

**Benzene Canada-wide Standard
PHASE 1
NATIONAL SUMMARY
Annual Progress Report – December 2001**

PN 1322

This publication contains a summary of information obtained from jurisdictions across Canada on progress towards the Benzene Phase 1 Canada-wide Standard, endorsed by the Canadian Council of Ministers of the Environment in June 2000. More detailed jurisdictional reports are available from each member jurisdiction.

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national, international and global concern. The 14 member governments work as partners in developing nationally consistent environmental standards, practices and legislation.

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Introduction

In June, 2000, the Canadian Council of Ministers of the Environment (CCME) endorsed the Canada-Wide Standard (CWS) for Benzene, Phase 1. The CCME recognized that implementation of the Phase 1 Standard would reduce Canadians' exposure to this non-threshold human carcinogen. Ministers committed to reducing national benzene emissions by 30% between the 1995 base year and the year 2000. All Ministers, except Quebec, signed this Standard.

Individual jurisdictions pursued Phase 1 reductions through specific actions related to

components of the Oil and Gas, Transportation, Petroleum, Chemical Manufacturing, and Steel Manufacturing sectors. Jurisdictions intend to demonstrate progress toward achievement of the reduction targets through individual reports tailored to their respective actions.

This report fulfills the CWS requirement for an annual national overview report summarizing information on emissions levels and trends, and ambient benzene concentrations where available. Jurisdictional reductions in benzene emissions by sector are contained in the Appendix.

National Reductions in Benzene Emissions

Based on reported data, it is estimated that benzene emissions in Canada decreased by 39% between 1995 and 1999. Details are

shown in Table 1. Further analysis will be included in the 2002 National Summary Report.

Table 1. Reduction in Benzene Emissions in Canada Between 1995 and 1999

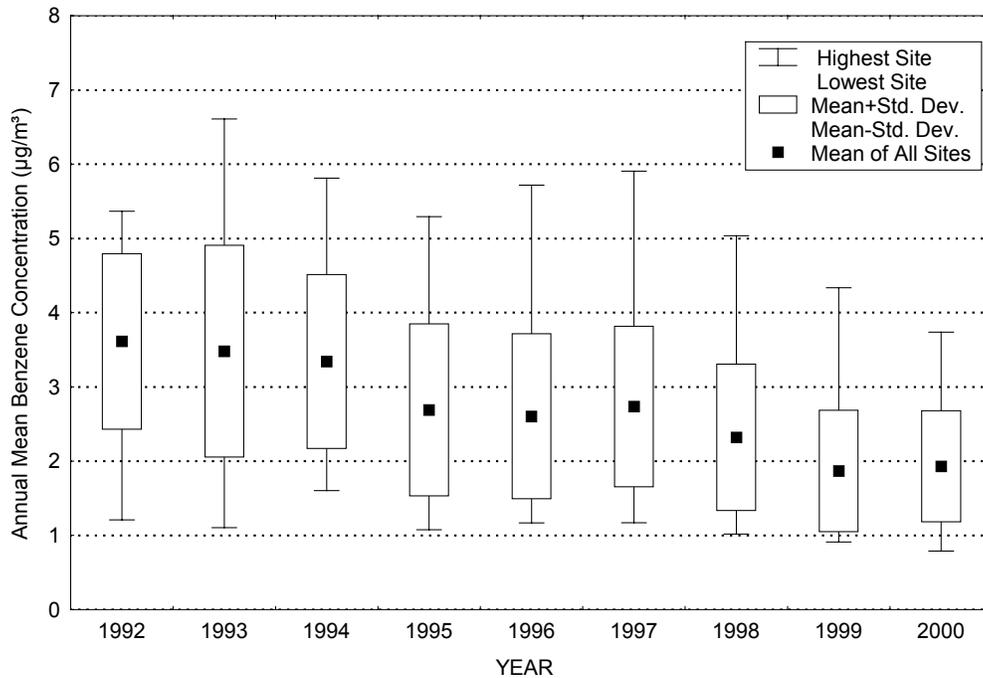
Sector	Emissions kt		Reductions Achieved in 1999 from 1995	
	1995	1999/2000	%	kt
Chemical Manufacturing Plants	0.44	0.18	59%	0.26
Steel Manufacturing - Steel mills	1.2	0.72	40%	0.48
Petroleum – Refining	0.44	0.26	42%	0.18
Petroleum - Distributing	0.5	0.5	0%	0.00
Oil and Gas (Natural Gas Dehydrators)	8.74	4.01	54%	4.73
Residential Wood Combustion	4.34	4.56	5% increase	0.22 increase
Transportation –On-Road Vehicles	30	15.60	48%	14.40
Miscellaneous Combustion	4.7	4.8	2% increase	0.10 increase
Prescribed Burning	0.5	0.4	20%	0.10
Total	50.86	31.03	39%	19.83

