

**CANADA-WIDE STANDARDS
FOR DIOXINS AND FURANS**

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

**PROGRESS REPORT
2009**

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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 subagreement 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' report on progress in reducing dioxins and furans emissions from the five sectors for which dioxins and furans Canada-wide standards have been developed. These are waste incineration (municipal solid waste, hazardous waste, sewage sludge and medical waste); burning salt laden wood in coastal pulp and paper boilers; iron sintering; electric arc furnace steel manufacturing; and conical municipal waste combustion.

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

Since Québec is not a signatory to the Canada-wide Accord on Environmental Harmonization or the agreement on Canada-wide Standards, it is not required to prepare an implementation plan. However, Québec strives to meet environmental standards whose limits are similar to those in the Canada-wide Standards. When it becomes available, information on Québec's progress toward meeting these standards will be posted on the website of the Ministry of Sustainable Development, Environment and Parks at the following address:

<http://www.mddep.gouv.qc.ca/index.asp>

Highlights

Coastal Pulp & Paper Mill Boilers

In 2008 all facilities reported test results that were in compliance with the CWS. However, 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. Total emissions from this sector have declined from 10.5 gTEQ/year to 1.5gTEQ/year.

Incineration

All types of incinerators covered by the CWS have achieved compliance with the relevant values except for a single facility in Ontario. The Ministry of Environment has worked with the operator of the sewage sludge incinerator to develop an abatement strategy that will be fully implemented by 2013.

Electric Arc Furnaces

Operators across the country have made significant investments in pollution control upgrades. Only one facility in Ontario reported tests results out of compliance with the CWS in 2008. The operator is considering changes to increase combustion efficiency and these improvements should result in compliance with the CWS by 2010.

Iron Sintering Plants

The only sintering plant in Canada was shut down in 2007 and the Ontario Ministry of Environment has not been informed of any plans to restart the facility.

Conical Waste Combustion

As of fall 2009, 42 conical waste combustors servicing 165,378 people have been closed resulting in a 76.3% reduction in atmospheric emissions of dioxins and furans. This leaves 16 combustors servicing 51,350 people to be closed by 2010.

By all accounts, the CWS for dioxins and furans has been successfully implemented and achieved the desired outcome of reducing the release of dioxins and furans to the atmosphere. This is the last progress report required under the CWS although facility monitoring must continue and the reports of those tests be made available by each jurisdiction.

Progress Reports

CANADA

As of August 2008, there were 45 known incinerators operating on federal lands. Of these, 28 were owned and operated by federal departments and agencies including the Department of National Defence, the Canadian Food Inspection Agency, Agriculture and Agri-Food Canada, the RCMP, and Environment Canada. The other 17 were owned and operated by third parties such as mining and oil and gas companies.

In response to recommendations made in the 2007 Review of Dioxins and Furans from Incineration, Environment Canada has developed a Technical Document for Batch Waste Incineration. This document provides guidance for owners and operators of batch waste incinerators regarding proper system selection, operation, maintenance and record keeping, with the goal of assisting them in achieving the intent of the Canada-wide Standards for dioxins/furans and mercury, and reducing releases of other toxic substances.

The document includes:

- A discussion of the importance of reducing, reusing and recycling to divert wastes from disposal;
- Methods for the selection of appropriate incineration technologies to meet specific waste management requirements;
- Operational requirements that should allow batch incinerators to meet the intent of the Canada-wide Standards for dioxins/furans and mercury, and to reduce the release of other toxic substances; and
- Recommendations on record keeping and reporting.

The Technical Document focuses on minimizing dioxins/furans and mercury emissions from batch waste incinerator systems ranging in size from 50 kg to 3000 kg of waste/batch, the latter representing the largest batch incinerator currently in use in Canada. Batch waste incinerators are those that operate in a non-continuous manner (i.e. they are charged with waste prior to the initiation of the burn cycle, and the door remains closed until the ash has cooled inside the primary chamber). Air emission testing completed by Environment Canada in 2002 using a modern Canadian-built batch waste incinerator demonstrated that, when properly operated and maintained, these systems are capable of meeting the Canada-wide Standards for dioxins/furans (80 pg I-TEQ/Rm3 @ 11% O2) and mercury (20 µg/Rm3 @ 11% O2).

Environment Canada is promoting the use of the technical document for waste incinerators within the Federal House. Further information on the document and how to access the full document is available on the web site of the Waste Reduction and Management Division.

<http://www.ec.gc.ca/drgd-wrmd/default.asp?lang=En&n=82401EC7-1>

BRITISH COLUMBIA

Sector	Incineration										
Data	<p>Emissions:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Emissions</th> </tr> </thead> <tbody> <tr> <td>1999</td> <td>below LoQ</td> </tr> <tr> <td>2003</td> <td>below LoQ</td> </tr> <tr> <td>2005</td> <td>below LoQ</td> </tr> <tr> <td>2007</td> <td>below LoQ</td> </tr> </tbody> </table> <p>Number of samples: Triplicate sampling conducted resulting in 12 data points for this</p>	Year	Emissions	1999	below LoQ	2003	below LoQ	2005	below LoQ	2007	below LoQ
Year	Emissions										
1999	below LoQ										
2003	below LoQ										
2005	below LoQ										
2007	below LoQ										

	<p>reporting period.</p> <p>Stack sampling parameters: Sampling was conducted under acceptable CWS methods with stack test results being corrected to reference conditions under CCME guidelines, which are 25 °C, 101.3 kPa, dry basis, corrected to 11% O₂.</p>
Discussion	<p>A municipal waste incineration facility is the only applicable facility in this category in British Columbia. The facility is in compliance with the Canada Wide Standard for such facilities of 80 pg I-TEQ/m³. Dioxin and furan testing, conducted in accordance with approved methods under the Canada Wide Standard, has not shown any results at or above the limit of quantification (LoQ), which is 32 pg I-TEQ/m³.</p>
Additional Information	
Contact	Paul J. Remillard, Tel: 604-436-6812

