

**JURISDICTIONAL INTERIM PROGRESS IN ACHIEVING DIOXINS AND  
FURANS CANADA-WIDE STANDARDS FOR:**

**Pulp and Paper Boilers Burning Salt Laden Wood, Waste Incineration, Iron  
Sintering Plants and Steel Manufacturing Electric Arc Furnaces**

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## INTRODUCTION

The Canada-wide Environmental Standards Sub-Agreement provides the framework for federal, provincial, and territorial Environment Ministers to work together to address key environmental protection and health risk reduction issues that require common environmental standards across the country. Set under the framework of the Canada-wide Accord on Environmental Harmonization, the Standards Sub-agreement sets out principles for governments to jointly agree on priorities, to develop standards, and to prepare complementary workplans to achieve those standards, based on the unique responsibilities and legislation of each government. The sub-agreement does not change the jurisdiction of governments nor does it delegate authority.

Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), commonly known as dioxins and furans, are toxic, persistent, bioaccumulative, and result predominantly from human activity. Development of CCME Canada-wide standards for dioxins and furans focused on atmospheric releases. Canada-wide standards have been developed for waste incineration, burning salt laden wood in coastal pulp and paper boilers, iron sintering, electric arc furnace steel manufacturing, and conical municipal waste combustion.

This report presents jurisdictions' interim progress in reducing dioxins and furans emissions from the first four of the five sectors for which dioxins and furans Canada-wide standards have been developed. The Canada-wide Standard for Conical Waste Combustion requires an interim progress report in Spring 2005. In 2008 jurisdictions will report on achievement of the standards.

Federal information is presented first, with provinces and territories then listed alphabetically. Where a sector is not listed below a jurisdiction, it does not have that particular sector within its boundaries.

## TARGETS AND TIMELINES

Each CCME Canada-wide standard agrees to an emission reduction target and a timeline to reach that target. These are summarized below:

Sector	Target and Timeline
<b>Incineration</b>	
<b>New or expanding facilities of any size</b>	All new or expanding facilities are required to design for and achieve compliance immediately upon attaining normal full scale operation. Municipal waste incineration 80pg I-TEQ/m <sup>3</sup> Medical waste incineration 80pg I-TEQ/m <sup>3</sup> Hazardous waste incineration 80pg I-TEQ/m <sup>3</sup> Sewage sludge incineration 80pg I-TEQ/m <sup>3</sup>
<b>Existing facilities</b>	Municipal waste incineration by 2006 Medical waste incineration by 2006 Hazardous waste incineration by 2006 Sewage sludge incineration by 2005
<b>Pulp and paper boilers burning salt-laden wood</b>	
<b>New boilers</b>	Less than 100 pg/m <sup>3</sup> TEQ if constructed after the effective date of the standard - April 2001
<b>Existing boilers</b>	Less than 500 pg/m <sup>3</sup> TEQ for all by 2006
<b>Iron sintering plants</b>	
<b>New or expanding plants</b>	Less than 200 pg/m <sup>3</sup> TEQ, and as a result of achieving this limit particulate emissions should correspond to a level of less than 20 mg/m <sup>3</sup> after the effective date of this standard (March 2003).
<b>Existing iron sintering plants</b>	<b>Phase 1:</b> less than 1350 pg/m <sup>3</sup> TEQ, and particulate emissions should correspond to a level of less than 50 mg/m <sup>3</sup> by 2002. <b>Phase 2:</b> less than 500 pg/m <sup>3</sup> TEQ for by 2005. The Phase 1 particulate emission level expected to continue to be met. <b>Phase 3:</b> less than 200 pg/m <sup>3</sup> TEQ, and particulate emissions should correspond to a level of less than 20 mg/m <sup>3</sup> by 2010.
<b>Steel manufacturing electric arc furnaces</b>	
<b>New and modified furnaces</b>	Less than 100 pg ITEQ/Rm <sup>3</sup>
	<b>Phase 1:</b> less than 150 pg ITEQ/Rm <sup>3</sup> by 2006. <b>Phase 2:</b> less than 100 pg ITEQ/Rm <sup>3</sup> by 2010.

## PROGRESS REPORTS

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### **Canada**

<b>Sector</b>	<b>Incineration</b>
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#### *Context:*

The federal government is working toward implementation of the Canada-wide Standards for Dioxins and Furans from Waste Incineration at its federally owned hazardous waste and non-hazardous waste incineration facilities.

Further, the federal government:

- Continues to support the National Pollutant Release Inventory (NPRI) as the major public reporting mechanism for emissions of dioxins and furans; and
- Continues to encourage and support international action to reduce anthropogenic releases of dioxins and furans.

#### **Data**

Emission concentration data is not available for federal waste incinerators.

#### *Federal Hazardous Waste Incinerators:*

The federal government is developing a strategy to address the management of hazardous waste in the Federal House, including verification of the inventory of federally owned hazardous waste incinerators and identification of alternative methods of hazardous waste disposal. The federal government is also amending the Federal Mobile PCB Treatment and Destruction Regulations to ensure harmonization with the Waste Incineration CWS for Dioxins and Furans.

#### *Federal Non-Hazardous Waste Incinerators:*

A survey undertaken in 2003, identified 17 federal non-hazardous waste incinerators that remain in operation, each burning less than 26 tonnes per year. Environment Canada is currently gathering more information on the status and operation of these incinerators including availability of emissions data. Further consultation with the applicable federal government departments will be carried out to evaluate the best management approach(es) to meet the requirements of both the Waste Incineration CWS for Dioxins and Furans, and the CWS for Mercury Emissions. Recommendations will be developed in consultation with the applicable federal government departments.

Since the formation and release of dioxins/furans are influenced by the incinerator design, operation and control technology, federal non-hazardous waste incinerators will be required to ensure best efforts in facility operations and the management of waste

### **Additional Information**

Dioxins and furans are released primarily as by-products of industrial and combustion processes, but are also found as contaminants in certain pesticides or chlorinated solvents. These substances have been identified as toxic substances under CEPA 1999, and are slated for virtual elimination.

Facilities engaged in identified activities have the potential to incidentally manufacture dioxins/furans and are required to submit a report to the NPRI. The identified activities, including:

- a. non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners;
- b. biomedical or hospital waste incineration of 26 tonnes or more of waste per year;
- c. hazardous waste incineration; and
- d. sewage sludge incineration,

were selected by Environment Canada to cover all main point sources of dioxins/furans releases being targeted by the *Canada-wide Standards* initiatives for dioxins/furans.

A single substance report is required for the cumulative release of the 17 dioxins/furans congeners, in grams of international toxicity equivalent (I-TEQ) to the most toxic congener of dioxin (i.e., 2,3,7,8-tetrachlorodibenzo-p-dioxin). The quantity in grams of I-TEQs of dioxins/furans released, disposed of or transferred for recycling is estimated by adding the individual units of I-TEQ for each congener.

To ensure the continued protection of Canadians and their environment, Canada is an active participant in international agreements on persistent organic pollutants (POPs) and has ratified the following:

- the United Nations Economic Commission for Europe (UNECE) POPs Protocol, ratified in 1998; and,
- the United Nations Environment Programme (UNEP) Stockholm Convention on POPs, ratified in 2001.

Canada is also committed to reducing dioxins/furans releases through regional initiatives such as:

- the North American Commission for Environmental Cooperation's Regional Action Plan (NARAP) on Dioxins, Furans and Hexachlorobenzene;
- the Canada-U.S. Great Lakes Binational Toxics Strategy (BTS); and
- the Northern Contaminants Program (NCP).

Canada's domestic programs provide examples to other countries for approaches to achieving significant dioxins and furans reductions. Under the UNEP, Canada has established a 5-year \$20 million (Cdn) Canada POPs Fund, administered by the World Bank, to assist developing countries to build their capacities to deal with POPs and to implement their obligations under the Convention.

Canada is a member of the UNEP Stockholm Convention Expert Group on Best Available Techniques (BAT) and Best Environmental Practices (BEP) for sources of unintentionally produced POPs (dioxins, furans, hexachlorobenzene and polychlorinated biphenyls). The Expert Group is developing guidelines on BAT and guidance on BEP for sources of these substances, which will be key to the implementation of the Stockholm Convention obligations on unintentionally produced POPs. Canada is making a significant contribution to the work of the Expert Group by drafting the BAT guidelines and BEP guidance for thermal metallurgical and other sources.

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<b>Sector</b>	<b>Coastal Pulp and Paper</b>
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### *Context:*

The federal government's approach to management of dioxins and furans emissions from coastal power boilers burning salt-laden wood is to support the Canada-wide Standards (CWS) through the CCME Harmonization Accord as the federal government does not own or operate any such facilities.

The federal government:

- Continues to support the National Pollutant Release Inventory (NPRI) as the major public reporting mechanism for emissions of dioxins and furans;
- Continues to encourage and support international action to reduce anthropogenic releases of dioxins and furans; and
- Has participated in the 2003 review of the CWS for Dioxins and Furans and the development of a pollution prevention strategy for this sector.

## Data

Coastal power boilers burning salt-laden wood<sup>1</sup> are required to report releases of dioxins and furans to the NPRI. This requirement began for reporting year 2000.

Releases to air from coastal pulp and paper mills operating power boilers burning salt-laden wood are reported in the table below. The data presented is based on estimated release data as documented in the Environment Canada Inventory of Releases (updated edition of February 2001)<sup>2</sup> and facility data reported to the NPRI for years 2000 to 2002.

All data for years 2000 to 2002 on releases of dioxins and furans to air reported by the coastal power boilers burning salt-laden wood are based on actual stack measurements. A total of 103 stack dioxins and furans tests were carried out on the eight coastal power boilers from 2000 through 2002. This number is substantially greater than the minimum of 64 required under the CWS agreement. All measurements and analyses have been performed by the same source testing company, using the same method, modified EPA method 5 (MM5), ensuring best comparability between all test results.

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<sup>1</sup> Environment Canada, *Guide for Reporting to the National Pollutant Release Inventory 2003, Table 10: Activities for which Dioxins/Furans and HCB Reports Are Required (20 000-hour Employee Threshold Applies)*, [http://www.ec.gc.ca/pdb/npri/2003Guidance/Guide2003/Guide2003\\_p3b\\_e.cfm#t10](http://www.ec.gc.ca/pdb/npri/2003Guidance/Guide2003/Guide2003_p3b_e.cfm#t10)

<sup>2</sup> Environment Canada, *Inventory of Releases of PCDDs/PCDFs, Up-dated Edition February 2001*.

