CANADA-WIDE STANDARDS FOR MERCURY

(Mercury Emissions, Mercury-Containing Lamps,
and Mercury for Dental Amalgam Waste)

A REPORT ON PROGRESS

June 2005

INTRODUCTION

This progress report presents updates on the status of the implementation of the three Canada-wide Standards for Mercury endorsed by the Canadian Council of Ministers of the Environment:

- Mercury Emissions;
- Mercury Containing Lamps; and
- Mercury for Dental Amalgam Waste.

More information on the Canada-wide Standards for Mercury may be found on the CCME website at www.ccme.ca.

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

Canada-wide Standards (CWSs) for Mercury Emissions were endorsed by the Canadian Council of Ministers of the Environment (CCME) in 2000. The standards address both existing and new facilities in the waste incineration and base metal smelting sectors. Waste incineration sectors include hazardous waste, sewage sludge, municipal waste, and medical waste.

This report addresses compliance by the hazardous waste incineration sector and presents an overview of actions by governments towards implementation in all incineration sectors, where available. A report in 2007 will address compliance by all incineration sectors and progress for base metal smelting, and a third report in 2010 will include an overall evaluation of compliance for all standards and any recommendations for revisions.

Report on Compliance

The CWS for hazardous waste incineration for existing, new, or expanding facilities of any size, is application of best available pollution prevention and control techniques, such as a mercury waste diversion program, to achieve a maximum concentration in the exhaust gases of 50 µg Rm^3 by 2003.

Six of seven reporting hazardous waste incinerators were in compliance with the standard in the compliance year. The cause of the one anomalous test result, which took the one facility out of compliance, was suspected to be the incineration of a mercury-containing item, such as a battery or switch. This highlights the need for rigorous screening of hazardous streams.

The federal government is currently gathering information for mercury emissions at its federally owned hazardous waste incineration facilities. This includes verification of federally owned hazardous waste incinerators and collection of information pertaining to mercury emissions. Emission concentration data will be provided in the future based on this information gathering exercise.

CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

The Canada-wide Standard (CWS) for Mercury-Containing Lamps was endorsed by the Canadian Council of Ministers of the Environment (CCME) in 2000. The intent of the CWS is to reduce releases of mercury to the environment from mercury-containing lamps.

The CWS is a 70% reduction by 2005 and an 80% reduction by 2010 in the average content of mercury in all mercury-containing lamps sold in Canada, from a 1990 baseline.

This report documents intermediate progress by manufacturers in reducing mercury content in lamps and presents an overview of actions by governments, where available. A 2012 report will include an evaluation of this standard and a recommendation on whether changes should be considered.

Report on Progress

In its October 19, 2004 update on mercury reduction, Electro-Federation Canada reported that the average mercury content of all mercury-containing lamps sold in 2003 was 11.4 mg per lamp. This represents a 73.5% reduction from the 1990 baseline of 43 mg per lamp, and exceeds the 2005 CWS target of 70% reduction.

The “average mercury content per lamp” industry number was calculated by dividing the total mercury content of all fluorescent and HID lamps sold in Canada by Electro-Federation members by the total number of fluorescent and HID lamps sold in Canada by Electro-Federation members for a specified year.

Electro-Federation Canada members include the following lamp manufacturers: GE Lighting; OSRAM Sylvania Ltd.; Panasonic Canada Inc.; and Philips Lighting. These members produce over 90% of the Fluorescent and High Intensity Discharge lamps sold in Canada.

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

The Canada-wide Standard (CWS) on Mercury for Dental Amalgam Waste was endorsed by the Canadian Council of Ministers of the Environment (CCME) in 2001. The objective of the CWS is to substantially reduce releases of mercury in waste amalgam from dental practices.

The CWS is the application of "best management practices" to achieve a 95% national reduction in mercury releases from dental amalgam waste discharges to the environment, by 2005, from a base year of 2000.

This report reflects interim progress on achieving the CWS and presents an overview of actions by governments, where available. A 2007 report will include an evaluation of this standard and a recommendation whether changes should be considered.

Report on Progress

A 2002 University of Toronto study to measure the amount of mercury from amalgam waste entering the sewer system from dental practices with conventional particle traps versus dental practices equipped with separators approved by the International Organization for Standardization (ISO 11143) found that about 60% of amalgam waste is discharged to the sewer system from conventional particle traps because amalgam "fines" are not captured, while almost all amalgam fines are captured when an ISO 11143 separator is used.

A 2003 national survey funded by Environment Canada to assess the use and fate of dental amalgam in Canada estimated that, for the year 2003, 5352 kg of mercury was used in the preparation of amalgam restorations, amalgam containing 2314 kg of mercury was placed as finished restorations in teeth, and 3038 kg of mercury was left over as either contact amalgam scrap (amalgam that has come into contact with the oral cavity) or non-contact scrap (no contact with the oral cavity). Results indicated that dentists removed amalgam restorations containing approximately 2472 kg of mercury. The study also showed that, by the end 2003, 27% of dentists had ISO certified amalgam separators, most of which had been installed since the year 2000. The Survey estimated that about 1046 kg of mercury entered the wastewater stream in 2003, but this could have been reduced to a mere 16 kg if all Canadian practices had installed separators that met ISO specifications.

JURISDICTIONAL REPORTS

ALBERTA

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no sewage sludge incineration facilities and no base metal smelters in Alberta.