Sector	Coastal Pulp and Paper																																						
Data	<p>Overall reduction: Emissions from coastal power boilers burning salt-laden hogged 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 g TEQ/y</td> </tr> <tr> <td>2003</td> <td>4.2 g TEQ/y</td> </tr> <tr> <td>2004</td> <td>4.2 g TEQ/y</td> </tr> <tr> <td>2005</td> <td>3.6 g TEQ/y</td> </tr> <tr> <td>2006</td> <td>2.9 g TEQ/y</td> </tr> <tr> <td>2007</td> <td>2.7 g TEQ/y</td> </tr> <tr> <td>2008</td> <td>1.5 g TEQ/y</td> </tr> </tbody> </table> <p>Number of stack tests exceeding the 500 pg TEQ/m³ @11% O₂:</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</td> <td>1 (2)</td> </tr> <tr> <td>2003</td> <td>3 (1)</td> </tr> <tr> <td>2004</td> <td>0 (2)</td> </tr> <tr> <td>2005</td> <td>0</td> </tr> <tr> <td>2006</td> <td>2</td> </tr> <tr> <td>2007</td> <td>3 (1)</td> </tr> <tr> <td>2008</td> <td>0</td> </tr> </tbody> </table>	Year	Total Emissions	1995	10.5 g TEQ/y	1997	7.9 g TEQ/y	2002	3.3 g TEQ/y	2003	4.2 g TEQ/y	2004	4.2 g TEQ/y	2005	3.6 g TEQ/y	2006	2.9 g TEQ/y	2007	2.7 g TEQ/y	2008	1.5 g TEQ/y	Year	Number of stack tests	1995-2000	5-6 per year	2002	1 (2)	2003	3 (1)	2004	0 (2)	2005	0	2006	2	2007	3 (1)	2008	0
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Bracketed number shows additional tests that produced emission concentrations very close to the criteria of 500 pg TEQ/m³ at 11% O₂.

Overall average dioxin emissions from all of the power boilers at the coastal BC mills:

Year	Overall Average Emissions ₂
1992-1999	493 pg TEQ/m ³
2000	239 pg TEQ/m ³
2001	280 pg TEQ/m ³
2002	130 pg TEQ/m ³
2003	343 pg TEQ/m ³
2004	154 pg TEQ/m ³
2005	90 pg TEQ/m ³
2006	113 pg TEQ/m ³
2007	276 pg TEQ/m ³
2008	77 pg TEQ/m ³

Note 2 - At 11% O₂.

Number of samples:

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.

For the period 2003 to 2008, 89 stack tests were carried out on the 8 coastal power boilers (7 after 2005). The minimum required by the CWS agreement would be 42.

Stack sampling parameters:

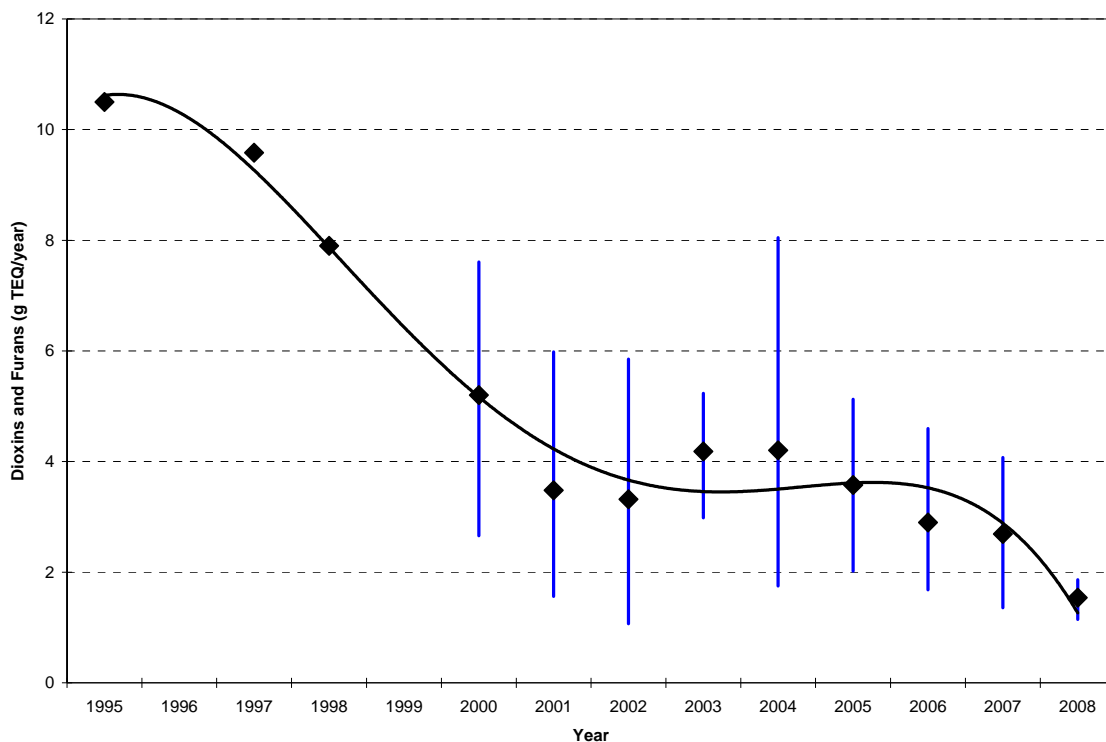
Dioxin/furan and PAH emissions in the stack gases were determined using modified EPA method 5 (MM5). While Environment Canada has set the Limit of Quantification for stack dioxin emission tests at 30 pg (10⁻⁹) ITEQ/dry standard cubic metre (dscm), an extensive study by the American Society of Mechanical 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.
Discussion	<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/m³ at 11% O₂ 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>
Additional information	The Western Forest Products pulp and paper mill located near Squamish ceased operations permanently in 2005. As a result, there are now seven coastal pulp and paper mills located in British Columbia and a further net reduction in dioxins emissions.
Contact	Warren McCormick, 250 952-2110

Summary of dioxin stack tests for each coastal power boiler in tests from 2003 through 2008.