National Ambient Levels of Benzene

National average levels of ambient benzene decreased by approximately 30% between 1995 and 2000 as shown in the following figure. The graph is based on the composite average of

annual mean benzene concentrations from 16 urban sites in Canada with complete data records for 1995 to 2000

Figure 1. Distribution of Annual Mean Benzene concentrations ($\mu\text{g}/\text{m}^3$) for 16 Urban Locations (1992-2000)



Data from the National Air Pollution Surveillance (NAPS) Monitoring Network

The Future

In September, 2001, CCME Ministers endorsed the CWS for Benzene, Phase 2, which establishes a target of a 6-kilotonne reduction in national emissions by 2010. This 6-kilotonne reduction is in addition to the 30% reduction established in Phase 1. It will be achieved by follow-through on Phase 1 initiatives related to transportation, natural gas dehydrators and the steel industry. Phase 2 also provides national application of Best Management Practices and develops the

foundation for additional reductions to be achieved through other air issues programs (including other Canada-Wide Standard initiatives). Reporting for the Phase 2 Standard will commence in Fall, 2002.

Significant progress in reduction of benzene emissions has been achieved in Phase 1; further achievements are anticipated through implementation of Phase 2.

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This appendix describes provincial and territorial benzene emissions reductions in terms of the instruments used in each sector. It is important to recognize that the scope of benzene emissions reporting varies amongst jurisdictions, because they only report on sectors operating within their boundaries. Absence of a jurisdiction from any sector should not be perceived as inaction by that jurisdiction.

Saskatchewan expects to report in 2002. Manitoba and British Columbia are not reporting in 2001. The latter is looking at options for increased industry participation in reporting in 2002.

Jurisdictional Reductions in Benzene Emissions by Sector

1. Oil and Gas - Natural Gas Dehydrators

Best Management Practices for Natural Gas Dehydrators in Three Western Provinces:

In 1997, a multi-stakeholder task force agreed to a voluntary approach whereby the oil and gas industry committed to reduce and report on benzene emissions from natural gas dehydrators by implementing Best Management Practices for the Control of Benzene Emissions from Glycol Dehydrators (BMP). Alberta, Saskatchewan, and British Columbia lead implementation of the BMP with Environment and Health Canada support.

Nova Scotia

Operation of Sable Offshore Energy Incorporation's Goldboro Gas Plant, in Goldboro, commenced in December 1999. The plant is equipped with a flaring system to oxidize benzene prior to its release into the atmosphere. The total on-site benzene releases from this facility were reported to be 0.04 t in 1999.

Alberta

Through a voluntary industry program in the Province, benzene emissions from natural gas dehydrators were reduced by 4814 t, from 7240 t in 1995 to 2426 t in 1999.

2. Transportation - On-Road Vehicles

Canadian Environmental Protection Act (CEPA) Benzene in Gasoline and New Vehicle Emission Regulations:

The instruments applied in this sector achieved reductions in all jurisdictions.

Reductions in benzene emissions were achieved through a combination of regulations to lower the benzene content of gasoline and regulations to improve the emission performance of on-road vehicles.

Implementation of the CEPA Benzene in Gasoline Regulations has resulted in the average benzene content in gasoline decreasing from 1.4% by volume in 1995 to 0.8% by volume in 1999.

Progressively more stringent vehicle emission regulations have been adopted since 1971. As new vehicles enter the Canadian fleet, replacing older higher-emitting models, total hydrocarbon emissions are reduced, including benzene. The most recent amendment to the vehicle emission standards came into effect in the 1998 model year, introducing more stringent exhaust, evaporative and refuelling emissions levels for hydrocarbons, effectively resulting in lower benzene emission levels.

Taking into account both the lower benzene content of gasoline and the improved emission performance of vehicles, it is estimated that emissions of benzene from on-road vehicles were reduced by about 14.4 kt from 1995 to 2000.