Alberta Overview

The three incinerator facilities in Alberta are the Swan Hills Treatment Center, the Beiseker Waste Incineration Plant, and the Wainwright Regional Waste to Energy Authority Incineration Facility. Each incinerator burns hazardous waste, municipal waste, and medical and municipal waste, respectively. For the municipal and medical waste incineration, feed values were in excess of 120 tonnes per year. The Swan Hills Treatment Center Compliance Report and the Beiseker Waste Incineration Plant and Wainwright Regional Waste to Energy Authority Incineration Facility Progress Reports are included below.

Swan Hills Treatment Center Compliance Report

As per approval 1774-01-00, section 6.3.24 (d)(vi), the concentration and flow rate for heavy metals emitted from the FBD and C.E. Raymond incinerator stacks are to be determined once for each calendar year. Table 19 specifies that mercury is included under the broad heading of heavy metals, however no emission standard for mercury had been specified. A mercury emission standard of 50 ug/Rm^3 was subsequently developed through the Canada-Wide Standard and was set for compliance by 2003. In addition, sections 6.3.25 through to 6.3.28 state that the results will be based on three replicate tests where at least two tests or the arithmetic mean do not exceed the specified emission limit. The effective date for the approval was November 30, 1995.

An inventory of mercury emission rates and concentrations was conducted from 2000 to 2003. Canada Wide Standards for Mercury Emissions had been previously supported by the CCME in 2000. For Hazardous Waste Incineration, a limit of 50 ug/Rm^3 was set for compliance by 2003. Any new or expanding facilities were to comply immediately upon commencement of normal full-scale operation. Table 1 details mercury emission data for the Swan Hills Treatment Center from 2000 – 2003.

Swan Hills Treatment Center (FBD Kiln Stack)					
Parameter	Year	Test 1	Test 2	Test 3	Average
Mercury Concentration (ug/m^3)* at 11 % Oxygen	2000	75.69	47.16	70.74	64.53
	2001	156.70	3.24	37.47	65.81
	2002	4.34	5.82	2.60	4.25
	2003	6.79	7.73	7.66	7.40
Mercury Emission Rate (g/h)	2000	4.39	2.53	4.07	3.66
	2001	7.573	0.175	2.071	3.273
	2002	0.158	0.272	0.124	0.185
	2003	0.310	0.379	0.400	0.363

*At 25^{o}C and 760 mmHg

Table 1. Swan Hills Treatment Center Mercury Concentrations and Emission Rates for 2000 to 2003

Mercury concentrations were not provided at 11% O_2 for the annual mercury stack results in 2000 through to 2002. Values were converted to a dry basis at 11% O_2 using Equations (1) and (2) shown below.

$$O_2 \text{ Factor} = \left(\frac{20.9\% - S\tan dard_{O_2\%}}{20.9\% - Measured_{O_2\%}} \right) \quad (1)$$

Where the standard oxygen percentage is 11 %

$$C_{Std.\,O2} = C_{Meas.O2} * O_2 \text{ Factor} \quad (2)$$

Measured O_2 values, dry mercury concentration values (at measured oxygen values) and calculated O_2 factors are shown in Table 2 for 2000 to 2002.

Swan Hills Treatment Center					
Parameter	Year	Test 1	Test 2	Test 3	Average
Mercury Concentration (ug/m3) Dry	2000	84.1	52.4	78.6	71.7
	2001	137.71	3.31	39.36	60.13
	2002	3.68	4.94	2.21	3.61
Oxygen Content (mole %) on a Dry Basis	2000	9.9	9.9	9.9	9.9
	2001	12.2	10.8	10.5	11.2
	2002	12.5	12.5	12.5	12.5
11 % Oxygen Factor	2000	0.9	0.9	0.9	0.9
	2001	1.14	0.98	0.95	1.02
	2002	1.18	1.18	1.18	1.18

Table 2. Mercury Concentration (Dry Basis), Measured O_2 Values, and 11% Oxygen Factors for 2000 to 2002.

Tests were conducted according to Method 29 – "Determination of Metals Emissions from Stationary Sources" of the EPA Code of Federal Regulations (40 CFR 60 Appendix A). Stack samples were analyzed for mercury with cold vapor atomic absorption spectroscopy. Gas emissions were collected in acidic solutions of H_2O_2 (aq) or HNO_3 (aq) and $KMnO_4$ (aq). Particulate emissions were collected in the probe and heated filter before gas emissions were passed to the acidic solutions.

While emissions in 2000 and 2001 were above the target value of 50 ug/Rm^3, the Swan Hills Treatment Center has been in compliance for all three tests in 2002 and 2003 and currently meets the CCME CWS target for Mercury.

With respect to mercury, the most viable option has been improved screening of waste and the elimination of mercury-bearing waste wherever practical. When this was not possible, stringent maximum feed rates were established. Additional proactive measures (e.g. routine inspections and cleaning of traps where mercury may concentrate) were also used where possible. These measures have resulted in significant reduction in mercury emission from the facility through the incinerator stacks.

Conor Pacific Environmental Technologies Inc. (2000), Entech Environmental Services Limited (2001), and Maxxam Analytics Inc. (2002-2003) conducted the required testing for each respective year.

A section of the reporting spreadsheet for Canada Wide Standards is shown below for the Swan Hills Treatment Center in Table 3. Included are values for the reduction of mercury stack concentration and emissions from 2000 to 2003.