**Table 1: Dioxins and Furans Emission Testing and Annual Release Data for Canadian Power Boilers burning Salt Laden Wood**

No.	Facility	Province	NPRI ID	1990 <sup>1</sup> Estimate grams I-TEQ	1997 <sup>1</sup> Estimate grams I-TEQ	1999 <sup>1</sup> Estimate grams I-TEQ	2000 NPRI Releases to Air grams I- TEQ	2001 NPRI Releases to Air grams I- TEQ	2002 NPRI Releases to Air grams I- TEQ
1	Norske Skog, Port Alberni	BC	1593	0.10	0.70	0.3-2.1	0.960	0.738	0.346
2	Howe Sound P&P, Port Mellon	BC	1419	0.58	0.58	0.8-1.5	1.227	1.041	1.469
3	Norske Skog, Crofton	BC	1266	2.64	2.64	0.1-0.6	0.668	0.220	0.280
4	Norske Skog, Elk Falls	BC	0333	3.90	3.90	0.15-0.6	0.554	0.530	0.970
5	Western Pulp, Port Alice	BC	2377	0.25	0.25	0.2-0.3	0.044	0.000	0.017
6	Western Pulp, Squamish	BC	2872	0.24	0.24	0.9-1.6	0.800	0.580	0.120
7	Norske Skog, Powell River	BC	0723	1.62	1.53	0.15-0.6	0.302	0.190	0.062
8	Pope & Talbot, Nanaimo	BC	1383	0.37	0.37	0.04-0.25	0.087	0.290	0.073
9	Eurocan, Kitimat	BC	3171	0	0	0.0003	Not using salt laden fuel		
10	Skeena Cellulose, Prince Rupert	BC	2158	0.2	0.2		Not using salt laden fuel		
11	Bowater, Gold River	BC	0927	0.4	0.4	0	Mill closed in 1998		
Total (all facilities)				<b>9.9</b>	<b>10.4</b>	<b>2.7-7.6</b>	<b>4.64</b>	<b>3.59</b>	<b>3.34</b>

NPRI = National Pollutant  
Release Inventory  
I-TEQ = International (NATO) Toxic  
Equivalency Quotient

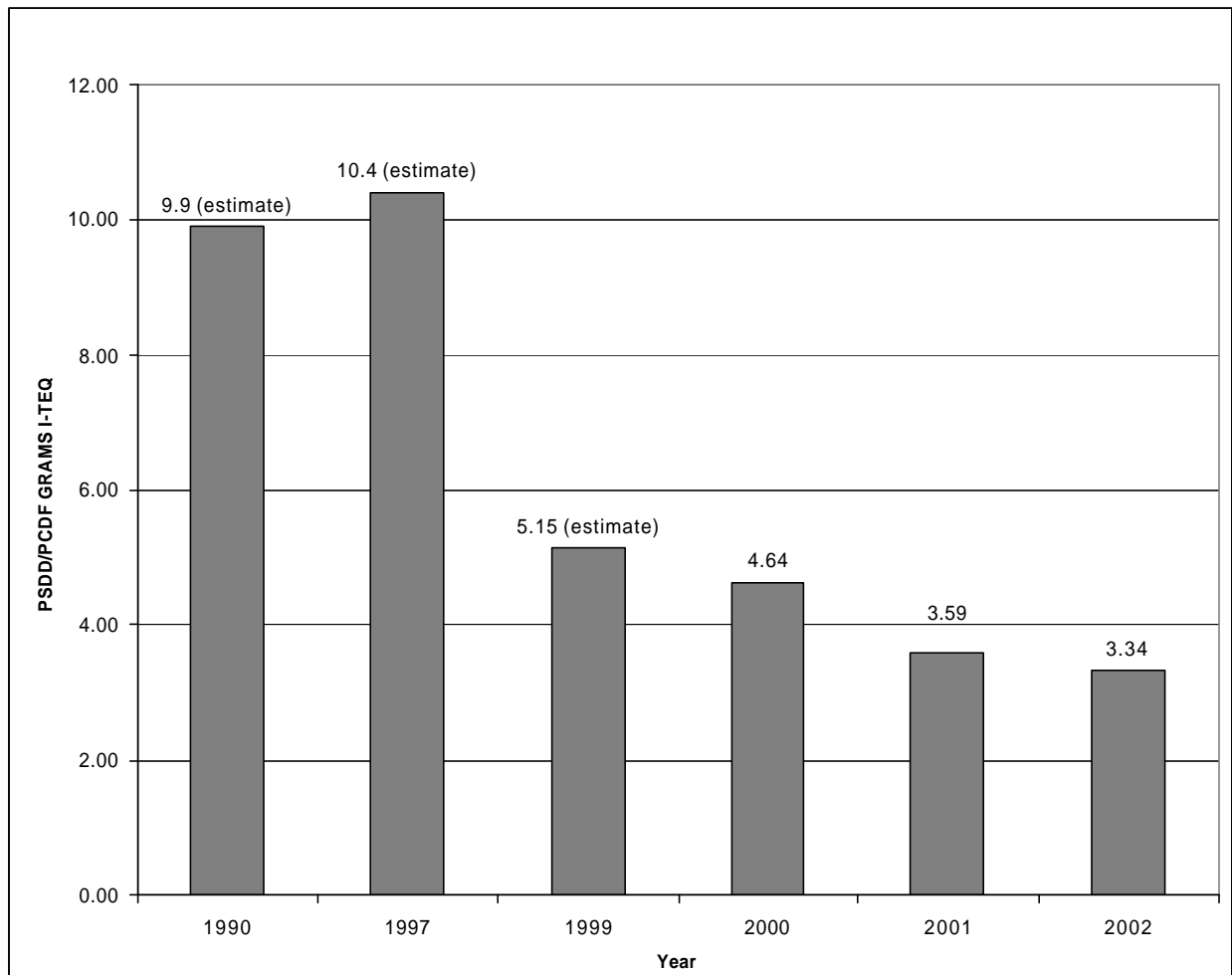
Note 1 - 1990, 1997 and 1999 data obtained from the Environment Canada Inventory of Releases, Updated Edition, February 2001

## Discussion

Dioxins and furans are released primarily as by-products of industrial and combustion processes, but are also found as contaminants in certain pesticides or chlorinated solvents. These substances have been identified as toxic substances under the CEPA 1999, and are slated for virtual elimination.

Facilities engaged in identified activities have the potential to incidentally manufacture dioxins/furans and are required to submit a report to the NPRI. The identified activities, including the combustion of hog fuel originating from logs that were transported or stored in salt water in pulp and paper mills, were selected by Environment Canada to cover all main point sources of dioxins/furans releases being targeted by the *Canada-wide Standards* initiatives for dioxins/furans.

A single substance report is required for the cumulative release of the 17 dioxins/furans congeners, in grams of international toxicity equivalent (I-TEQ) to the most toxic congener of dioxin (i.e., 2,3,7,8-tetrachlorodibenzo-p-dioxin). The quantity in grams of I-TEQs of dioxins/furans released, disposed of or transferred for recycling is estimated by adding the individual units of I-TEQ for each congener.



**Figure 1:** Dioxins and Furans Releases to Air from Burning Salt Laden Wood

## **Additional Information**

The CWS included commitments to thoroughly review the standard in 2003 in a multi-stakeholder forum and to develop a pollution prevention strategy. In 2003, Environment Canada participated in the review of the CWS for Dioxins and Furans from coastal power boilers burning salt-laden wood and the associated pollution prevention strategy, conducted through the Coastal Power Boiler Multi-stakeholder Advisory Group (MAG). MAG members include representatives of industry, industry research institute representatives, environmental non-government organizations and provincial/federal governments.

To ensure the continued protection of Canadians and their environment, Canada is an active participant in international agreements on persistent organic pollutants (POPs) and has ratified the following:

- the United Nations Economic Commission for Europe (UNECE) POPs Protocol, ratified in 1998; and,
- the United Nations Environment Programme (UNEP) Stockholm Convention on POPs, ratified in 2001.

Canada is also committed to reducing dioxins/furans releases through regional initiatives such as:

- the North American Commission for Environmental Cooperation's Regional Action Plan (NARAP) on Dioxins, Furans and Hexachlorobenzene;
- the Canada-U.S. Great Lakes Binational Toxics Strategy (BTS); and
- the Northern Contaminants Program (NCP).

Canada's domestic programs provide examples to other countries for approaches to achieving significant dioxins and furans reductions. Under the UNEP, Canada has established a 5-year \$20 million (Cdn) Canada POPs Fund, administered by the World Bank, to assist developing countries to build their capacities to deal with POPs and to implement their obligations under the Convention.

Canada is a member of the UNEP Stockholm Convention Expert Group on Best Available Techniques (BAT) and Best Environmental Practices (BEP) for sources of unintentionally produced POPs (dioxins, furans, hexachlorobenzene and polychlorinated biphenyls). The Expert Group is developing guidelines on BAT and guidance on BEP for sources of these substances, which will be key to the implementation of the Stockholm Convention obligations on unintentionally produced POPs. Canada is making a significant contribution to the work of the Expert Group by drafting the BAT guidelines and BEP guidance for thermal metallurgical and other sources.

## **Contact**

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<b>Sector</b>	<b>Iron Sintering</b>
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*Context:*

The federal government's approach to management of dioxins and furans emissions from iron sintering plants is to support the Canada-wide Standards (CWS) through the CCME Harmonization Accord as the federal government does not own or operate any such facilities.

The federal government:

- Continues to support the National Pollutant Release Inventory (NPRI) as the major public reporting mechanism for emissions of dioxins and furans;
- Continues to encourage and support international action to reduce anthropogenic releases of dioxins and furans; and
- Has provided support to the 2003 review of the CWS for Dioxins and Furans and the development of a pollution prevention strategy for this sector.

**Data**

Facilities engaged in manufacturing of iron using a sintering process are required<sup>3</sup> to report releases of dioxins and furans to the NPRI. This requirement began for reporting year 2000.

Releases to air from iron sintering plants are shown in the table below. Note, there is only one remaining iron sintering plant operating in Canada. The data presented is based on estimated release data as documented in the Environment Canada Inventory of Releases (updated edition of February 2001)<sup>4</sup> and facility data reported to the NPRI for years 2000 to 2002.

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<sup>3</sup> Environment Canada, *Guide for Reporting to the National Pollutant Release Inventory 2003, Table 10: Activities for which Dioxins/Furans and HCB Reports Are Required (20 000-hour Employee Threshold Applies)*, [http://www.ec.gc.ca/pdb/npri/2003Guidance/Guide2003/Guide2003\\_p3b\\_e.cfm#t10](http://www.ec.gc.ca/pdb/npri/2003Guidance/Guide2003/Guide2003_p3b_e.cfm#t10)

<sup>4</sup> Environment Canada, *Inventory of Releases of PCDDs/PCDFs, Up-dated Edition February 2001*.