Power Boiler at Mill	No. of Tests	Average pg TEQ/m³ at 11% O₂	Highest Level, pg TEQ/m³	Lowest Level, pg TEQ/m³	Ratio of High to Low	No. of Tests above 400 pg TEQ/m³	No. of Tests above 500 pg TEQ/m³
1	10	58	133	17	8	0	0
2	11	143	494	23	21	1	0
3	20	128	476	15	32	2	0
4	15	276	1,155	3	385	0	4
5						0	0
6	11	19	11	5	2	0	0
7	4	275	402	123	3	1	0
8	16	372	1,369	76	18	0	4

Annual average stack dioxin concentrations for 2004, 2006 and 2008 (pg TEQ/m ³ at 11% O ₂)						
	2004		2006		2008	
	No. of Tests	Conc.	No. of Tests	Conc.	No. of Tests	Conc.
Mill 1	2	89	2	55	0	-
Mill 2	2	320	2	42	2	34
Mill 3	8	143	2	127	2	40
Mill 4	2	43	5	364	2	34
Mill 5					2	50
Mill 6	2	22	2	16	3	8
Mill 7	2	253	-	-	-	-
Mill 8	2	210	2	77	2	300



Total dioxin and furan emissions from BC coastal pulp and paper mill power boilers. Large black diamond indicates the annual total emissions estimated from average stack test results; the black line is a 4th order polynomial trend line. The high/low bars indicate the range of annual emissions estimated from high and low stack test results.

ALBERTA

Sector	Incineration – Biomedical Waste
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The Crisallo – Beiseker facility closed in 2007

Sector	Incineration – Hazardous Waste
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Number of facilities: one

Facility: AECOM Canada Ltd – Swan Hills

Source: FBD incinerator

Three runs, dry at 11% O₂

Summary of dioxin emissions 2000 through 2008.

Facility	2000		2002		2008	
	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³
Swan Hills	66	73	90	120	4.27	4.7

Sector	Incineration – Municipal Waste
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Number of facilities: one

Facility: Wainwright Regional Waste to Energy Authority

Three runs, dry at 11% O₂

Summary of dioxin emissions 2001 through 2008.

Facility	2000		2002		2008	
	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³
Wainwright	332	376	87.3	130	*44	*64.4

* This facility was under construction in 2008 for abatement of dioxins and furans (added carbon absorbent bags to the exhaust), a test was done early 2009.

Sector	Steel Manufacturing Electric Arc Furnaces
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Number of facilities: one
 Facility: Alberta Steel - Edmonton

Summary of dioxin emissions 2000 through 2008.

Facility	2000		2002		2008	
	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³	Average Emissions pg TEQ/m ³	Highest Emission Level, pg TEQ/m ³
Alta Steel	70.3		59.1		**39.1	

**A stack test was not done in 2008, averaged tests from 2000, 2002, 2003, 2004 and 2005 for this number.

Dioxin Annual Emissions for All Sectors

Facility	2000, g TEQ/yr	2002, g TEQ/yr	2008, g TEQ/yr
Swan Hills	0.0147	0.0182	0.000763
Wainwright	0.015574	0.004575	0.002075
Alta Steel	0.179	0.164	0.117

SASKATCHEWAN

Sector	Incineration
Data	<p>Existing Facilities: There is only one incinerator (St. Joseph's Hospital biomedical waste incinerator) in Saskatchewan to which this applies.</p> <p>Stack sampling has not been required, nor conducted, at the St. Joseph's Hospital incinerator, as this facility only incinerates 12 tonnes of waste per year. Due to the amount of waste incinerated, it is expected that dioxin and furan emissions are less than 80 pg/m³ I-TEQ at this facility.</p> <p>In Saskatchewan there were thirteen medical incinerators permitted and operating in the province prior to the introduction of the CWS. In 2004, eight of those thirteen incinerators were no longer operating and in 2009 only one medical incinerator is in</p>

	operation. The discontinued use of these twelve incinerators has lowered the overall emission of dioxins and furans.
Discussion	<p>Progress Towards Implementation</p> <p>General accountability: Since the St. Joseph's incinerator is of relatively small loading (less than 26 tonnes per year) the management of dioxin and furan emissions is handled by incorporating 'determined effort' requirements in the permit to operate, issued pursuant to Saskatchewan's Clean Air Act and Clean Air Regulations. The Hospital has adopted and implemented the applicable actions as outlined in, "Determined Efforts" for PVC and Mercury containing Products used in Saskatchewan Hospitals, Saskatchewan Environment, Environmental Protection Branch, 2003. It is noted that while the existing waste incinerator governed by the CWS is operated by a hospital, the waste stream sent to this incinerator could allow classification as either medical waste or municipal waste.</p> <p>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>
Contact	Jeff Paterson, (306) 787-9764