CWS: Hazardous Waste	Swan Hills
Hg Stack Concentration in 2000 base year (µg/Rm^3)	64.53
Hg Stack Concentration in 2003 compliance year (µg/Rm^3)	7.4
Reduction in Hg stack concentration (%)	89%
In compliance (Yes=1, No=0)	1
Hg Emissions in 2000 base year (kg/year)	15
Hg Emissions in 2003 compliance year (kg/year)	1.319
Reduction in emissions (%)	91%

Table 3. Swan Hills Treatment Center Excerpt for CWS Spreadsheet

Beiseker Waste Incineration Plant Progress Report

Canada Wide Standards for Mercury Emissions had been previously supported by the CCME in 2000. For Municipal Waste Incineration and Medical Waste Incineration, a limit of 20 ug/Rm^3 was set for compliance by 2006. Any new or expanding facilities were to comply immediately upon commencement of normal full-scale operation.

A significant decrease in mercury concentrations was attained in 2003 in comparison to previous years. The Beiseker Facility is confident that they will be compliant to the proposed mercury standards by 2006. The new management staff is committed to becoming the leader in their field.

In efforts to reduce mercury emissions, the Beiseker Facility has increased their screening for mercury and amalgam. The majority of waste incinerated at the Beiseker Facility can be characterized as either oil field waste or biomedical waste. Oilfield waste is screened for mercury. Biomedical waste, which constitutes 60-70 % of their feed stream, is not screened at the facility. As per their policy, they do not open the containers received. This has created a problem in regards to screening for mercury. All facility users have

been notified of the increased vigilance for mercury by facility staff and have been apprised of the situation regarding mercury content and the proposed mercury emission standards. Any users found in contravention of the mercury standards will be charged for hazardous materials disposal off-site. Random checks have been instituted on the waste submitted by all users

The incineration process has been modified to produce a cleaner burn. The Beiseker Facility is also looking at modifying the composition of their feed (i.e. ratio of biomedical waste to other waste) and trying to discern an appropriate feed rate that would minimize their mercury emission rate.

The Beiseker Facility is also working with Maxxam Analytics to develop a more vigorous screening and testing process. An investigation into what wastes are contributing to their mercury load is under way.

Wainwright Regional Waste to Energy Authority Incineration Facility Progress Report Comments

Canada Wide Standards for Mercury Emissions had been previously supported by the CCME in 2000. For Municipal Waste Incineration, a limit of 20 ug/Rm^3 was set for compliance by 2006. Any new or expanding facilities were to comply immediately upon commencement of normal full-scale operation.

In response to the increase in mercury emissions in 2003, the Wainwright Facility re-evaluated their screening techniques. A potential cause for the spike in emissions may be attributed to dental amalgam waste. The Wainwright Facility is focused on ensuring compliance to the proposed mercury emission standards.

CANADA WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Alberta Overview

CCME endorsed a CWS for mercury containing lamps in 2000 to reduce the amount of mercury released to the environment. The CWS calls for a reduction in the average mercury content of all mercury-containing lamps sold in Canada. A 70 % reduction had been proposed for 2005 with an 80 % reduction by 2010. A summary of government initiatives and manufacturers progresses has been provided below.

Alberta Environment initiated a bulb-recycling program in 2000 (Fluorescent Initiative). Numbers were reported by over 130 organizations that were involved in the initiative. Total numbers for 2001 and 2002 are shown below in Table 1.

Year	Length (m)
2001	158, 023
2002	307, 184
Total	465, 207

Table 1. Length in Meters of Fluorescent Bulbs Recycled

All reported values are measured in meters of length of bulbs recycled. Values for 2003 have yet to be compiled and are currently unavailable. Recorded values are provided by organizations involved with the initiative and do not include recycling programs outside the Fluorescent Initiative.

Stats Canada reported, in 1999, that 10 % of the total Canadian shipments reported where shipped to Alberta (~5.95 million bulbs/87.5 kg of mercury). As a baseline for comparison, the Fluorescent Lamp Stewardship Initiative, prepared by Randall Conrad and Associates Ltd. (June 2000), reported recycling in 1999 as 150, 000 fluorescent bulbs (2.5 % recycle rate). If each bulb recycled is taken to be on average a 4-foot bulb, then the recycled amount would be 600, 000 feet or 182, 880 meters. The same paper reported that the average mercury content per bulb was 15 mg of mercury (June 2000). Table 2 below provides rough estimates for recycle rates for 2001 and 2002 based on average values reported in the Fluorescent Lamp Stewardship Initiative. 1999 values were provided in the Fluorescent Lamp Stewardship Initiative.

Year	Length (m)	Amount of Bulbs	Amount of Mercury (kg)	Recycle Rate (%)
1999	182, 880	150, 000	2.25	2.6
2001	158, 023	129, 610	1.94	2.2
2002	307, 184	251, 952	3.78	4.2
Total (2001-02)	465, 207	381, 562	5.72	3.3
Total	648, 087	531, 562	7.97	3.0

*Based on a 1999 average mercury content value and an average bulb length of 4 feet

Table 2. Fluorescent Lamp Recycling Values for 1999, 2001 and 2002 in Alberta

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Alberta Overview

Alberta Environment (AENV) is working with the Alberta Dental Association (ADA) to implement the Canada-Wide Standard on Mercury for Dental Amalgam Waste. Progress to date in Alberta is the distribution to Alberta's dentists of:

- a booklet, developed by the ADA, titled *Best Practice Management Dental Wastes* on the proper disposal techniques for dental amalgam waste, and

- a list of separator manufacturers (all with ISO 11143 certified amalgam traps).

There are approximately 1700 dentists currently practicing in Alberta

CANADA

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

Hazardous Waste Incineration

Canada Overview

The federal government is currently gathering information for mercury emissions at its federally owned hazardous waste incineration facilities. This includes verification of federally owned hazardous waste incinerators and collection of information pertaining to mercury emissions. Emission concentration data will be provided in the future based on this information gathering exercise.