**Table 1: Dioxins and Furans Emission Testing and Annual Release Data for Iron Sintering Sector**

No.	Facility	Province	NPRI ID	1990 <sup>1</sup> Estimate grams TEQ	1997 <sup>1</sup> Estimate grams TEQ	1999 <sup>1</sup> Estimate grams TEQ	2000 NPRI Releases to Air grams TEQ	2001 NPRI Releases to Air grams TEQ	2002 NPRI Releases to Air grams TEQ
1	Algoma Iron Ore Division	Ontario	n/a	19.4	19.4	<i>Algoma Wawa iron sintering plant ceased operations in 1998.</i>			
2	Stelco Hamilton	Ontario	2984	6.00	6.00	6.00	1.73	1.730	1.840
Total (all facilities)				<b>25.40</b>	<b>25.40</b>	<b>6.00</b>	<b>1.73</b>	<b>1.73</b>	<b>1.84</b>

n/a = not available

NPRI = National Pollutant Release

Inventory

I-TEQ = International (NATO) Toxic Equivalency Quotient

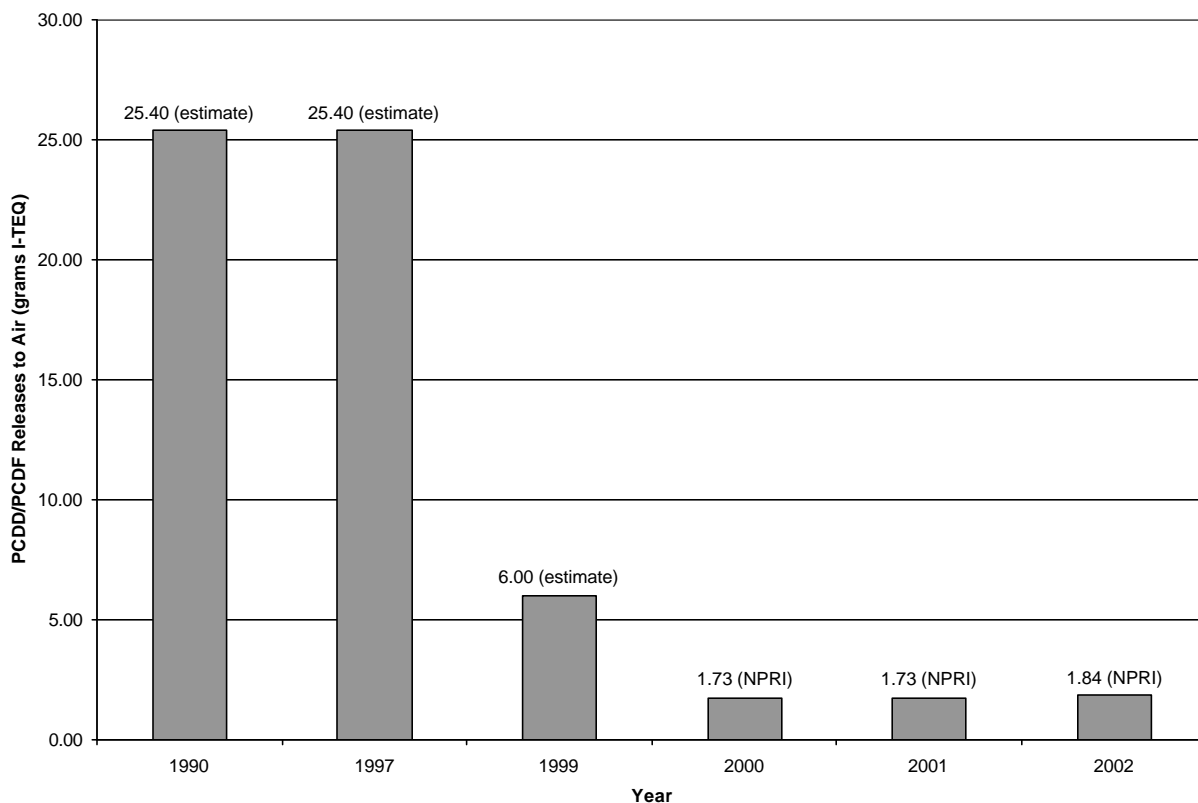
Note 1 - 1990, 1997 and 1999 data obtained from the Environment Canada Inventory of Releases, Updated Edition, February 2001

## Discussion

Dioxins and furans are released primarily as by-products of industrial and combustion processes, but are also found as contaminants in certain pesticides or chlorinated solvents. These substances have been identified as toxic substances under CEPA 1999, and are slated for virtual elimination.

Facilities engaged in identified activities that have the potential to incidentally manufacture dioxins/furans and are required to submit a report to the NPRI. The identified activities, including manufacturing of iron using a sintering process, were selected by Environment Canada to cover all main point sources of dioxins/furans releases being targeted by the *Canada-wide Standards* initiatives for dioxins/furans.

A single substance report is required for the cumulative release of the 17 dioxins/furans congeners, in grams of international toxicity equivalent (I-TEQ) to the most toxic congener of dioxin (i.e., 2,3,7,8-tetrachlorodibenzo-p-dioxin). The quantity in grams of I-TEQs of dioxins/furans released, disposed of or transferred for recycling is estimated by adding the individual units of I-TEQ for each congener.



**Figure 1:** Dioxins and Furans Releases to Air from Iron Sintering

## **Additional Information**

The CWS included commitments to thoroughly review the standard in 2003 in a multi-stakeholder forum and to develop a pollution prevention strategy. In 2003, Environment Canada provided support for the review of the CWS for Dioxins and Furans from Iron Sintering Plants and the development of advice for a pollution prevention strategy, conducted through the Iron Sintering Multi-stakeholder Advisory Group (IS-MAG). IS-MAG was led by the Ontario Ministry of Environment, and its members include representatives of industry, environmental non-government organizations, labour groups and provincial/federal governments.

The federal government will continue to promote sound management practices including practices aimed at minimizing the formation and release of dioxins and furans through initiatives such as the Environmental Codes of Practice for Steel Mills published under the *Canadian Environmental Protection Act 1999*.

To ensure the continued protection of Canadians and their environment, Canada is an active participant in international agreements on persistent organic pollutants (POPs) and has ratified the following:

- the United Nations Economic Commission for Europe (UNECE) POPs Protocol, ratified in 1998; and,
- the United Nations Environment Programme (UNEP) Stockholm Convention on POPs, ratified in 2001.

Canada is also committed to reducing dioxins/furans releases through regional initiatives such as:

- the North American Commission for Environmental Cooperation's Regional Action Plan (NARAP) on Dioxins, Furans and Hexachlorobenzene;
- the Canada-U.S. Great Lakes Binational Toxics Strategy (BTS); and
- the Northern Contaminants Program (NCP).

Canada's domestic programs provide examples to other countries for approaches to achieving significant dioxins and furans reductions. Under the UNEP, Canada has established a 5-year \$20 million (Cdn) Canada POPs Fund, administered by the World Bank, to assist developing countries to build their capacities to deal with POPs and to implement their obligations under the Convention.

Canada is a member of the UNEP Stockholm Convention Expert Group on Best Available Techniques (BAT) and Best Environmental Practices (BEP) for sources of unintentionally produced POPs (dioxins, furans, hexachlorobenzene and polychlorinated biphenyls). The Expert Group is developing guidelines on BAT and guidance on BEP for sources of these substances, which will be key to the implementation of the Stockholm Convention obligations on unintentionally produced POPs. Canada is making a significant contribution to the work of the Expert Group by drafting the BAT guidelines and BEP guidance for thermal metallurgical and other sources.

## Contact

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<b>Sector</b>	<b>Electric Arc Furnaces</b>
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### *Context:*

The federal government's approach to management of dioxins and furans emissions from steel manufacturing electric arc furnaces is to support the Canada-wide Standards (CWS) through the CCME Harmonization Accord as the federal government does not own or operate any such facilities.

The federal government:

- Continues to support the National Pollutant Release Inventory (NPRI) as the major public reporting mechanism for emissions of dioxins and furans;
- Continues to encourage and support international action to reduce anthropogenic releases of dioxins and furans; and
- Has provided support to the 2003 review of the CWS for Dioxins and Furans and the development of a pollution prevention strategy for this sector.

## Data

Facilities engaged in the operation of electric arc furnaces (EAFs) in steel manufacturing<sup>5</sup> are required to report releases of dioxins and furans to the NPRI. This requirement began for reporting year 2000.

Releases to air from steel manufacturing EAFs are reported in the table below. The data presented is based on estimated release data as documented in the Environment Canada Inventory of Releases (updated edition of February 2001)<sup>6</sup> and facility data reported to the NPRI for years 2000 to 2002.

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<sup>5</sup> Environment Canada, *Guide for Reporting to the National Pollutant Release Inventory 2003, Table 10: Activities for which Dioxins/Furans and HCB Reports Are Required (20 000-hour Employee Threshold Applies)*, [http://www.ec.gc.ca/pdb/npri/2003Guidance/Guide2003/Guide2003\\_p3b\\_e.cfm#t10](http://www.ec.gc.ca/pdb/npri/2003Guidance/Guide2003/Guide2003_p3b_e.cfm#t10)

<sup>6</sup> Environment Canada, *Inventory of Releases of PCDDs/PCDFs, Up-dated Edition February 2001*.

**Table 1: Dioxins and Furans Emission Testing and Annual Release Data for Canadian Steel Manufacturing Electric Arc Furnaces**

No.	Facility	Province	NPRI ID	1990 <sup>1</sup> Estimate grams I- TEQ	1997 <sup>1</sup> Estimate grams I- TEQ	1999 <sup>1</sup> Estimate grams I- TEQ	2000 NPRI Releases to Air grams I- TEQ	2001 NPRI Releases to Air grams I- TEQ	2002 NPRI Releases to Air grams I- TEQ
1	AltaSteel Ltd	Alberta	1106	0.35	0.60	0.15	0.196	0.175	0.183
2	IPSCO Inc.	Saskatchewan	2740	1.01	1.41	1.40	2.059	2.059	3.752
3	Gerdau Ameristeel (MRM)	Manitoba	1651	0.54	0.63	0.63	0.378	0.378	0.152
4	Atlas Specialty Steels (Slater)	Ontario	3158	0.30	0.16	0.27	0.217	0.217	0.136
5	Gerdau Ameristeel Cambridge Inc.	Ontario	4169	0.50	0.36	0.36	0.411	0.410	0.421
6	Slater Steels - Hamilton Specialty Bar Division	Ontario	2161	0.62	0.74	0.82	0.174	0.174	0.175
7	Dofasco Inc.	Ontario	3713	0.00	1.20	0.50	0.578	0.578	0.680
8	Gerdau Ameristeel Whitby	Ontario	3824	1.62	0.70	0.79	0.041	0.041	0.135
9	Ivaco Rolling Mills Ltd.	Ontario	1520	0.78	0.88	0.92	0.072	0.072	0.071
10	Stelco McMaster Ltée	Quebec	2986	0.78	1.08	1.13	0.810	0.810	0.420
11	Ispat-Sidbec Inc.	Quebec	3649	1.62	1.95	3.69	0.210	0.210	0.310
12	Aciers Inoxydables Atlas (Slater)	Quebec	3953	0.14	0.16	0.09	0.120	0.120	0.150
13	Sydney Steel Corporation	Nova Scotia	4204	0.50	0.20	0.40	0.200	Closed	Closed
	Total (all facilities)			<b>8.76</b>	<b>10.07</b>	<b>11.15</b>	<b>5.47</b>	<b>5.24</b>	<b>6.59</b>