Sector	Steel Manufacturing Electric Arc Furnaces								
Data	<p>There is only one facility in Saskatchewan to which this applies.</p> <p>Emissions from EVRAZ, 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/drm³</td> </tr> <tr> <td>2002</td> <td>919 pg/drm³</td> </tr> <tr> <td>2008</td> <td>33 pg/drm³</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</p>	Year	Total Emissions	1999	237* pg/drm ³	2002	919 pg/drm ³	2008	33 pg/drm ³
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	<p>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>
Discussion	<p>Over the time period of 1999 to 2009 EVRAZ has pursued a number of research initiatives and process modifications. Significant initiatives include a new baghouse installed in 2005 which significantly improved air emissions. Since the installation of the new baghouse annual testing has shown D/F levels well below the applicable CCME criteria.</p>
Contact	Jeff Paterson, (306) 787-9764

MANITOBA

Sector	Steel Manufacturing Electric Arc Furnaces																						
Data	<p>Total dioxin and furan emissions from steel manufacturing electric arc furnace:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Total Emissions</th> </tr> </thead> <tbody> <tr> <td>1990¹</td> <td>0.54 g TEQ/y</td> </tr> <tr> <td>1997¹</td> <td>0.63 g TEQ/y</td> </tr> <tr> <td>1999¹</td> <td>0.63 g TEQ/y</td> </tr> <tr> <td>2002²</td> <td>0.15 g TEQ/y</td> </tr> <tr> <td>2003²</td> <td>0.30 g TEQ/y</td> </tr> <tr> <td>2004²</td> <td>0.50 g TEQ/y</td> </tr> <tr> <td>2005²</td> <td>0.45 g TEQ/y</td> </tr> <tr> <td>2006²</td> <td>0.38 g TEQ/y</td> </tr> <tr> <td>2007²</td> <td>0.39 g TEQ/y</td> </tr> <tr> <td>2008³</td> <td>0.11 g TEQ/y</td> </tr> </tbody> </table> <p>¹As 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/m³.</p> <p>²Based on source sampling conducted at the Manitoba facility and as reported to NPRI.</p> <p>³ Based on engineering estimates and as reported to NPRI.</p>	Year	Total Emissions	1990 ¹	0.54 g TEQ/y	1997 ¹	0.63 g TEQ/y	1999 ¹	0.63 g TEQ/y	2002 ²	0.15 g TEQ/y	2003 ²	0.30 g TEQ/y	2004 ²	0.50 g TEQ/y	2005 ²	0.45 g TEQ/y	2006 ²	0.38 g TEQ/y	2007 ²	0.39 g TEQ/y	2008 ³	0.11 g TEQ/y
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Average dioxin and furan concentration in exhaust gas from steel manufacturing electric arc furnace:

Year	Average Plant Exhaust Gas Concentration
2002	35 pg ITEQ/Rm ³
2003	55 pg ITEQ/Rm ³
2004	191 pg ITEQ/Rm ³
2005	50 pg ITEQ/Rm ³
2006	250 pg ITEQ/Rm ³
2007	88 pg ITEQ/Rm ³
2008	n/a ¹

¹ Operational schedules were affected by the economic downturn and negated the opportunity for sampling.

Samples in 2004 and 2006 for the individual stacks exceeded the 2006 CWS of 150 pg ITEQ/Rm³ for this sector. These higher levels are believed to arise from maintenance issues which have been resolved.

Number of samples:

From 2002 to 2007, 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.

Stack sampling parameters:

Dioxin/furan in the stack gases were determined using the Environment Canada method EPS/1/RM/2 with analysis by US EPA method EPA 0023a/8290A. US EPA Method 5 was used to sample for particulates.

Discussion

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.

Contact

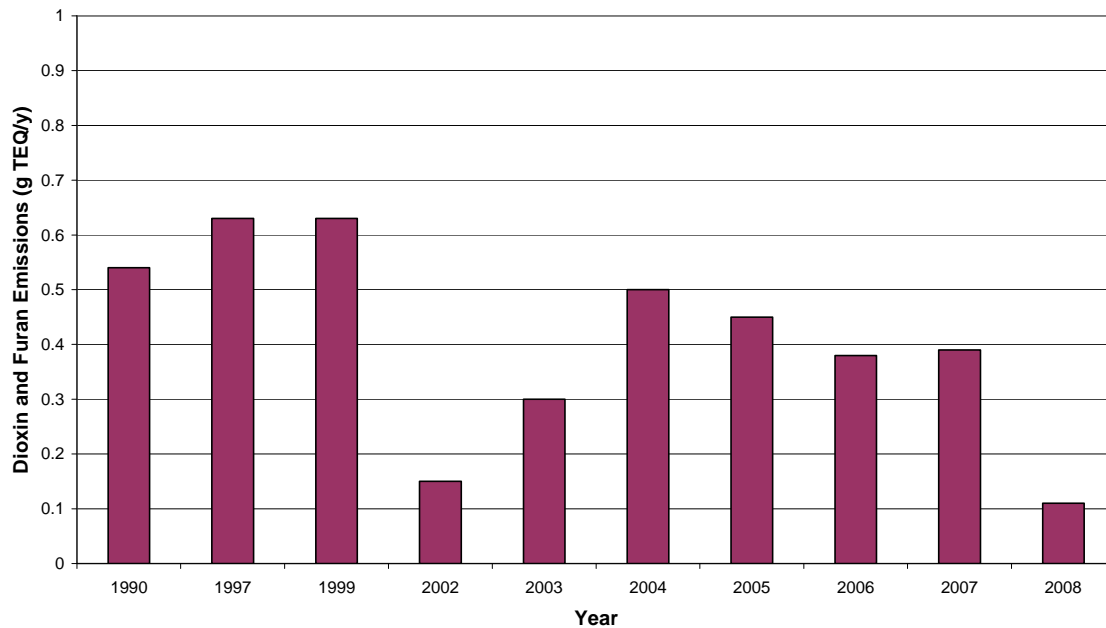
Pollution Prevention Branch, (204) 945-8443,
pollupreve@gov.mb.ca

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 ³)				No. of Tests above 150 pg TEQ/m ³
		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
2004	1	191	416	35	18	1
2005	1	50	98	8.3	19	0
2006	1	250	590	8.7	10	1
2007	1	88	199	5	16	0
2008 ¹	0					

¹Operational schedules were affected by the economic downturn and negated the opportunity for sampling.