Non-Hazardous Waste Incineration

Canada Overview

Environment Canada is working with federal departments that own and/or operate non-hazardous waste incinerators to ensure that the targets in the CWS are achieved. All federal non-hazardous waste incinerators process less than 120 tonnes of waste per year and as such, the CWS requires the federal facilities to make determined efforts to reduce mercury emissions. Efforts to reduce mercury emissions will be implemented through the adoption of the Mercury-containing Product Stewardship Manual for Federal facilities. The manual promotes life cycle management of mercury-containing products and diversion of mercury-containing wastes from federally owned and operated non-hazardous incinerators. The manual emphasizes activities to plan and implement appropriate procurement, handling and disposal practices to minimize environmental releases.

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Base metal Smelting

Canada Overview

The federal government is helping monitor progress towards achievement of the standard. The Base-metals Environmental Multi-stakeholder Advisory Group (BEMAG) has been formed, and serves to provide advice and input on environmental issues of relevance to the base metals smelting sector. Members of the BEMAG include industry, public interest organizations, provinces, and federal departments (EC, HC, NRCan).

On September 25, 2004, Environment Canada published in the *Canada Gazette*, Part I a *Proposed Notice Requiring the Preparation and Implementation of Pollution Prevention*

Plans in respect to Specified Toxic Substances Released from Base Metals Smelters and Refineries and Zinc Plants. The Proposed Notice included the Canada-wide Standard for Mercury Emissions among its factors to consider.

Environment Canada also published, for public consultation, a Draft *Environmental Code of Practice for Base Metals Smelters and Refineries* dated June 2004. The Code contains a series guidelines, criteria, and recommended practices, including the Canada-wide Standard for Mercury Emissions. Conformance with the Code's guidelines, criteria, and recommended practices is also a factor to consider of the Proposed Notice.

Both documents and related documents are available at *http://www.ec.gc.ca/nopp* at "What's New" or "Consultations"

Priority issues for the BEMAG include:

- The development and implementation of Canadian Environmental Protection Act, 1999 toxic management initiatives;
- The development of Environmental Performance Standards such as a comprehensive Environmental Code of Practice for the sector. (2005); and
- The implementation of the recommendations of the Base Metals Smelting Strategic Options Report (SOR).

The table below shows Environmental Performance Indicator data for the year 2000, and shows that all facilities, with the exception of one, are meeting the CWS. Where 'N/A' appears, this indicates that the CWS is not applicable to a facility, either because the facility uses alternate processes (e.g., hydrometallurgical) for which mercury releases to air are not likely, or the facility does not process ores, concentrates, or metals that contain mercury.

FACILITY	Environmental Performance Indicator (grams Hg/ tonne metal produced)
Teck Cominco	0.412
Sheritt	N/A
Hudson Bay Mining & Smelting	8.226
Inco - Thompson	0.061
Falconbridge - Kidd	N/A
Falconbridge - Sudbury	N/A
Inco - Copper Cliff	0.009
Inco - Port Colborne	N/A
Noranda - Horne	1.810
Noranda - CCR	N/A
Noranda - CEZ	0.000
Noranda - Gaspé (closed in 2001)	0.450
Noranda - Brunswick	0.724

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CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Canada Overview

Environment Canada will continue to monitor industry compliance with the reductions stipulated in the standard and to receive updates from Electro-Federation Canada. Environment Canada will also continue to monitor mercury emissions from lamp manufacturing operations through reporting under the National Pollutant Release Inventory.

Environment Canada will work with other federal departments to encourage new mercury reduction and energy conservation purchasing considerations for lighting of federal buildings. *The Mercury-containing Product Stewardship Manual for Federal Facilities* has been developed by Environment Canada to promote the lifecycle management of mercury-containing products, and in particular fluorescent lamps. The manual emphasizes activities to plan and implement appropriate procurement, handling and disposal practices to minimize environmental releases.

Work is underway to promote this manual and to include considerations for lamps and other mercury-containing products in initiatives such as Environmental Management Systems and pollution prevention and sustainable development activities.

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CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Canada

The Canadian Dental Association and Environment Canada signed a Memorandum of Understanding (MOU) committing to actions for the voluntary implementation of the CWS and outlining Best Management Practices for dental offices. The Canadian Dental Association agreed to make determined efforts to ensure that dentists take action to achieve the objectives of the CWS, and Environment Canada agreed to support these efforts.

Environment Canada has undertaken several activities to implement the commitments in the MOU. These have included:

- collaborating with the CDA on the determination of the number of Canadian dentists affected by the CWS;
- providing support for the assessment of the amount of amalgam waste generated and an evaluation of the adoption of best management practices as of 2003;
- providing support for the development of a technology verification protocol for amalgam separators equivalent to the criteria stated in the ISO 11143;
- compiling information on jurisdictional management requirements relative to the management of amalgam waste from dental practitioners;
- writing an article that was published in the CDA's journal on the background and rationale for the MOU and the CWS amalgam waste issue;
- working with the Ontario Dental Association, the Ontario Ministry of the Environment, and other stakeholders in the Ontario region on the development of technical guidance documents to help dental practitioners in implementing Best Management Practices; and
- continuing with outreach and education efforts directed to the dental community, through the Mercury and the Environment (www.ec.gc.ca/mercury) web site and through presentations and exhibits at dental conferences on Best Management Practices.

MANITOBA

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste or sewage sludge incineration facilities in Manitoba.