n/a = not available

NPRI = National Pollutant Release Inventory

I-TEQ = International (NATO) Toxic Equivalency Quotient

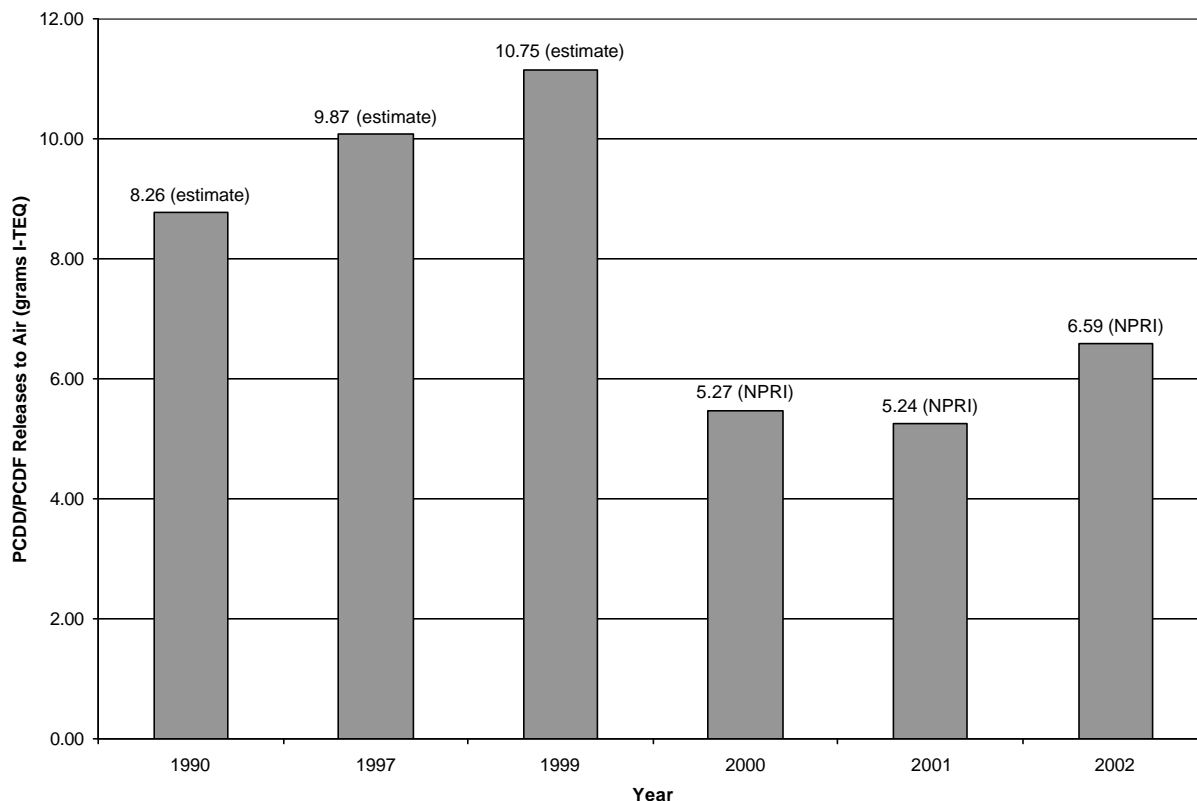
Note 1 - 1990, 1997 and 1999 data obtained from the EC's Inventory of Releases, Updated Edition, February 2001

## Discussion

Dioxins and furans are released primarily as by-products of industrial and combustion processes, but are also found as contaminants in certain pesticides or chlorinated solvents. These substances have been identified as toxic substances under CEPA 1999, and are slated for virtual elimination.

Facilities engaged in identified activities have the potential to incidentally manufacture dioxins/furans and are required to submit a report to the NPRI. The identified activities, including operation of electric arc furnaces in steel manufacturing, were selected by Environment Canada to cover all main point sources of dioxins/furans releases being targeted by the *Canada-wide Standards* initiatives for dioxins/furans.

A single substance report is required for the cumulative release of the 17 dioxins/furans congeners, in grams of international toxicity equivalent (I-TEQ) to the most toxic congener of dioxin (i.e., 2,3,7,8-tetrachlorodibenzo-p-dioxin). The quantity in grams of I-TEQs of dioxins/furans released, disposed of or transferred for recycling is estimated by adding the individual units of I-TEQ for each congener.



**Figure 1:** Dioxins and Furans Releases to Air from Steel Manufacturing Electric Arc Furnaces

## **Additional Information**

The CWS included commitments to thoroughly review the standard in 2003 in a multi-stakeholder forum and to develop a pollution prevention strategy. In 2003, Environment Canada led the review of the CWS for Dioxins and Furans from Steel Manufacturing Electric Arc Furnaces and the development of advice for a pollution prevention strategy, conducted through the Steel Environmental Multi-stakeholder Advisory Group (SEMAG). SEMAG members include representatives of industry, environmental non-government organizations, labour groups and provincial/federal governments.

The federal government will continue to promote sound management practices including practices aimed at minimizing the formation and release of dioxins and furans through initiatives such as the Environmental Codes of Practice for Steel Mills published under the *Canadian Environmental Protection Act 1999*.

To ensure the continued protection of Canadians and their environment, Canada is an active participant in international agreements on persistent organic pollutants (POPs) and has ratified the following:

- the United Nations Economic Commission for Europe (UNECE) POPs Protocol, ratified in 1998; and,
- the United Nations Environment Programme (UNEP) Stockholm Convention on POPs, ratified in 2001.

Canada is also committed to reducing dioxins/furans releases through regional initiatives such as:

- the North American Commission for Environmental Cooperation's Regional Action Plan (NARAP) on Dioxins, Furans and Hexachlorobenzene;
- the Canada-U.S. Great Lakes Binational Toxics Strategy (BTS); and
- the Northern Contaminants Program (NCP).

Canada's domestic programs provide examples to other countries for approaches to achieving significant dioxins and furans reductions. Under the UNEP, Canada has established a 5-year \$20 million (Cdn) Canada POPs Fund, administered by the World Bank, to assist developing countries to build their capacities to deal with POPs and to implement their obligations under the Convention.

Canada is a member of the UNEP Stockholm Convention Expert Group on Best Available Techniques (BAT) and Best Environmental Practices (BEP) for sources of unintentionally produced POPs (dioxins, furans, hexachlorobenzene and polychlorinated biphenyls). The Expert Group is developing guidelines on BAT and guidance on BEP for sources of these substances, which will be key to the implementation of the Stockholm Convention obligations on unintentionally produced POPs. Canada is making a significant contribution to the work of the Expert Group by drafting the BAT guidelines and BEP guidance for thermal metallurgical and other sources.

## Contact

Patrick G. Finlay  
Environment Canada  
Tel: 819-953-1103

## Alberta

Sector	Incineration
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### Biomedical Waste facilities

**Number of facilities:** one

**Facility:** Cristallo - Beiseker

**Data –**

**Facility Monitoring Summary:** Year: 2001 = 7.4 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>  
2002 = 9.8 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>

**Applicable CWS for facility:** Year: 2006 = 80 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>

**Manner of CWS implementation:** EPEA approval

**Summary:** Data indicates that all emission values were below 2006 CWS requirements.

### Hazardous Waste Incineration

**Number of facilities:** one

**Facility:** Earth Tech – Swan Hills

**Source:** FBD incinerator

**Facility Monitoring Summary:** Year: 1995 = 9 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>  
1996 = 45 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>  
1997 = 115 pgTEQ/m<sup>3</sup> @11%O<sub>2</sub>  
1998 = 79 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>  
1999 = 389 pgTEQ/m<sup>3</sup> @11%O<sub>2</sub>  
2000 = 66 pgTEQ/m<sup>3</sup> @11%O<sub>2</sub>  
2001 = 80 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>  
2002 = 90 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>  
2003 = 102 pg TEQ/m<sup>3</sup> @11%O<sub>2</sub>

**Applicable CWS for facility:** Year: 2006 = 80 pg TEQ/m<sup>3</sup>@11%O<sub>2</sub>

**Manner of CWS implementation:** EPEA approval

**Summary:** Stack dioxin and furan concentrations vary significantly between successive years. Five of the nine test surveys indicate that this facility would be able to meet the upcoming 2006 CWS. Additional work is required to determine rationale for emissions variance and potential remedy to reduce emissions.

**Municipal Waste Incineration**

**Number of facilities:** one

**Facility:** Wainwright Regional Incinerator

**Facility Monitoring Summary:** Year: 1999 = 28 pg TEQ/m<sup>3</sup> @11% O<sub>2</sub>  
2001 = 493 pg TEQ/m<sup>3</sup>@11% O<sub>2</sub>  
2002 = 87 pg/TEQ/m<sup>3</sup>@11% O<sub>2</sub>  
2003 = 342 pg TEQ/m<sup>3</sup>@11% O<sub>2</sub>

**Applicable CWS for facility:** Year: 2006 = 80 pg TEQ/m<sup>3</sup> @11% O<sub>2</sub>

**Manner of CWS implementation:** EPEA approval

**Summary:** Wide variance in dioxins and furans emissions data for this facility. Additional work is required to determine rationale for emissions variance and potential remedy to reduce emissions.

<b>Sector</b>	<b>Electric Arc Furnaces</b>
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**Number of facilities:** one

**Facility:** Alberta Steel – Edmonton (electric arc furnace)

**Data -**

**Facility Monitoring Summary:** Year: 2000 = 70.3 pg TEQ/m<sup>3</sup>  
2002 = 59.1 pg TEQ/m<sup>3</sup>  
2003 = 12.5 pg TEQ/m<sup>3</sup>

**Applicable CWS for facility:** Interim: 2006 = 150 pg TEQ/m<sup>3</sup>  
Final: 2010 = 100 pg TEQ/m<sup>3</sup>

**Manner of CWS implementation:** EPEA approval

**Summary:** Data indicates that all emission values were all below 2006 and 2010 CWS requirements.

<b>Sector</b>	<b>Coastal Pulp and Paper</b>
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**Number of facilities:** There are no facilities in Alberta.

<b>Sector</b>	<b>Conical Waste Combustion for Municipal Waste</b>
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**Number of facilities:** There are no facilities in Alberta.

