadian and U.S. acid rain science programs and the progress made in both countries to meet their respective commitments to reduce acidifying emissions. Canada is ahead of schedule, meeting its year-2000 national cap of 3.2 million tonnes of SO_2 in 1993. In 1994, national SO_2 emissions were down even further to an estimated 2.6 million tonnes.

- Health Canada and Environment Canada published an important paper on the health effects of air pollution in 1994. Positive and statistically significant associations were found between hospital admissions in Ontario and both ozone and sulphates recorded on the day of admission and up to three days prior to the date of admission. Health Canada continues to research the health effects of sulphates in Saint John, New Brunswick. This city of 100,000 has the most acidic air in Canada.

- Sulphate deposition declined significantly in the early 1980s, and was closely correlated with declining SO_2 emissions; however, nitrate deposition has shown no trend,either up or down, consistent with NOx emissions which have shown no strong trend.

- Lake survey data shows increasing nitrate concentrations in a number of lakes and streams in Ontario and Quebec. These locations also receive some of the highest levels of nitrogen deposition in North America. Maintenance of existing levels or increases of nitrogen deposition over the long term may eventually undermine the ecological benefits derived from SO_2 control programs. Furthermore, aquatic ecosystems can be adversely affected not only by chronic acidification, but also by short-term or episodic decreases in pH that occur during snowmelts and rainstorms.

- Results from the Quebec Lake Survey of 58 headwater lakes showed that, although there was a decrease in lakewater sulphate concentrations in 1993, there was an increase in the number of lakes that were considered to be acidic as compared to 1992. These lakes are situated mainly to the east

of Montreal. From 1985 to 1993, 24 percent of the lakes under study showed increases in alkalanity and/or pH while the same percentage of lakes still show signs of acidification (mainly east of Montreal). The remainder of the lakes are stable in terms of acidity.

- Recent aquatic effect studies in Ontario indicate that: recovery of acidified lakes in south-central Ontario following reductions in SO_2 emissions has been much slower than expected in most cases; climatic effects, notably the occurrence of El Niño events, have resulted in this slower than expected recovery; there is also growing evidence that global climate change is altering the magnitude and frequency of large-scale atmospheric processes, such as El Niño, and is thus linked to poor recovery of acidified lakes.

- As reported in the 1993 report on the Eastern Canada Acid Rain Program, forestry research indicates that acid deposition has affected forests in a number of ways. For example, acid fog has contributed to serious deterioration and death of white birch in New Brunswick, and sulphate and nitrate deposition has been correlated with reduced growth rates in sugar maples over the past 30 years over large areas of Ontario and Quebec.

- Under a Memorandum of Understanding between Environment Canada and the producers and marketers of diesel fuel, as of October 1, 1994, most on-road diesel sold at retail outlets is be low in sulphur (below .05 percent), which will cut emissions of SO_2 and particulate matter.

- In 1994, as part of the "greening government program," the federal government began reviewing all federal facilities for their use of fossil fuels with the aim of increasing energy efficiency and conservation and reducing acidifying emissions.

Conclusion

The sulphur dioxide control program in eastern Canada continues to be a success, with emissions in eastern Canada well below the 2,300 kilotonne cap and projected to remain below that level to the year 2000.

Actual emissions in 1994 were down 22 percent from 1993 levels to 1,698 kilotonnes and have declined a total of 56 percent from 1980 levels. Emissions are not expected to remain as low as 1994 levels in the near future, however, because the temporary plant shut-downs were exceptional. Nevertheless, emissions are expected to remain considerably below 2,300 kilotonnes as a result of industrial process changes, scrubbers, fuel switching, and old plant closures which are unlikely to be reversed.

Although the program goals are now being met, many ecosystems are still being damaged. Lakes and streams in some areas continue to acidify. Furthermore, the health effects of acid particles are a growing concern. Some of these effects will be alleviated when the United States has achieved its 9 million tonnes SO_2 reduction by 2000; however, even after all currently planned emissions reductions are in place on both sides of the border, some regions are expected to receive excess acid deposition post-2000, i.e., in excess of the critical loads for sulphur as currently defined for aquatic ecosystems.

Another emerging concern is nitrogen deposition, which scientists predict may overtake sulphur as the major acidifying agent. Scientists therefore have turned their attention to developing critical loads for nitrogen, and have dubbed the next phase in the fight against acid rain as the "nitrogen era," as distinct from the "sulphur era" of the 1970s and 1980s.

In short, the acid rain problem has not been solved. The Eastern Canada Acid Rain Program has been a good solid first step, but more needs to be done. As a result, the federal and provincial governments have begun working with stakeholders to develop a new National Strategy on Acidifying Emissions for post-2000 to protect acid-sensitive areas, human health, and visibility in Canada. The Strategy is expected to be completed by early 1997, to take effect when the Eastern Canada Acid Rain Program expires in the year 2000.