Municipal Waste Incineration

Manitoba Overview

Manitoba's overall approach to both new and existing municipal waste incinerators would be to integrate both the mercury and dioxins/furans CWS requirements into the relevant regulatory process. New proposed incinerators that are a part of a 'manufacturing and industrial plant', as defined in Manitoba Regulation 164/88 under the Environment Act, would be subject to environmental Licencing. Achievement of the CWS limits would be included as a requirement within the facility Licence. Incinerator installations not falling into the above categories may be addressed by potential future regulatory changes. Any applicant would be advised of these forthcoming changes and requirements to meet CWS limits.

There are no large existing municipal waste incinerator installations in the province. However, there are a number (~42) of small units typically at schools, commercial or industrial establishments that technically could meet the criteria for being considered as "municipal" waste incinerators. Volumes of waste incinerated are very small. Manitoba is still considering a strategy for addressing these small existing units to ensure compliance with the future CWS requirements. An active information campaign to facility operators of such incinerators is being delivered by inspection/enforcement staff of the Department to draw attention to the forthcoming changes that may be required to meet the stringent standards.

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Medical Waste Incineration

Manitoba Overview

Manitoba's overall approach to new medical waste incinerators would be to integrate both the mercury and dioxins/furans CWS requirements into the relevant regulatory process. Achievement of the CWS limits would be included as a requirement within the facility licence.

Manitoba is still in the midst of developing and implementing a strategy for bringing existing medical waste incinerators into compliance with the future CWS requirements. There are about 35 medical waste incinerators in the province mostly located at health care institutions. Most burn very small quantities of waste of which only a small portion actually meets the definition for biomedical waste. Notwithstanding, Manitoba Health, in consultation with the province's regional health authorities, is working on a strategy that will broadly address biomedical waste including waste creation minimization, handling and disposal issues. A plan will be implemented to ensure that remaining incinerators (if any) comply with CWS requirements and/or alternate technologies, as may be required, are instituted to treat biomedical waste.

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Base Metal Smelting

Manitoba Overview

Manitoba's overall approach to new BMS facilities, should such additional facilities be constructed in the province, will be to incorporate the CWS requirements into the facility's Environment Act Licence or to include the requirements in a covering regulation. [A 'smelter' is a Class 2 type of development as listed in the Class of Development Regulation 164/88 under the Manitoba Environment Act. No person shall construct, alter, operate or set into operation any Class 2 development unless a proposal is submitted and a valid Licence obtained unless specifically exempt or covered by regulation.]

In Manitoba, the Hudson Bay Mining and Smelting Co., Limited (HBM&S) zinc-copper facility in Flin Flon has been identified as releasing mercury emissions to the atmosphere. With the commissioning of its pressure leaching process for zinc in 1993, significant reductions in mercury emissions were achieved. Since 1994, a continuing small annual decrease has been realized. For the year 2003, HBM&S emitted 0.959 tonnes of mercury at a rate of 4.8 grams per tonne of total metal production from its operation. Manitoba's other base metal smelter, INCO Thompson, processes ores that contain very low levels of mercury and, therefore, emissions of mercury are accordingly low.

At this time, Manitoba proposes to continue to liase with the one affected smelter (HBM&S) to voluntarily work towards achievement of the BMS CWS for existing facilities. Included in this approach are provisions in the CWS for determined efforts within the context of best available pollution prevention and control techniques, technically and economically achievable.

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CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Manitoba Overview

In 2002, the Manitoba Government released a draft regulation under The Waste Reduction and Prevention (WRAP) Act. The regulation is based on the principles of producer responsibility, placing primary responsibility for managing wastes associated with designated products on the sellers and manufacturers of those products. The regulation is still under consideration. Eleven categories of household hazardous waste, including mercury-containing lamps, are included in the draft regulation.

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CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Manitoba Overview

Manitoba has worked closely with its Dental Association during the course of the standard development and meets regularly to review implementation. The Manitoba Dental Association (MDA) has agreed to voluntarily implement the CWS as a precautionary and preventative measure. As of November 2004, the MDA has reported that more than 97% of Manitoba dental practices have already installed and are utilizing amalgam separators.

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NEWFOUNDLAND AND LABRADOR

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste, sewage sludge, municipal waste or medical waste incineration facilities or base metal smelters in the Province of Newfoundland and Labrador.

Prior to the implementation of the CWS for waste incineration, Newfoundland and Labrador had 53 uncontrolled municipal waste incinerators servicing 185,429 people. Our province has developed a Provincial Waste Management Strategy with the objective of phasing out all existing conical waste combusters by 2008. According to the Strategy, various facilities that have been targeted are required to close by the end of 2005 resulting in an anticipated 40% reduction in atmospheric mercury emissions from 2000 levels. Closure of remaining facilities is expected to occur before the end of 2008. As of December 31, 2004, 14 conical waste combusters servicing 82,984 people have been shut down resulting in a 44.8% reduction in atmospheric mercury emissions.

CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Newfoundland and Labrador Overview

There are no manufacturers of mercury-containing lamps in Newfoundland and Labrador. Since reductions in mercury content within the lamp is to be done through manufacturers of fluorescent tubes, which will be tracked at the federal level, there will be no provincial accounting of mercury content in the lamps. Consequently, the province has focused its efforts on promoting the proper disposal of mercury-containing lamps. Currently, the two largest government office buildings in St. John's have purchased 'Bulb Eaters' for the disposal of mercury-containing lamps.

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Newfoundland and Labrador Overview

Newfoundland and Labrador Department of Environment and Conservation have been working with the Newfoundland and Labrador Dental Association to achieve a 95% reduction in mercury releases from dental amalgam waste by 2005 from base year 2000. Compliance with this standard will be through the Memorandum of Understanding between Environment Canada and the Canadian Dental Association.