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



Sector	Incinerators – Biomedical Waste								
Data	<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>1990¹</td> <td>0.54 g TEQ/y</td> </tr> <tr> <td>1997¹</td> <td>0.63 g TEQ/y</td> </tr> <tr> <td>1999¹</td> <td>0.63 g TEQ/y</td> </tr> </tbody> </table> <p>¹As reported in the Environment Canada report “Inventory of Releases (PCDDs and PCDFs)” of February 2001, based on an average concentration of 260 pg/m³.</p>	Year	Total Emissions	1990 ¹	0.54 g TEQ/y	1997 ¹	0.63 g TEQ/y	1999 ¹	0.63 g TEQ/y
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1999 ¹	0.63 g TEQ/y								
Discussion	<p>No stack sampling of biomedical waste incinerators in Manitoba has been conducted. The provincial effort remains focused on working with the Regional Health Authorities to reduce the incineration of biomedical waste in Manitoba. Winnipeg-based waste requiring incineration is disposed at an off-site approved incinerator in the United States. An environmental proposal for Licencing of a centralized CWS-compliant incinerator for disposal of rural biomedical waste requiring incineration is expected soon.</p> <p>Since the CWS came into effect in May 2001, no new or expanded biomedical waste incinerators have been installed in Manitoba.</p>								
Contact Name	<p>Pollution Prevention Branch, (204) 945-8443, pollupreve@gov.mb.ca</p>								

ONTARIO

Summary

Ontario continues to make good progress in reducing environmental contamination by dioxins and furans through a comprehensive program of regulatory, monitoring, abatement, research and education initiatives.

CWS emission limits have been adopted as standards in Ontario so that they are conditions of operation for Ontario facilities that emit significant amounts of dioxins and furans.

Ontario is implementing the increasingly stringent CWS standards for existing iron sintering and electric arc furnaces facilities.

Sector	Incineration
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Annual Emissions

* Annual emissions figure = On-site Releases

Hazardous Waste Incinerators:

Year	Total Emissions (g TEQ/y)
2005	0.013
2006	0.017
2007	0.001
2008	0.001

Municipal Waste Incinerators:

Year	Total Emissions (g TEQ/y)
2005	N/A
2006	0.000
2007	0.000
2008	0.000

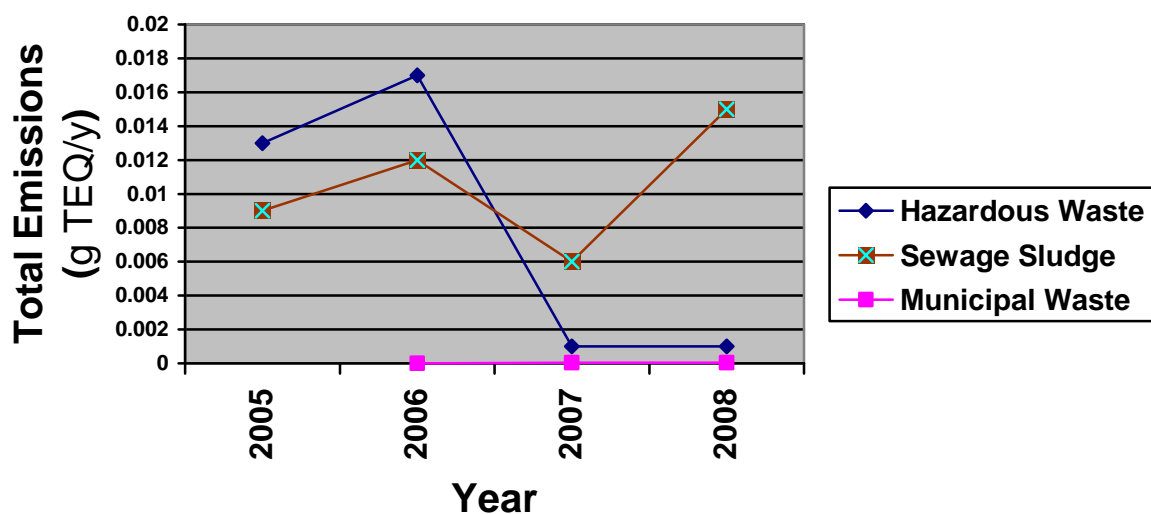
Medical Waste Incineration:

Year	Total Emissions (g TEQ/y)
2005	N/A
2006	N/A
2007	N/A
2008	N/A

Sewage Treatment incinerators:

Year	Total Emissions (g TEQ/y)
2005	0.007
2006	0.012
2007	0.006
2008	0.016

Annual Emissions of Dioxins & Furans: Incineration



Summary of dioxin/furan emissions for municipal waste incinerators, medical waste incinerators, hazardous waste incinerators and sewage sludge incinerators.