3. Petroleum - Refineries and Distribution

Reductions from Refineries:

Newfoundland and Labrador

Benzene emissions from the one refinery located in Come by Chance, increased by 4.93 t, from 8.82 t in 1995 to 13.75 t in 1999. The refinery was not operating at full capacity in 1995, hence the increase in emissions from 1995 to 1999. The refinery has recognized the concern associated with benzene and has developed an action plan that will reduce benzene emissions from the site. The action plan will be fully implemented by 2005 and benzene emissions estimates for 2005 are approximately 8 t.

Nova Scotia

The only refinery in Nova Scotia is located in Dartmouth. In 1995, it reported 22 t of benzene emissions. Benzene emissions decreased by about 5 t, to 17 t in 1999.

New Brunswick

New Brunswick's single refinery, located in Saint John, Reported that emissions decreased by 1.00 t from 2.91 t in 1995 to 1.91 t in 1999. Emissions reductions were accomplished by implementing requirements of the Benzene in Gasoline Regulations, and the CCME Code of Practice and Guidelines respecting VOC emissions from equipment leaks and aboveground storage tanks.

Ontario

Refineries in Ontario achieved a benzene emission reduction of 75 t from 194 t in 1995 to 119 t in 1999, by implementing the CCME Environmental Code of Practice for Measurement and Control of Fugitive VOC Emissions from Equipment Leaks.

Alberta

Refineries in Alberta achieved a benzene emission reduction of 14 t, from 39 t in 1995 to 25 t in 1999, by implementing the CCME Environmental Code of Practice for Measurement and Control of Fugitive VOC Emissions from Equipment Leaks.

Northwest Territories

Only one facility in the Northwest Territories has reported benzene emissions. This facility showed a 0.64t decrease in on-site benzene releases, from 0.80 t in 1996, to 0.16 t in 1999.

CEPA Regulations on Fuel Dispensing Rates:

This instrument will achieve reductions in all jurisdictions.

The CEPA Gasoline and Gasoline Blend Dispensing Flow Rate Regulations came into

effect on February 1, 2001, and therefore are not expected to have had an appreciable effect on emissions of benzene in 2000.

4. Chemical Manufacturing

Proposed Memorandum of Understanding (MOU) between the Governments of Canada, Ontario, and Alberta, and the Canadian Chemical Producers Association (CCPA):

Through the proposed MOU, a voluntary initiative under CCPA Responsible Care® was developed. NPRI reports that benzene emissions from chemical manufacturing plants have decreased by 260t, from 440t in 1995 to 180t in 1999.

Ontario

The chemical sector in Ontario participates in several programs to reduce air emissions, including leak detection and repair to reduce VOC emissions that contribute to summer smog. Benzene emissions from chemical manufacturing plants in Ontario decreased by 264 t, from 319 t in 1995 to 55 t in 1999.

Alberta

An increase of 1 t of benzene emissions, from 70 t to 71 t, was observed in Alberta between 1995 and 1999 in the chemical manufacturing sector. This increase in emissions has been attributed to the chemical industry's production expansion over that time period.

5. Steel Manufacturing

Reductions from the Steel Manufacturing Sector:

Canada and Ontario

The governments of Ontario and Canada, in conjunction with the local steel industry, have implemented actions to address a range of emissions from this sector. These actions include the development of the Environmental Code of Practice for Integrated Steel Mills, Canadian Steel Producers Association Benzene Environmental Best Practice Manual for Coke Producers in Ontario, and environmental management agreements. Benzene emissions from the four steel mills in Ontario were 720 t in 1999. This is a decrease of 480 t from the estimated 1,200 t of emissions in 1995.

For further information, please contact:

British Columbia Ministry of Water, Land and Air Protection: www.gov.bc.ca

Alberta Department of Environment: <http://www3.gov.ab.ca/env/protenf/publications/CWSforBenzenePhaseI.pdf>

Saskatchewan Department of Environment and Resource Management: www.gov.sk.ca

Manitoba Department of Conservation: www.gov.mb.ca

Ontario Ministry of the Environment: www.gov.on.ca

Quebec Ministère de l'Environnement: www.gov.qc.ca

New Brunswick Environment and Local Government: www.gov.nb.ca

Nova Scotia Department of Environment and Labour: www.gov.ns.ca

Prince Edward Island Department of Fisheries, Aquaculture and Environment: www.gov.pe.ca

Newfoundland and Labrador Department of Environment: www.gov.nf.ca

Nunavut Territory Department of Sustainable Development: www.gov.nu.ca

Northwest Territories Department of Resources, Wildlife and Economic Development: www.gov.nt.ca

Yukon Territory Department of Renewable Resources: www.gov.yk.ca

Environment Canada: www.ec.gc.ca