NEW BRUNSWICK

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste, sewage sludge, or municipal waste incineration facilities in the Province of New Brunswick.

Medical Waste Incineration

New Brunswick Overview

There are currently two medical waste incineration facilities that remain in operation in New Brunswick since the closure and decommissioning of the medical waste incinerator at the Dr. Everett Chalmers Hospital in June 2002.

Mr. Shredding Waste Management Ltd. (MSWM) operates the largest medical waste incinerator in the Province, incinerating approximately 800 tonnes of medical waste per year. The facility is equipped with extensive pollution control equipment, including a high temperature afterburner chamber, a wet scrubber, an activated carbon injection system and a fabric filter baghouse. Results of stack testing conducted in 2000 indicate that mercury emissions are below the CWS emission limit of 20 $\mu g/m^3$ for existing facilities incinerating more than 120 tonnes of medical waste per year, with test results averaging 9 $\mu g/m^3$.

A relatively small medical waste incinerator is operated by the Edmundston Regional Hospital, where approximately 70 tonnes of medical waste is incinerated each year. This facility is equipped with pollution control equipment that consists of a high temperature afterburner chamber and a wet scrubber. Results of stack testing conducted in 2000 indicate that mercury emissions are below the CWS emission limit of 40 $\mu g/m^3$ for existing facilities incinerating less than 120 tonnes of medical waste per year, with test results averaging 0.00135 $\mu g/m^3$.

Low emissions of mercury from New Brunswick's medical waste incinerators can be attributed to both the pollution control equipment in place and the efforts made by hospitals to segregate mercury containing wastes from the medical waste stream that is destined for incineration.

Stack testing of mercury emissions will be a requirement of the Approvals to Operate issued pursuant to New Brunswick's *Air Quality Regulation*, for the medical waste incinerators prior to 2006, in order to ensure the facilities remain in compliance with the CWS.

Contact

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Base Metal Smelting

New Brunswick Overview
There is one base metal smelter operating in New Brunswick. Noranda Inc. operates a lead smelter in the northern part of the Province.

Results of stack testing conducted over several years indicate that emissions have consistently been below the CWS emission limit of 2 g Hg/tonne of production of finished metals for existing facilities, with results ranging from 0.65 to 1.00 g Hg/tonne of finished metals produced.

Annual stack testing of mercury emissions will continue at the Noranda Inc., Brunswick Smelter and will be incorporated (upon renewal in 2005) as a requirement of the Approval to Operate, issued pursuant to New Brunswick's *Air Quality Regulation*, in order to track emissions and ensure that the facility remains in compliance with the CWS.

Contact
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CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

New Brunswick Overview
A Letter of Understanding between the New Brunswick Department of the Environment and Local Government and the New Brunswick Dental Society was signed to promote better management of dental amalgam waste. As of May 2005, 45% (126 out of 280) of the dental practices in New Brunswick have installed amalgam separators.

NORTHWEST TERRITORIES

CANADA WIDE STANDARDS FOR MERCURY EMISSIONS

The Department of Environment and Natural Resources was created in April 2005 to administer legislative authority over the environment and natural resources. The primary territorial environmental legislation is the Environmental Protection Act, Pesticide Act, Waste Reduction and Recovery Act and various Regulations and Guidelines.

Guidelines for the Management of Biomedical Waste in the Northwest Territories were adopted under the Environmental Protection Act on April 1, 2005. The Guidelines incorporate the CCME CWS for Dioxins, Furans and Mercury. The incineration of unsegregated municipal solid waste, sewage sludge and hazardous waste is not routinely practiced on Commissioners Lands in the NWT. Mining and oil and gas exploration and development sites on federal lands are under the jurisdiction of Indian and Northern Affairs Canada.

Biomedical Waste Incineration

The Northwest Territories has three biomedical waste incinerators, each having a capacity less than 120 tonnes per year. Inuvik and Fort Smith Hospital incinerators are new, installed in 2005 and equipped with secondary combustion chambers and wet scrubbers. The Stanton Hospital incinerator in Yellowknife was constructed in 1997 and is scheduled to be replaced in 2006.

Inuvik, Fort Smith and Yellowknife hospital incinerators are presently undergoing stack sampling and analysis by Al Lanfranco and Associates Inc. Langley, BC, to determine compliance with the territorial Biomedical Waste Guideline emission criteria (same as CWS). Reports are expected in June 2005.

CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Mercury vapor street and yard lights are identified under the Environmental Protection Act as being a “contaminant”. Acceptable disposal options for these lamps include return to the manufacturer or approved recycling or disposal facility.

Acceptable fluorescent lamp disposal options include shipment to approved recyclers or the use of mercury extraction technology to remove the mercury before local disposal of the residual glass. A fluorescent tube disposal guide that lists packaging procedures and recyclers has been provided since 1997. Disposal of fluorescent tubes and mercury vapour lamps at municipal landfill sites is not permitted.

In 2004 the Department of Environment and Natural Resources successfully demonstrated the use of a Dextrite Fluorescent Lamp Disposer for mercury vapour

pretreatment of fluorescent tubes. The Department is making the Dextrite available to communities and industry on a cost-recovery basis as an incentive for the proper management of waste fluorescent lamp tubes.

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

There are 13 Dental Clinics, approximately 15 Dentists and an unknown number of Dental Therapists practicing in the NWT. Many of these dentists no longer use dental amalgam restoration.