[CWS incinerator emission target = 80pg I-TEQ/m³]

Facility	2006	2007	2008
	*Average Emissions pg TEQ/m ³	*Average Emissions pg TEQ/m ³	*Average Emissions pg TEQ/m ³
Municipal waste incinerators			
Facility A Algonquin Power (APEFW)]	6.4	10.3	13.1
Facility B De Beers	No test	43.2	20.9
Medical waste incinerators			
Facility C Stericycle	1.59	2.58	1.39
Hazardous waste incinerators			
Facility D Clean Harbours (Corunna)	3.12	1.98	3.9
Facility E Cameco - Blind River	No test	No test	18.3
Facility F Material Resource Recovery – Cornwall	7.59	45.68	61.7
Facility G Gary Steacy Dismantling	631	921	No test
Facility H Bruce Nuclear	2.81	6.3	10.4
Sewage sludge incinerators			
Facility I Greenway Pollution Control Centre - London, Region of Greenway	2.46	2.4	3.49
Facility J Toronto, Highland Creek	Main Incinerator Sludge 16.2	Main Incinerator sludge	Main Incinerator sludge
	Main Incinerator Biosolids 19.2	Main Incinerator Biosolids 94.3	Main Incinerator Biosolids 54.6
	Stub Stack #1&2 253	Stub Stack #1&2 16.8	Stub Stack #1&2 361
Facility K Toronto, Duffin Creek	4.29	3.3	Incinerator #1- 3.5
			Incinerator #2 -9.7
Facility L Lakeview Water Treatment Plant- Peel, Region of Lakeview	3.20	5.39	8.54 (1)

Notes:

*Ontario source testing code requires three test runs per source. The reported emission level is an average of the three test runs.

(1) One of two stacks reporting. Other is closed down.

Discussion

Municipal waste incinerators and Biomedical waste incinerator operated by Stericycle (previously Medical Waste Management) are in compliance with CWS for dioxins and furans for 2008.

Gary Steacy Dismantling hazardous waste incinerator was not in compliance in 2007 and was not operating commercially in 2008. The facility has installed additional pollution abatement equipment at the site (approved under section 9 EPA) to meet the CWS.

Sewage Sludge and Biosolids incinerators, except for Highland Creek (Toronto), were in compliance with the CWS for dioxins and furans in 2008. Highland Creek has had significant leakage, leading to exceedances in 2008. MOE is working with the municipality on a short-term and medium-term abatement strategy. In 2009 process changes were made to reduce leakage emissions and a project was begun to seal and refurbish the stub stacks to ensure all emissions go through the scrubber at the main incinerator. This work is expected to be completed by 2013. In 2006, test exceedances were due to tests runs simulating a power outage.

Sewage sludge incinerator, Ashbridges Bay Treatment Plant, was closed down in 2002.

Sector	Steel Manufacturing Electric Arc Furnaces
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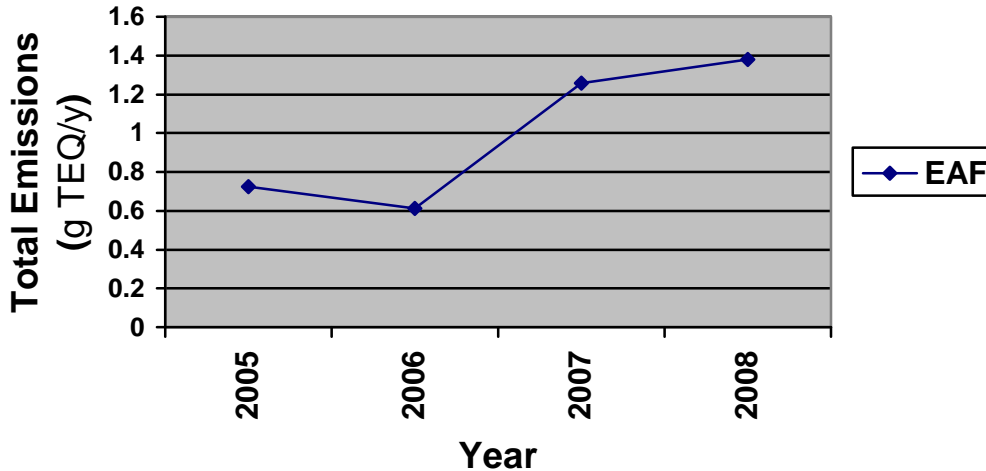
Annual Emissions

Steel Manufacturing Electric Arc Furnaces

Year	Total Emissions (g TEQ/y)
2005	0.725
2006	0.611
2007	1.257
2008	1.381

Note: annual emissions figure = On-site Releases

Annual Emissions of Dioxins & Furans: Steel Manufacturing Electric Arc Furnaces (EAF)



Summary of dioxin/furan emissions for Steel Manufacturing Electric Arc Furnaces (EAF).
 [CWS emission target = 100pg I-TEQ/m³ for new and modified EAF and 150pg I-TEQ/m³ for existing EAF]

Facility	2006	2007	2008
	*Average Emissions pg TEQ/m ³	*Average Emissions pg TEQ/m ³	*Average Emissions pg TEQ/m ³
Facility A Gerdau Ameristeel Corporation – Cambridge]	303	215	64.4
Facility B Gerdau Ameristeel – Whitby	69.4	28.7	Test Cancelled
Facility C Hamilton Specialty Bar	No test	No test	290
Facility D Ivaco Rolling Mills	43.8	78.3	Test Cancelled
Facility E Arcelor Mittal (Dofasco)	8.28	12.1	No test
Facility F Atlas (Slater) - Hamilton	No test	n/a	36.1

*Ontario source testing code requires three test runs per source. The reported emission level is an average of the three test runs.

Discussion

Ontario has six electric arc furnace facilities. Five were in operation in 2008 as Ivaco Rolling Mills was offline in 2008.