## British Columbia

Sector	Incineration
<b>Discussion</b>	A municipal waste incineration facility is the only applicable facility in British Columbia. It is a relatively new facility and is in compliance with the standard for such facilities of 80pg I-TEQ/m <sup>3</sup> . British Columbia will ensure implementation of the standard for any new incineration facilities through its regulatory/authorization process.
<b>Additional Information</b>	The province has developed an extended producer responsibility regulation to expand the existing program, which addresses beverage containers and hazardous materials used in the home, to include electronic waste, starting with computers and televisions.
<b>Contact</b>	Sohee Ahn, (250) 953-5138

Sector	Coastal Pulp and Paper																								
<b>Data</b>	<p><b>Overall reduction:</b> Emissions from coastal power boilers burning salt-laden hog fuel:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Total Emissions</th> </tr> </thead> <tbody> <tr> <td>1995</td> <td>10.5 g TEQ/y</td> </tr> <tr> <td>1997</td> <td>7.9 g TEQ/y</td> </tr> <tr> <td>2002</td> <td>3.3 to 3.4 g TEQ/y</td> </tr> </tbody> </table> <p>Number of stack tests exceeding the 500 pg TEQ/m<sup>3</sup> @ 11% O<sub>2</sub>:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Number of stack tests</th> </tr> </thead> <tbody> <tr> <td>1995-2000</td> <td>5-6 per year</td> </tr> <tr> <td>2002<sub>1</sub></td> <td>1</td> </tr> </tbody> </table> <p>1 Note that there were still 2 or 3 stack tests in 2002 that produced emissions estimates very close to the 500 pg TEQ/m<sup>3</sup> at 11% O<sub>2</sub>.</p> <p>Overall average dioxin emissions from all of the power boilers at the coastal BC mills:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Overall Average Emissions<sub>2</sub></th> </tr> </thead> <tbody> <tr> <td>1992-1999</td> <td>493 pg TEQ/m<sup>3</sup></td> </tr> <tr> <td>2000</td> <td>239 pg TEQ/m<sup>3</sup></td> </tr> <tr> <td>2001</td> <td>280 pg TEQ/m<sup>3</sup></td> </tr> <tr> <td>2002</td> <td>130 pg TEQ/m<sup>3</sup></td> </tr> </tbody> </table> <p>2 At 11% O<sub>2</sub>.</p> <p><b>Number of samples:</b> A total of 103 stack dioxin tests were carried out on the eight coastal power boilers from 2000 through 2002. This number is substantially greater than the minimum of 64 required under the CWS agreement.</p> <p><b>Stack sampling parameters:</b></p>	Year	Total Emissions	1995	10.5 g TEQ/y	1997	7.9 g TEQ/y	2002	3.3 to 3.4 g TEQ/y	Year	Number of stack tests	1995-2000	5-6 per year	2002 <sub>1</sub>	1	Year	Overall Average Emissions <sub>2</sub>	1992-1999	493 pg TEQ/m <sup>3</sup>	2000	239 pg TEQ/m <sup>3</sup>	2001	280 pg TEQ/m <sup>3</sup>	2002	130 pg TEQ/m <sup>3</sup>
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	<p>Dioxin/furan and PAH emissions in the stack gases were determined using modified EPA method 5 (MM5). While Environment Canada has set the Limit of Quantification for stack dioxin emission tests at 30 pg (10<sup>-9</sup>) ITEQ/dry standard cubic metre (dscm), an extensive study by the American Society of Mechanical Engineers using side by side, simultaneous stack traverses indicates that 99 out of 100 single dioxin emission measurements should fall within 69 pg ITEQ/dscm of the true concentration when the emission concentration is in the range from 20 to 900 pg ITEQ/dscm.</p>
<b>Discussion</b>	<p>Stack dioxin concentrations varied significantly between individual tests on a given boiler and between boilers at different pulp mills. While some of the variability was due to tests where boiler combustion conditions, or operating conditions in the final particulate collection device, were deliberately altered in order to provide data for correlation validation, some boilers showed consistently higher average emission levels than others.</p> <p>The poor precision and reproducibility of the stack dioxin emission test makes data interpretation at low concentrations very difficult and risky.</p> <p>Despite the general improvement in dioxin emissions and the fact that the average stack emissions over the last three years are now generally below the CWS limit of 500 pg TEQ/m<sup>3</sup> at 11% O<sub>2</sub> for existing facilities, the large variations of individual test results, present difficulties for many of the mills in ensuring compliance with the current CWS limit, a concern noted in the CWS.</p>
<b>Additional information</b>	<p>The pulp and paper mill located in Port Alice ceased operations in Spring 2004. As a result, there are now seven coastal pulp and paper mills located in British Columbia and a further net reduction in dioxins emissions.</p>
<b>Contact</b>	<p>Sohee Ahn, (250) 953-5138</p>

**Summary of dioxin emissions tests for each coastal power boiler in tests from 2000 through 2002.**

<b>Power Boiler at Mill</b>	<b>No. of Tests</b>	<b>Average Emissions pg TEQ/m<sup>3</sup> at 11% O<sub>2</sub></b>	<b>Highest Emission Level, pg TEQ/m<sup>3</sup></b>	<b>Lowest Emission Level, pg TEQ/m<sup>3</sup></b>	<b>Ratio of High to Low</b>	<b>No. of Tests above 400 pg TEQ/m<sup>3</sup></b>	<b>No. of Tests above 500 pg TEQ/m<sup>3</sup></b>
<b>A</b>	16	274	2,570	10	252	2	2
<b>B</b>	12	108	290	15	19.3	0	0
<b>C</b>	12	394	868	160	5.4	5	3
<b>D</b>	12	37	138	10	13.8	0	0
<b>E</b>	18	55	176	16	11.0	0	0
<b>F</b>	17	212	550	12	45.8	2	1
<b>G</b>	10	542	1,720	56	30.7	4	4
<b>H</b>	6	46	144	16	9.0	0	0

<b>Annual Average Stack Dioxin Emissions from 2000 through 2002 (pg TEQ/m<sup>3</sup> at 11% O<sub>2</sub>)</b>						
<b>Year</b>	<b>2000</b>		<b>2001</b>		<b>2002</b>	
	<b>No. of Tests</b>	<b>Emissions</b>	<b>No. of Tests</b>	<b>Emissions</b>	<b>No. of Tests</b>	<b>Emissions</b>
<b>Mill A</b>	2	120	3 (*4)	130 (*740)	10	120
<b>Mill B</b>	5	130	2	89	5	91
<b>Mill C</b>	4	410	4	410	4	360
<b>Mill D</b>	4	37	4	48	4	25
<b>Mill E</b>	8	82	6	45	4	16
<b>Mill F</b>	9	270	3	240	5	100
<b>Mill G</b>	4	700	2	1020	4	140
<b>Mill H</b>			4	30	2	78

\* Including one extraordinarily high emission result under abnormal operating conditions.

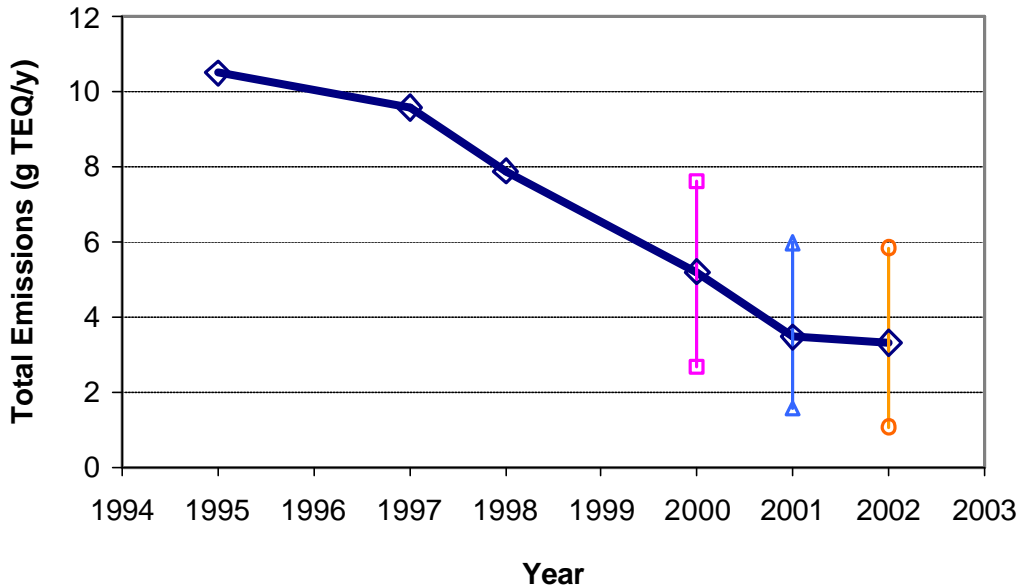


Figure 1. Average annual total dioxin emissions from the eight BC coastal power boilers from 1995 through 2002. The bars for 2000, 2001 and 2002 indicate the uncertainty in each emission estimate.

## Manitoba

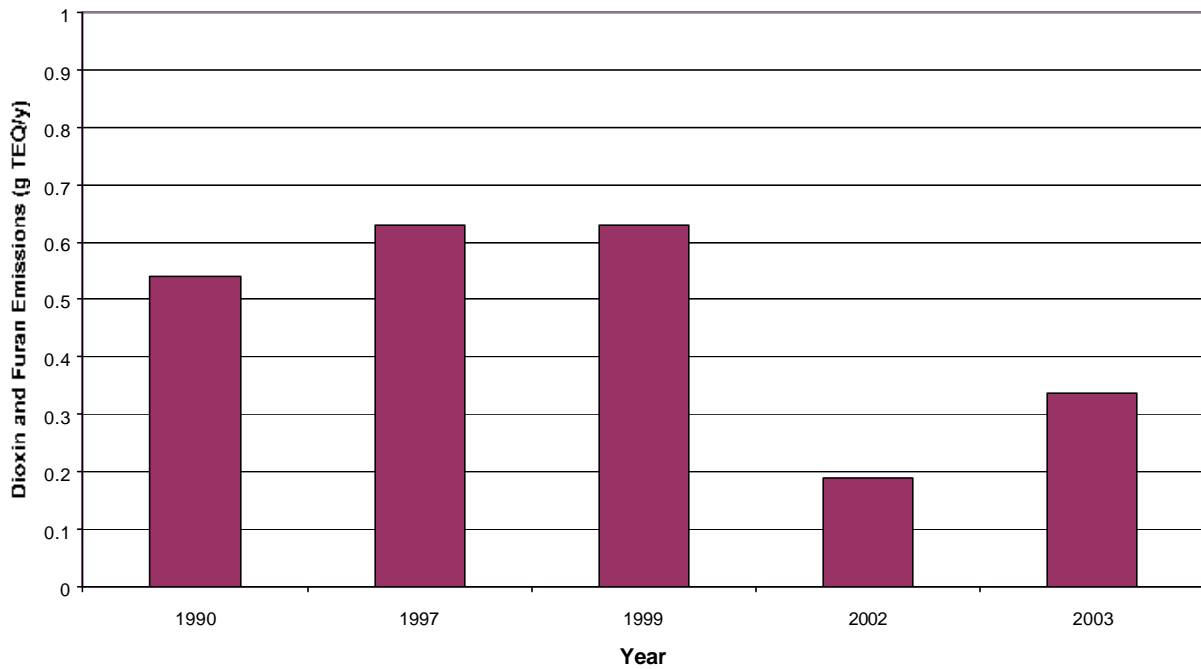
Sector	Incineration – Biomedical Waste								
Data	<p><b>Total dioxin and furan emissions from biomedical waste incinerators:</b></p> <table border="1"> <thead> <tr> <th>Year</th> <th>Total Emissions</th> </tr> </thead> <tbody> <tr> <td>1990<sup>1</sup></td> <td>0.54 g TEQ/y</td> </tr> <tr> <td>1997<sup>1</sup></td> <td>0.63 g TEQ/y</td> </tr> <tr> <td>1999<sup>1</sup></td> <td>0.63 g TEQ/y</td> </tr> </tbody> </table> <p><sup>1</sup>As reported in the Environment Canada report “Inventory of Releases (PCDDs and PCDFs)” of February 2001, based on an average concentration of 260 pg/m<sup>3</sup>.</p>	Year	Total Emissions	1990 <sup>1</sup>	0.54 g TEQ/y	1997 <sup>1</sup>	0.63 g TEQ/y	1999 <sup>1</sup>	0.63 g TEQ/y
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Discussion	<p>No stack sampling of biomedical waste incinerators in Manitoba has been conducted. The provincial effort has been focused on working with the Regional Health Authorities to reduce the incineration of biomedical waste in Manitoba rather than on testing the existing incinerators. This effort has been led by Manitoba Health with support from Manitoba Conservation. Since the CWS came into effect in May 2001, no new or expanded biomedical waste incinerators have been installed in Manitoba.</p>								
Contact	Jean Van Dusen, (204) 945-1671								