The 2005 Guideline for Management of Biomedical Waste states that dental office mouth wash and aspiration equipment should be equipped with ISO certified amalgam traps capable of a 95% capture rate. The NWT Dental Association will be contacted in 2005 to determine the extent of compliance with the Biomedical Waste Guideline.

The Department of Environment and Natural Resources accepts time expired and waste dental amalgam from dental therapists for disposal and recycling.

Other Mercury Containing Devices

A draft Guidelines for the Management of Waste Institutional, Commercial and Industrial Chemicals is being developed for adoption under the Environmental Protection Act. This guideline will address the management of mercury from the remaining institutional and commercial sources.

Contact

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NOVA SCOTIA

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste or sewage sludge incineration facilities and no base metal smelters in Nova Scotia.

Municipal Waste and Medical Waste

Nova Scotia Overview

Nova Scotia has one municipal solid waste/biomedical waste incinerator unit with two stacks. Each stack (with the exception of Stack #1 in 2003) of the unit had one annual stack test (average of 3 individual tests) for a total of 7 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.

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. Mercury levels were tested in accordance with US EPA 40 CFR Part 60, Method 29. 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.

Historical stack test results of the single municipal solid waste/biomedical waste incinerator has consistently met the 20µg /Rm^3.

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

Year	**Total Sector Release (kg /yr)**
2000	1.2
2001	2.1
2002	2.3
2003*	

*insufficient testing

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

Year	Stack #1 Mercury Concentrations (µg /Rm^{3**})	Stack #2 Mercury Concentrations (µg /Rm^{3**})
2000	4.8	2.9
2001	11.2	2.42
2002	10.3	6.1
2003***		2.59

**conditions at 25°C, 101.3kPa, 11% Oxygen, dry basis
***construction modifications to Stack #1 prevented testing.

Number of Annual Stack Tests exceeding the 20/µg /Rm^3(@25°C, 101.3kPa, 11% oxygen):

Year	Stack Tests (average of 3 individual)
2000	0
2001	0
2002	0
2003	0

Contact

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(Information regarding Mercury Canada-Wide Standards)

CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Nova Scotia Overview

There are no manufacturers of mercury-containing lamps in Nova Scotia. Therefore, the province has focused its efforts on the handling and disposal of waste mercury-containing lamps. Past efforts of the province in the establishment of a program to address the issue have proven ineffective due to relatively small volumes of mercury-containing lamps and a disperse population base. As such, the Nova Scotia Department of Environment and Labour is re-examining its plan with the intent of providing a more practical program to safely manage the mercury waste.

Contacts

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(Mercury Disposal Information)

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Nova Scotia Overview

In August of 1999 the Nova Scotia Dental Association signed a Memorandum of Understanding (MOU) with the Nova Scotia Department of the Environment. This voluntary partnership was intended to assist dentists with the minimization of waste and the consumption of resources in dental practices. A one-time collection program for bulk elemental mercury from all dental offices was completed. This resulted in minimizing the risk of mercury spills or improper disposal. In addition, a guide titled, "Best Management Practices for Hazardous Dental Waste Disposal", was developed for dentists. The MOU and the Best Management Practices for Hazardous Dental Waste Disposal guide are available on the Nova Scotia Dental Association website at http://www.nsdental.org/mercury.HTM and http://www.nsdental.org/hazardous.HTM, respectively.

There are approximately 200-225 dental practices in the province. The Nova Scotia Dental Association 2003 members survey demonstrated that 96 percent of the dentists were aware of the need for amalgam separators and the timelines of the Canada-Wide Standard. The survey also determined that 25 percent of the dentists in Nova Scotia have installed the appropriate amalgam separators. Anecdotal information from the Nova Scotia Dental Association currently indicates that the number of dental practices with amalgam separators may actually be closer to 50 percent.

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(Information Associated with MOU with Nova Scotia Dental Association)

NUNAVUT

CANADA WIDE STANDARDS FOR MERCURY EMISSIONS

Nunavut does not incinerate hazardous wastes, and/or sewage sludge. Opening burning is carried in smaller communities. There is no open burning in Iqaluit.

There are no base metal smelters in Nunavut.

Biomedical Waste Incineration

Nunavut Overview
Nunavut has one biomedical waste incinerator, which is operated at the Baffin Regional Hospital. This unit was installed in the 2004 and is equipped with a secondary combustion chamber and a wet scrubber.

Stack sampling and analysis is planned for the summer of 2005.

CANADA-WIDE STANDARDS FOR MERCURY-CONTAINING LAMPS

Nunavut Overview
Nunavut uses two disposal options for the mercury-containing lamps. One option includes shipment to approved recyclers. The other involves crushing of fluorescent tubes, collecting and shipping the material to disposal facilities.

Disposal of fluorescent tubes and mercury vapour lamps are not permitted at municipal landfill sites.

CANADA-WIDE STANDARDS ON MERCURY FOR DENTAL AMALGAM WASTE

Nunavut Overview
Nunavut is a signatory to the Canada-Wide Standard on Mercury for Dental Amalgam Waste. The Department of Environment promotes the collection of dental amalgam wastes at clinics across Nunavut.

Alternative filling practices have reduced the use of mercury in dental practices. Mercury is still being used and as a result DOE has spoken with the dental clinics in regard to their practices. DOE will be contacting the Dental Association to outline our position and to stress the need to follow methods that would meet the Mercury Canada-wide Standard.

ONTARIO

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

Hazardous Waste Incineration

Ontario Overview

Notices amending the Certificates of Approval of the hazardous waste incinerators to include the mercury CWS limit were issued prior to end of December 2003.