Gerdau (Cambridge) was not in compliance in 2006 and 2007. The facility took action to increase maintenance and control of equipment and processes. Following these abatement activities they showed compliance in 2008. The facility has been on strike since the spring of 2009. It is uncertain when the company will be operating once again.

Gerdau (Whitby) 2008 emission test was cancelled due to intermittent production.

Hamilton Specialty Bar was not in compliance in 2008. Hamilton Speciality Bar is currently considering operational changes to increase combustion efficiency and has hired a consultant. The Ontario Ministry of the Environment fully expects that 2010 testing will show the company to be well within the guidelines. Sampling data in August, 2009 showed that two out of three tests revealed that the company was meeting the guidelines, and the average numbers were well within the guidelines.

Data

Sector	Iron Sintering Plants
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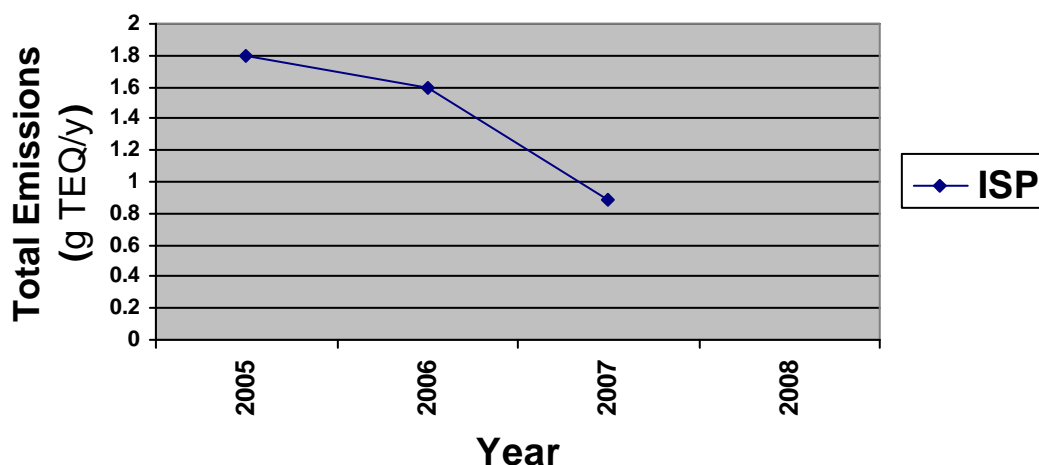
Annual Emissions

Iron Sintering Plants

Year	Total Emissions (g TEQ/y)
2005	1.846
2006	1.589
2007	0.888
2008	

Note: annual emissions figure = On-site Releases

Annual Emissions of Dioxins & Furans: Iron Sintering Plants (ISP)



Summary of dioxin/furan emissions for Iron Sintering Plants (ISP)

[CWS emission target = less than 500 pg/m³ TEQ for all existing iron sintering plants by 2005]

Facility	2006	2007	2008
	*Average Emissions pg TEQ/m ³	*Average Emissions pg TEQ/m ³	*Average Emissions pg TEQ/m ³
Facility A U.S. Steel Canada Inc Hamilton	Test Delayed	859	No Test

Discussion

U.S. Steel Canada Inc., in Hamilton, is the only iron sintering plant that is subject to the CWS.

The Sinter Plant was shut down in July 2007 after problems when the exhaust gas ducting prevented the proper operation of the gas cleaning system. The ministry has advised the company of required actions prior to restart of the Sinter Plant. The ministry has not been informed of any plans to restart.

Following an investigation by the ministry's Investigations and Enforcement Branch, U.S. Steel Canada Inc. was charged with one alleged offence under the Environmental Protection Act.

According to the wording of the charge, U.S. Steel Canada Inc., allegedly failed to comply with its Certificate of Approval (Air) by failing to operate the facility in such a manner as to ensure that the international toxic equivalent emissions of dioxins and furans from the existing Sinter

Plant stack were less than 500 picograms per dry cubic metre normalized to reference conditions contravening section 186 (3) of the Environmental Protection Act (EPA). The matter is currently before the courts.

NEW BRUNSWICK

Sector	Incineration – Biomedical Waste
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With the closure of two incinerators (one closed in 2002 and the other in 2005) that were located at provincial hospitals, New Brunswick currently has one remaining biomedical waste incineration facility operating in the province.

There are no hazardous waste, municipal waste or sewage sludge incinerators in New Brunswick.

Below are the dioxin and furan concentrations measured in the stack gas exhausted from the one biomedical waste incineration facility operating in New Brunswick:

Facility	2001		2004		2005		2008	
	Emissions (pg TEQ/m ³)		Emissions (pg TEQ/m ³)		Emissions (pg TEQ/m ³)		Emissions (pg TEQ/m ³)	
	Avg.	Highest	Avg.	Highest	Avg.	Highest	Avg.	Highest
A	172.0	317.2	7.34	12.34	3.75	4.00	1.92	2.48

Based on the stack test results, New Brunswick has achieved the dioxin and furan CWS for incineration (which requires an emission concentration of not more than 80 pg TEQ/m³).