Sector	Steel Manufacturing Electric Arc Furnaces																		
<p><b>Data</b></p>	<p><b>Total dioxin and furan emissions from steel manufacturing electric arc furnace:</b></p> <table border="1" data-bbox="669 317 1263 543"> <thead> <tr> <th>Year</th> <th>Total Emissions</th> </tr> </thead> <tbody> <tr> <td>1990<sup>1</sup></td> <td>0.54 g TEQ/y</td> </tr> <tr> <td>1997<sup>1</sup></td> <td>0.63 g TEQ/y</td> </tr> <tr> <td>1999<sup>1</sup></td> <td>0.63 g TEQ/y</td> </tr> <tr> <td>2002<sup>2</sup></td> <td>0.19 g TEQ/y</td> </tr> <tr> <td>2003<sup>2</sup></td> <td>0.34 g TEQ/y</td> </tr> </tbody> </table> <p><sup>1</sup>As reported in the Environment Canada report "Inventory of Releases (PCDDs and PCDFs)" of February 2001, based on an average concentration in the exhaust gases of 260 pg/m<sup>3</sup>.</p> <p><sup>2</sup>Based on source sampling conducted at the Manitoba facility.</p> <p><b>Average dioxin and furan concentration in exhaust gas from steel manufacturing electric arc furnace:</b></p> <table border="1" data-bbox="669 806 1263 957"> <thead> <tr> <th>Year</th> <th>Average Plant Exhaust Gas Concentration</th> </tr> </thead> <tbody> <tr> <td>2002</td> <td>35 pg ITEQ/Rm<sup>3</sup></td> </tr> <tr> <td>2003</td> <td>55 pg ITEQ/Rm<sup>3</sup></td> </tr> </tbody> </table> <p>None of the samples for the individual stacks exceeded the 2006 CWS of 150 pg ITEQ/Rm<sup>3</sup> for this sector.</p> <p><b>Number of samples:</b> In 2002 and 2003, stack dioxin/furan tests (with replicates) were carried out on each of the three stacks located at the one steel manufacturer in Manitoba using an electric arc furnace.</p> <p><b>Stack sampling parameters:</b> Dioxin/furan in the stack gases were determined using the Environment Canada method EPS/1/RM/2 with analysis by EPA method EPA 0023a/8290A. EPA Method 5 was used to sample for particulates.</p>	Year	Total Emissions	1990 <sup>1</sup>	0.54 g TEQ/y	1997 <sup>1</sup>	0.63 g TEQ/y	1999 <sup>1</sup>	0.63 g TEQ/y	2002 <sup>2</sup>	0.19 g TEQ/y	2003 <sup>2</sup>	0.34 g TEQ/y	Year	Average Plant Exhaust Gas Concentration	2002	35 pg ITEQ/Rm <sup>3</sup>	2003	55 pg ITEQ/Rm <sup>3</sup>
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<p><b>Discussion</b></p>	<p>Stack dioxin and furan concentrations obtained from the source sampling were less than the default concentration used to estimate emissions in the 2001 Inventory Report. Emissions were significantly higher from the primary stack off the electric arc furnace, compared to the secondary stacks off the canopy and ladle furnaces. Emissions from both the primary and secondary stacks were controlled by baghouses.</p> <p>No reason is available for the higher dioxin and furan emissions from the primary stack in 2002 compared to 2003.</p>																		
<p><b>Contact</b></p>	<p>Jean Van Dusen, (204) 945-1671</p>																		

**Summary of dioxin emissions tests from the steel manufacturer using an electric arc furnace in 2002 and 2003.**

Year	No. of Tests	Average Dioxin and Furan Concentrations (pg TEQ/m <sup>3</sup> )				No. of Tests above 150 pg TEQ/m <sup>3</sup>
		Plant	Primary Stack	East Secondary Stack	West Secondary Stack	
2002	1	35	74	6	4	0
2003	1	55	132	1.4	2.2	0

**Manitoba Steel Manufacturing Electric Arc Furnaces  
Dioxin and Furan Emissions**



## New Brunswick

Sector	Incineration – Biomedical Waste
<b>Discussion</b>	New Brunswick has two remaining biomedical waste incinerators operating in the Province, since the closure of a biomedical waste incinerator in June 2002. The larger incinerator, equipped with activated carbon injection, fabric filter baghouse and wet scrubber, processes approximately 800 tonnes of biomedical waste per year. The smaller incinerator, equipped with a wet scrubber, processes approximately 70 tonnes per year. Stack testing for dioxins and furans was been conducted at the larger biomedical waste incinerator in 2001 and will be conducted again in 2004. Dioxin and furan emissions (from stack testing in 2001) ranged from 24.9 pg TEQ/m <sup>3</sup> to 317.2 pg TEQ/m <sup>3</sup> . The three-test average was 172 pg TEQ/ m <sup>3</sup> , which translates to annual dioxin and furan emissions of 0.003 g TEQ/y, based on 5000 operating hours per year.
<b>Additional Information</b>	The operator of the larger incinerator has made efforts to improve the dioxin and furan capture efficiency of the activated carbon injection/fabric filter baghouse system. Stack testing is to be conducted in 2004 to verify improvements.
<b>Contact</b>	Mark Glynn, (506) 453-4463

Sector	Coastal Pulp and Paper
<b>Discussion</b>	Currently, only one of New Brunswick's pulp and paper mills burns salt-laden wood. The salt-laden wood is a result of an old hogged fuel pile located on the facility property, which was generated many years ago when logs were floated to the mill. The facility no longer receives wood in this manner, nor is any salt-laden wood purchased. Currently, this hogged fuel is blended in small quantities with other wood waste in an effort to eliminate the pile. It is anticipated that this pile of salt-laden wood will be eliminated by the end of 2005.
<b>Additional Information</b>	The burning of salt laden wood in pulp and paper mill boilers will be prohibited in New Brunswick by the time the Canada-Wide Standard for Dioxins and Furans becomes effective in 2006. Therefore, no stack testing or emissions reporting requirements are envisioned for this industrial sector.
<b>Contact</b>	Mark Glynn, (506) 453-4463

## ***Newfoundland and Labrador***

### **Discussion**

Newfoundland and Labrador is committed to the phase-out of Conical Waste Combustors in the province by 2008, under the Canada Wide Standard for Conical Waste Combustors signed by the provincial Minister of Environment on January 15, 2004. New Air Pollution Control Regulations have recently been enacted which define Ambient Air Quality Standards for Dioxins and Furans, and also limit in-stack concentrations of PCDDs and PCDFs, for new incineration or pyrometric equipment, to 80 pg I-TEQ/m<sup>3</sup> at reference conditions.

Currently there are no other major atmospheric releases of concern as defined by the work of the CCME group on Dioxins and Furans in this province.

### **Contact**

Geoff Dawe, (709) 729-2564

## Northwest Territories

Sector	Incineration
<b>Data</b>	No stack test data is currently available.
<b>Discussion</b>	<p>Since endorsement of the CWS, 2 of the original 4 biomedical incinerators falling within the jurisdiction of the territorial government have ceased operation. The 2 operating incinerators burn biomedical waste in amounts less than 26 tonnes/year.</p> <p>One of the non-operating incinerators has closed permanently, with waste shipped for disposal in a southern location. The other facility is closed pending upgrade or installation of a new incinerator.</p> <p>Of the operational incinerators, one is a recent installation, replacing the previous equipment, using modern technology and pollution control equipment. The facility has been designed to comply with the emission limits specified in the CWS. Ongoing compliance will be demonstrated through a program of waste diversion and other activities related to determined efforts.</p> <p>The other operating incinerator is outdated and no pollution control equipment is installed. Discussions have been initiated regarding upgrading, replacement or options for alternative disposal of the biomedical waste.</p> <p>The Department of Resources, Wildlife and Economic Development is currently drafting Guidelines for Biomedical Waste Disposal which will incorporate the CWS emission limits and options for demonstrating compliance. The Guidelines will require that any new facility use best available technology and pollution control equipment, regardless of size.</p> <p>The Department of Health and Social Services has recently completed a report on options for disposal of biomedical waste throughout the territories.</p>
<b>Additional Information</b>	There are other waste incinerators operating within the NWT (e.g at remote industrial sites and exploration camps). However, they are located on federal crown land and are not regulated by the Government of the Northwest Territories.
<b>Contact</b>	Graham Veale Air Quality Programs Coordinator, (867) 873-7654 or Don Helfrick Hazardous Waste Specialist, (867) 873-7654.

## Nova Scotia

<b>Sector</b>	<b>Incinerators – Municipal Solid and Biomedical Waste</b>
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### Data

Year Total Emissions (based on single annual stack test event of 3 test average)

Year	Total Sector Release (g TEQ/yr)
1999	0.01
2000	0.0004
2001	0.02
2002	0.05

Stack Test Results (single annual stack test event of 3 test average)

Year	Stack #1 Dioxins and Furans Concentrations (pg /m <sup>3</sup> )	Stack #2 Dioxins and Furans Concentrations (pg /m <sup>3</sup> )
1999	24.2	39.6
2000	0.21	2.16
2001	81.4	43
2002	245.3	110.0

Number of Annual Stack Tests exceeding the 80pg ITEQ/m<sup>3</sup>(@25°C, 101.3kPa, 11% oxygen):

Year	Stack Tests (average of 3 individual)
1999	0
2000	0
2001	1
2002	2

Number of Samples:

Nova Scotia has one incinerator unit with two stacks. Each stack of the unit had one annual stack test (average of 3 individual tests) for a total of 8 tests over four years. The facility currently processes approximately 36,500 tonnes/yr of municipal solid waste and approximately 2200 tonnes/year of biomedical waste.

Stack Sampling Parameters and Test Methodology:

Each stack undergoes annual stack sampling at 100% capacity for total suspended particulate, metals, hydrogen chloride, dioxins and furans, sulfur dioxide, carbon monoxide and nitrogen oxides as part of their requirements for their Approval to Operate the facility. The dioxins and furans were tested in accordance to the Reference Method for Source Testing: Measurement of Releases of Selected Semi-volatile Organic Compounds from Stationary Sources (EPS 1/RM/2). The test results were expressed in relation to dry cubic metres of flue gas at 25°C and 101.3 kPa and the degree of dilution air in the gas stream was defined at 11% oxygen.

## **Discussion**

Historical stack test results had consistently met the 80pg ITEQ/m<sup>3</sup>. Consequently, in 2001 the province amended the facility's approval to incorporate the Canada-Wide Standard for Dioxins and Furans. However, stack test results for Stack #1 in 2001 and both Stacks #1&2 in 2002 indicated that the facility was out of compliance. One possible cause for the change in results over the last two years, is the change in the composition of the waste stream. An increase in recycling and composting has changed the overall composition of the waste stream and has increased the density by reducing voids.

In addition, there were some operational problems with the combustion air supply during the 2002 stack test which have since been corrected. Additional modifications were performed at the facility in 2003 which should contribute to reductions in dioxins and furans emissions.

## **Contact**

Sharon Vervaeet, P.Eng., (902) 424-2546

## ***Nunavut***

*Progress report will be added when available.*

## Ontario

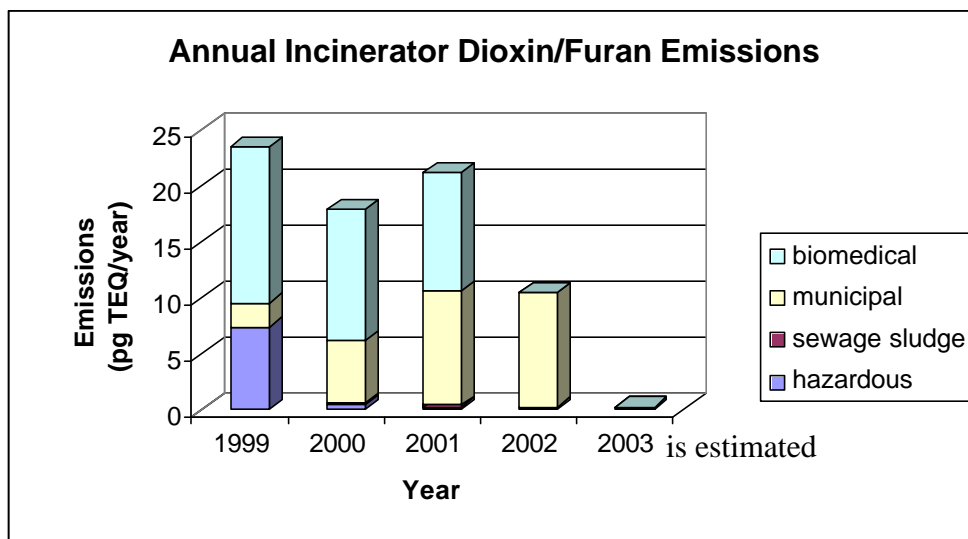
Sector	Incinerators – Annual Emissions															
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<sup>7</sup> 1999 emissions taken from the Environment Canada Inventory of Releases, 2001 Update; 2000 and 2002 releases are copied from NPRI, emissions from facilities that did not report to NPRI were estimated

<sup>8</sup> 6.8 g is attributed to the incinerator at the Bruce nuclear plant (Environment Canada Inventory of Releases- 2001 Update); this facility was replaced in 2002 and is being commissioned.

<sup>9</sup> SWARU was Hamilton's Solid Waste Recovery Unit that was closed December 2002.

<b>Discussion</b>	<p>Significant reductions have been achieved in Ontario due to the following:</p> <ul style="list-style-type: none"> <li>• the Bruce nuclear plant incinerator was replaced in 2002 and is being commissioned;</li> <li>• Hamilton’s Solid Waste Recovery Unit (SWARU) closed December 2002;</li> <li>• Ontario passed O.Reg 323/02 requiring hospital incinerators to close by December 6, 2003 and a new state of the art commercial biomedical waste incinerator that accepts hospital waste was commissioned in 2001, and</li> <li>• KMS Peel installed new pollution control equipment in 2001 that significantly reduced their emissions.</li> </ul>
<b>Contact</b>	John Steele, (416) 314-6666



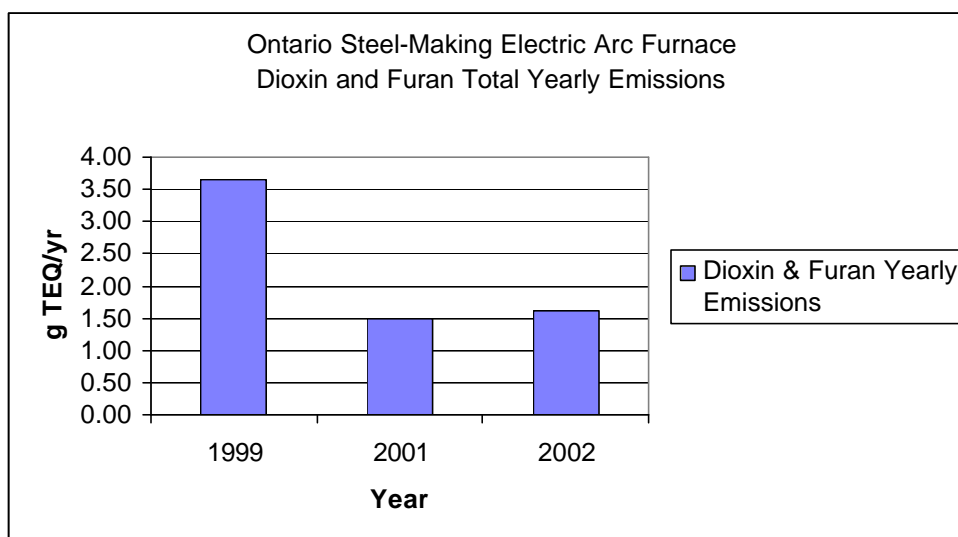
<sup>10</sup> Ontario passed O.Reg 323/02 that required hospital incinerators to close by December 6, 2003.

<sup>11</sup> The 2000 and 2001 emissions were estimated based on the number of operating hospital incinerators in these years compared to the number operating in 1999.

<sup>12</sup> A new state of the art commercial biomedical waste incinerator that accepts hospital waste was commissioned in 2001.

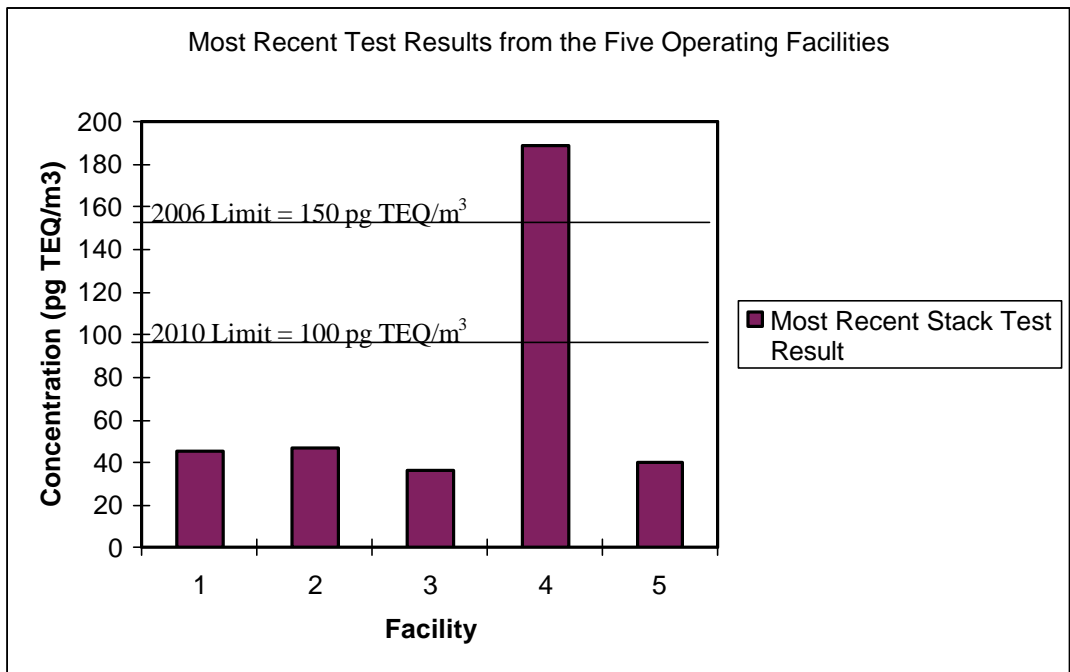
<sup>13</sup> Ontario has a state of the art municipal waste incinerator and commercial biomedical waste incinerator, the most recent stack test results for both of these facilities were below the Level of Quantification (LoQ) for dioxins/furans (32 pg TEQ/m<sup>3</sup>) and therefore these facilities were not required to report their annual emissions to NPRI.

Sector	Steel Making Electric Arc Furnaces – Annual Emissions	
<b>Emission reductions</b>	Emissions:	
	<b>Year</b>	<b>Total Emissions<sup>14</sup></b> (g TEQ/y)
	1999	3.66
	2001	1.49
	2002	1.62
<b>Discussion</b>	There are five (5) EAFs that are subject to this Canada-wide Standard currently operating in Ontario (a sixth facility in Welland was idled (temporarily) in late 2003). The National Pollutant Release Inventory (NPRI) data for this sector shows a 56% reduction in annual emissions for this sector between 1999 and 2002.	
<b>Contact</b>	John Steele, (416) 314-6666	



<sup>14</sup> 1999 emissions taken from the Environment Canada Inventory of Releases – 2001 Update; 2001 and 2002 releases are taken from NPRI

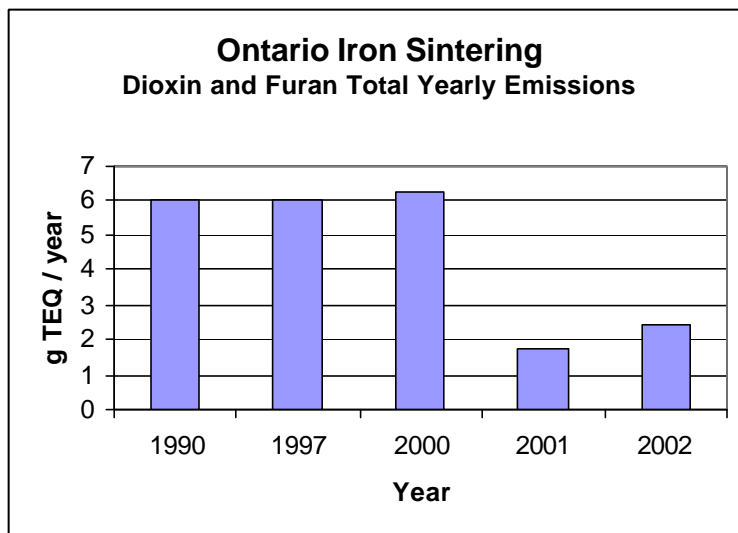
Sector		Steel Making Electric Arc Furnaces – Emission Concentrations		
Emission reductions	Most Recent Results from Stack Testing:			
	Year	Number of Facilities Tested	Concentrations (pg TEQ/m <sup>3</sup> )	
	2001	1	40.0	
	2002	3	45.3, 46.6, 34.8	
	2003 <sup>15</sup>	2	189, 36.1	
Discussion	Four of the five EAFs currently operating in Ontario have already proven their ability to meet the 2010 limit and the fifth facility is taking action to also meet the 2010 limit of 100 pg TEQ/m <sup>3</sup> .			
Contact	John Steele, (416) 314-6666			



<sup>15</sup> This facility installed a new fume conditioning system and expects to meet the 2010 limit before the end of 2004.