Below are the annual dioxin and furan emissions from the one biomedical waste incineration facility operating in New Brunswick (calculated based on the average stack test results and assuming a worst case that the facility operates 24 hours per day and 365 days per year):

Facility	2001	2004	2005	2008
	Annual Emissions (g TEQ/yr)	Annual Emissions (g TEQ/yr)	Annual Emissions (g TEQ/yr)	Annual Emissions (g TEQ/yr)
A	0.0047	0.00021	0.000097	0.000070

Sector	Coastal Pulp and Paper
Discussion	Previously, only one of New Brunswick's pulp and paper mills burned salt-laden wood. The salt-laden wood was 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. This hogged fuel was blended in small quantities with other wood waste in an effort to eliminate the pile. This pile of salt-laden wood was eliminated at the end of 2005.
Additional Information	The burning of salt laden wood in pulp and paper mill boilers is no longer permitted in New Brunswick. Therefore, no stack testing or emissions reporting requirements are envisioned for this industrial sector.
Contact	Mark Glynn, (506) 453-4463

NOVA SCOTIA

Sector	Incineration
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Discussion

Nova Scotia had one incinerator facility with two units which processed both municipal and biomedical waste. This incinerator closed in 2005. The facility processed approximately 36,500 tonnes/yr of municipal solid waste and approximately 2200 tonnes/year of biomedical waste.

Data

Annual Total Incinerator 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
2003*	0.048
2004*	0.098
2005*	0.105
2006	Incinerator closed

*Source: Environment Canada NPRI

**Stack Test Results for Incinerator (single annual stack test event of 3 test average)
(@25°C, 101.3kPa, 11% oxygen):**

Year	Unit Stack #1 Dioxins and Furans Concentrations (pg /Rm³)	Unit Stack #2 Dioxins and Furans Concentrations (pg /Rm³)
1999	24.2	39.6
2000	0.21	2.16
2001	81.4	43
2002	245.3	110.0
2003	*	70
2004	*	*
2005	*	*
2006	Incinerator closed	Incinerator closed

* Testing not conducted

**Number of Annual Stack Tests exceeding the 80pg ITEQ/m³
(@25°C, 101.3kPa, 11% oxygen):**

Year	Stack Tests (average of 3 individual)
1999	0
2000	0
2001	1
2002	2
2003*	
2004*	
2005*	
2006	Incinerator closed

*Insufficient Testing

Contact: Sharon Vervae, P.Eng., (902) 424-2546

NEWFOUNDLAND & LABRADOR

Sector	Conical Municipal Waste Combustion
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Municipal incineration, conducted in uncontrolled conical waste combustors, is the largest identified point source release of dioxins and furans to the atmosphere in Newfoundland and Labrador. In April 2002, The Provincial Waste Management Strategy was developed to address this issue and it identified a total of 58 conical waste combustors servicing 216,728 people for closure by 2010. Estimates based on emission factors and population indicated that this sector was releasing 44 gm I-TEQ of dioxins and furans to the atmosphere annually. To date 42 conical waste combustors servicing 165,378 people have been closed resulting in a 76.3% reduction in

atmospheric emissions of dioxins and furans. This represents a further 24.6% reduction based on the Spring 2005 Jurisdictional Update, which reported a 51.7% reduction.

From a regulatory perspective, the *Newfoundland and Labrador Air Pollution Control Regulations* (www.env.gov.nl.ca/env) were amended in May 2004 to include stack concentration limits for dioxins and furans for any new incineration source. Section 4 of the regulation states that:

"An owner or operator shall not operate or permit the operation of new incineration or pyrometric equipment having an in-stack concentration in excess of the standards prescribed in Schedule B."

Schedule B

In-Stack Standards for Incineration and Pyrolysis

Facility Type	Mercury	Polychlorinated dibenzo-p-dioxins (PCDDs) & poly-chlorinated dibenzofurans (PCDFs)
Municipal Waste Incineration	20 ug/m ³	80 pg I-TEQ/m ³
Medical Waste Incineration	20 ug/m ³	80 pg I-TEQ/m ³
Hazardous Waste Incineration	50 ug/m ³	80 pg I-TEQ/m ³
Sewage Sludge Incineration	70 ug/m ³	80 pg I-TEQ/m ³

YUKON

Sector	Incineration
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The single biomedical waste incinerator formerly in use in the Yukon, at the Whitehorse General Hospital, was shut down following a stack test conducted in 2008 which showed that the average dioxin/furan concentration was about 67 times the limit specified in the CWS for Dioxins and Furans Emissions from Waste Incinerators (80 pg I-TEQ/m³).

Biomedical wastes are currently being stored and shipped to appropriate disposal facilities outside the territory. The Yukon Government is continuing to work with the Whitehorse General Hospital to investigate alternative disposal options for approximately 195 tonnes/year of biomedical waste generated throughout the territory. Acceptable options must be capable of meeting the Canada-Wide Standards for mercury and dioxin/furan emissions.

Any new facilities will be required to comply with the standards immediately.

Contact: Shannon Jensen, (867) 667-8787, shannon.jensen@gov.yk.ca

NORTHWEST TERRITORIES

Sector	Incineration
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Data:

- The latest available stack test data for the one biomedical waste incinerator operating in the NWT averaged 126 pg/Rm³ TEQ in 2006.
- There is no other facility or average annual emission data currently available.

Discussion:

- The four original biomedical waste incinerators in the NWT have been closed down permanently and are being decommissioned. There is currently one new incinerator operating at the Fort Smith Regional Hospital. All biomedical waste from other regions is shipped south for disposal.
- The Department of Environment and Natural Resources has developed Guidelines for Biomedical Waste which incorporate the CWS emission limits and options for demonstrating compliance. The Guidelines require any new facility to use best available technology and pollution control equipment, regardless of size.
- There are other waste incinerators operating at remote industrial sites within the NWT. However, they are located on federal crown land and are not regulated by the Government of the Northwest Territories.

Contact: Ken Hall, (867)873-7654

Glossary

dscm – dry stack cubic metre
ITEQ – international toxic equivalency quotient
LoQ – limit of quantification
NPRI – National Pollutant Release Inventory
TEQ – toxic equivalency quotient