Sector	Iron Sintering – Annual Emissions																														
<b>Data</b>	<p><b>Overall reduction:</b> Emissions from iron sintering in Ontario:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>Total Emissions<sup>16</sup> (g TEQ/y)</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>6.0</td> </tr> <tr> <td>1997</td> <td>6.0</td> </tr> <tr> <td>2000</td> <td>6.248</td> </tr> <tr> <td>2001</td> <td>1.73</td> </tr> <tr> <td>2002</td> <td>2.39</td> </tr> </tbody> </table> <p>Average dioxin/furan and particulate in-stack concentrations from iron sintering:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>Average Conc. (pg TEQ/m<sup>3</sup>)</th> <th>Particulate Concentrations (mg/Nm<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>2,700</td> <td>not available</td> </tr> <tr> <td>1997</td> <td>2,700</td> <td>not available</td> </tr> <tr> <td>1998</td> <td>2,693</td> <td>90.1</td> </tr> <tr> <td>2001</td> <td>510</td> <td>48.5</td> </tr> <tr> <td>2002</td> <td>1,040</td> <td>67.7</td> </tr> </tbody> </table> <p><b>Number of samples:</b> A total of four stack tests for dioxins/furans and particulate were carried out on the single remaining Canadian iron sintering plant between 1998 and 2003. The results from the stack test conducted in late 2003 are not yet available. The Iron Sintering CWS (endorsed by Ministers in March, 2003) requires annual stack testing for dioxins/furans and particulate matter.</p>	Year	Total Emissions <sup>16</sup> (g TEQ/y)	1990	6.0	1997	6.0	2000	6.248	2001	1.73	2002	2.39	Year	Average Conc. (pg TEQ/m <sup>3</sup> )	Particulate Concentrations (mg/Nm <sup>3</sup> )	1990	2,700	not available	1997	2,700	not available	1998	2,693	90.1	2001	510	48.5	2002	1,040	67.7
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<b>Discussion</b>	There is only one facility currently operating in Canada that is subject to this Canada-wide Standard. The facility has not been able to meet the 2005 limit and is taking further corrective action.																														
<b>Contact</b>	John Steele, (416) 314-6666																														

<sup>16</sup> 1999 emissions taken from the Environment Canada Inventory of Releases – 2001 Update; 2000 and 2001 releases are taken from NPRI; 2002 releases are taken from Ontario's OnAIR website



### **Prince Edward Island**

Sector	Incineration-Municipal Waste		
Introduction	An energy-from-waste plant, operating in Charlottetown since the mid 1980s, is the only facility in PEI incinerating municipal solid waste. Since 1998, it has been stack tested for dioxins and furans three times.		
Data	Average of 3 tests from single annual test events.		
	Year	Concentration in pg TEQ/m <sup>3</sup> (at 25EC, 101.3 kPa, 11% oxygen)	Year Total Emissions (g TEQ/y)
	1998	500	0.75
	2002	2,900	0.58
	2004	20,300	4.25
Discussion	<p>Changes in the composition of the waste stream, due to an increase in recycling and composting, is likely responsible for the steady increase in dioxin/furan levels.</p> <p>Because the facility is an energy-from-waste plant that supplies a large district heating system, the quantity of waste incinerated will remain constant for years to come. Consequently, appropriate emission controls will be applied and a concentration of 80 pg I-TEQ/m<sup>3</sup>, or less, achieved by 2006.</p>		
Contact	Todd Fraser, (902) 368-5037		

Sector	Incineration-Medical Waste
Introduction	Two small biomedical waste facilities incinerate approximately 15 tonnes of material per year.
Data	No stack emissions testing has been performed on either of the units.
Discussion	Rather than testing the emissions from these facilities, the focus has been on working with them to reduce the incineration of biomedical waste.
Contact	Todd Fraser, (902) 368-5037

## Québec

The Province of Quebec, while not a signatory to the Canada-wide Accord on Environmental Harmonization or Canada-wide Environmental Standards Sub-Agreement, has undertaken analogous efforts on environmental standards as those covered by the agreement, and has also developed working inter-jurisdictional arrangements on issues such as monitoring and reporting.

## Saskatchewan

<b>Sector</b>	<b>Incineration</b>								
<b>Data</b>	<p>Total dioxin and furan emissions from biomedical waste incinerators:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Total Emissions</th> </tr> </thead> <tbody> <tr> <td>1990<sup>1</sup></td> <td>2.26 g TEQ/y</td> </tr> <tr> <td>1997<sup>1</sup></td> <td>2.26 g TEQ/y</td> </tr> <tr> <td>1999<sup>1</sup></td> <td>0.86 g TEQ/y</td> </tr> </tbody> </table> <p><sup>1</sup>As reported in the Environment Canada report "Inventory of Releases (PCDDs and PCDFs)" of February 2001. The numbers above are the totals of Municipal Waste Incinerators and Medical Incinerators. However, Saskatchewan has only Medical Waste incinerators.</p> <p><b>Numeric Target and Timeframe for Achieving Target:</b>  Dioxin and furan emissions will be less than 80 pg/m<sup>3</sup> I-TEQ for all new or expanding facilities of any size and for all uses (municipal waste, medical waste, hazardous waste and sewage sludge). Use of best available pollution prevention and control techniques, such as a waste diversion program, will be used to achieve this CWS. Any new or expanding facility will be required to design for and achieve compliance immediately upon attaining normal full scale operation with compliance to be confirmed by annual stack testing.</p> <p>At existing medical waste incineration facilities, dioxin and furan</p>	Year	Total Emissions	1990 <sup>1</sup>	2.26 g TEQ/y	1997 <sup>1</sup>	2.26 g TEQ/y	1999 <sup>1</sup>	0.86 g TEQ/y
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	<p>emissions will be less than 80 pg/m<sup>3</sup> I- TEQ. These smaller facilities must make determined efforts to achieve this stack concentration by 2006. "Determined Efforts" have been defined in a fact sheet which can be found on the internet at <a href="http://www.se.gov.sk.ca/environment/protection/standards/EBP255_PVC_Mercury_inHospitals.pdf">www.se.gov.sk.ca/environment/protection/standards/EBP255_PVC_Mercury_inHospitals.pdf</a>.</p>
<p><b>Discussion</b></p>	<p><b>Progress Towards Implementation</b></p> <p><b>General accountability:</b> Saskatchewan's overall approach to management of emissions from new waste incineration facilities is to incorporate the CWS into the conditions of "permits to operate" issued pursuant to Saskatchewan's Clean Air Act and Clean Air Regulations. If the construction of a new waste incineration facility is such that it would be considered to be a "development," during the project development and assessment stage, management of dioxin and furan emissions will be introduced through the processes associated with The Environmental Assessment Act. These provisions will apply for municipal waste incineration, medical waste incineration, hazardous waste incineration and sewage sludge incineration as defined within the CWS.</p> <p>In Saskatchewan there were thirteen medical incinerators permitted and operating in the province prior to the introduction of the CWS. As of 2004, eight of those thirteen incinerators are no longer operating. Two of the remaining five medical incinerators are discussing decommissioning plans with Saskatchewan Environment. The discontinued use of these eight incinerators has lowered the overall emission of dioxins and furans from incineration that is now estimated at 0.55 g/yr, a 0.31g/yr reduction from the 1999 estimate. This reduction does not include further reductions realized by "determined efforts."</p> <p>Saskatchewan's overall approach to management of dioxin and furan emissions from these two and the remaining three permitted medical incinerators is to incorporate the CWS into the conditions of permits to operate issued pursuant to Saskatchewan's Clean Air Act and Clean Air Regulations by 2006. Since these remaining five incinerators subject to the CWS are operated as components of waste management of hospital operations, and all are of relatively small loading of less than 26 tonnes per year, permit conditions will provide for choice of pollution control upgrading and stack testing or "determined efforts" including diversion planning and waste audits. The initial thrust of permit implementation is to encourage voluntary actions through diversion planning and subsequent waste auditing. It is noted that while all existing waste incinerators governed by the CWS are operated by hospitals, the waste stream sent to these incinerators would allow classification as either medical waste or municipal</p>

	<p>waste incinerators.</p> <p>Saskatchewan Environment also intends to pursue the decommissioning of those ten incinerators not operating at this time. Existing sources that have not been identified or permitted will be subject to the same requirements as described above for existing incinerators and will require permits according to The Clean Air Regulations.</p>
<b>Additional Information</b>	The “Determined Efforts” fact sheet that defines expectations of facilities to meet the CWS can be found at <a href="http://www.se.gov.sk.ca/environment/protection/standards/">www.se.gov.sk.ca/environment/protection/standards/</a> .
<b>Contact</b>	Dave Ballagh, (306) 787-6208

<b>Sector</b>	<b>Electric Arc Furnaces</b>										
<b>Data</b>	<p>Emissions from IPSCO, Regina SK :</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Total Emissions</th> </tr> </thead> <tbody> <tr> <td>1999</td> <td>237* pg ITEQ/Rm<sup>3</sup></td> </tr> <tr> <td>2001</td> <td>317 pg ITEQ/Rm<sup>3</sup></td> </tr> <tr> <td>2002</td> <td>919 pg ITEQ/Rm<sup>3</sup></td> </tr> <tr> <td>2003</td> <td>1284 pg ITEQ/Rm<sup>3</sup></td> </tr> </tbody> </table> <p>* Indicates that the 1999 result does not include a second column confirmation analysis. All other tests include a second column confirmation analysis. The detection limits for all non-detects have been included in the total.</p> <p>The above results are calculated using flow weighted averages and are expressed as a concentration in the total exhaust gas exiting the EAF air pollution control systems.</p>	Year	Total Emissions	1999	237* pg ITEQ/Rm <sup>3</sup>	2001	317 pg ITEQ/Rm <sup>3</sup>	2002	919 pg ITEQ/Rm <sup>3</sup>	2003	1284 pg ITEQ/Rm <sup>3</sup>
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<b>Discussion</b>	IPSCO's release of dioxins and furans are estimated at 1.4 grams ITEQ/yr according to the 1999 Inventory of Releases. Over the time period of 1999 to 2004 IPSCO has pursued a number of research initiatives. These initiatives and process changes have yielded a wide variety of results over the 1999 to 2003 time period. However, and even though these results vary greatly, the steel producer is confident in meeting the 2006 phase 1 of the CWS. Other developments include the announcement of construction of a fourth baghouse that will aid in the reduction of dioxins and furans. This additional baghouse will improve the overall emissions from this EAF facility, and this addition coupled with existing pollution control devices, will align the Regina facility with similar IPSCO facilities in the United States. This addition will aid IPSCO in meeting the challenges in Phase 2 of the CWS as well.
<b>Contact</b>	Dave Ballagh, (306) 787-6208

## **Yukon**

### **Discussion**

The Yukon has no pulp & paper industry, iron sintering plants or steel manufacturing electric arc furnaces.

<b>Sector</b>	<b>Incineration</b>
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Stack sampling is not required, nor has it ever been conducted at the only biomedical waste incinerator in the Yukon (Whitehorse General Hospital). At this facility, which burns approximately 8m<sup>3</sup> of biomedical waste per week, dioxin and furan emissions are likely less than 80 pg/m<sup>3</sup> I-TEQ. This facility is in the process of making voluntary determined efforts to achieve lower stack concentrations by 2006, and will be legally required to make determined efforts upon permit renewal. The renewed permit requirements will prescribe a waste diversion program audit to achieve compliance with the CWS.

New facilities will be required to comply with the standards immediately.

### **Contact**

Janine Kostelnik, (867)667-5456