Five of the six facilities were below the CWS limit. The one facility that did not meet the CWS limit in the 2003 reviewed the three tests and found that one test result was significantly higher than the CWS limit, and that two were less than 10% of the limit (*e.g.* under 5:g/Rm^3). It is speculated that a mercury-containing item (battery, switch etc) was put in the incinerator during the test causing the anomalous result. To prevent this from happening in the future the facility management took steps to re-educate the incinerator operators regarding what can and cannot be incinerated.

New and expanded hazardous waste incineration facilities will have to comply with *Guideline A8 for the Implementation of Canada-wide Standards for Emissions of Mercury and of Dioxins and Furans and Monitoring and Reporting Requirements for Municipal Waste Incinerators, Biomedical Waste Incinerators, Sewage Sludge Incinerators, Hazardous Waste Incinerators, Steel Manufacturing Electric Arc Furnaces, Iron Sintering Plants*.

All six hazardous waste incinerators are required to perform stack testing in 2004.

Contact

John Steele (416) 314-6666

Sewage Sludge Incineration

Ontario Overview

Ontario has five sewage sludge incinerators of which four are currently operating. At this time two have the CWS limit incorporated into their Certificates of Approval. The remaining three facilities will have their Certificates amended to include the limit prior to the end of 2005 (the compliance date of the CWS).

All operating sewage sludge incinerators will be required to perform annual stack testing for mercury.

Contact

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Municipal Waste Incineration

Ontario Overview

Ontario has two municipal waste incinerators, one that is approved for full-scale operation and one that is approved only for research and development burns a maximum of twenty hours in any calendar month. At this time both have the CWS limit incorporated into their Certificates of Approval. The full-scale facility is already in compliance with the mercury CWS limit.

Any new municipal solid waste incineration facilities must comply with Guidelines A-7 and A-8 that incorporate the CWS.
The municipal waste solid waste incinerator that has approval for full-scale operation is required to perform annual stack testing.

Contact

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Medical Waste Incineration

Ontario Overview

All existing hospital incinerators were closed by regulation (O. Reg. 323/02). This regulation required these incinerators to close by December 6, 2003. MOE staff have verified that all hospital incinerators have closed.

Ontario has one commercial biomedical incinerator currently operating and this facility meets the CWS limit for mercury. This facility is required to perform annual stack testing.

Ontario has *Guideline A-1: Combustion, Air Pollution Control and Monitoring Requirements for Biomedical Waste Incinerators in Ontario* that sets the emission limits, including the CWS, for new and existing biomedical incinerators.

Contact

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Base metal Smelting

Ontario Overview

Ontario has three base metal smelters that are covered by the mercury CWS for base metal smelting.

Ontario Base Metal Smelters

Reporting year	Mercury Releases to Air (g/t finished product)		
	Facility A	Facility B	Facility C
2000	N/A	N/A	0.02334
2001	N/A	N/A	0.05262
2002	N/A	N/A	0.02114
2003	0.00281	0.00155	N/A

N/A – not available at the time this report was prepared

CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Ontario Overview

Ontario started lamp recycling programs at several government buildings. To date approximately 30,000 lamps have been recycled and over 1 kilogram of mercury has been captured. Ontario plans to continue to promote lamp recycling in government buildings.

Waste Diversion Ontario (WDO) is a non-crown corporation whose mandate is to develop, implement and operate waste diversion programs. The Waste Diversion Act enables the WDO to use Extended Producer Responsibility (EPR) to finance the diversion programs. In general, the Ontario Minister of the Environment **designates** a material under regulation and subsequently issues a request to WDO to develop a diversion program for the material. WDO has cited fluorescent lamps as a product that may be designated in the future.

Contact

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CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Ontario Overview

Ontario has implemented the CWS in using the following instrument:

> Amalgam Waste Disposal - Ontario Regulation 196/03 (*http://www.e-laws.gov.on.ca/DBLaws/Source/Regs/English/2003/R03196_e.htm*)

This regulation (O.Reg. 196/03) required dental offices in Ontario maintained by a member of the RCDSO that place, repair or remove dental amalgam to have a properly installed dental amalgam device that meets or exceeds the International Organization for Standardization (ISO) standard for dental amalgam separators by November 15, 2003. The regulation also requires that members of the Royal College of Dental Surgeon of Ontario who place, repair or remove dental amalgam to comply with their Standard of Practice of the Profession for Amalgam Waste Disposal (*http://www.rcdso.org/*). It is

expected that the regulation will achieve the 95% reduction in mercury releases from waste dental amalgam prior to the 2005 target compliance date. The RCDSO, the regulatory body for the dental profession, is monitoring compliance with this regulation and preliminary feedback from the 2003 members survey indicate that approximately 99% of the 7800 dentists in Ontario appear to be in compliance.

Ontario has worked with the Federal government and other dental stakeholders to produce a Best Management Practices Guide and Dental waste management flow charts *(http://www.rcdso.org/)*

In addition to the actions of the provincial government, several municipalities in Ontario have pro-actively passed bylaws that address mercury releases from dental clinics, for example:

City of Toronto Municipal Code: Sewers
http://www.city.toronto.on.ca/legdocs/municode/1184_681.pdf
City of Ottawa Sewer Use Bylaw
http://ottawa.ca/city_services/waterwaste/sewer_use/sewer_use_4_en.shtml
City of North Bay Sewer Use Bylaw *http://www.city.north-bay.on.ca/VCH/data/2002/2002_112.pdf*

Data from the City of Toronto indicates the mercury content in biosolids sampled at sewage treatment plants across the city decreased between 40% and 70% shortly after the bylaw was in place (late 2001).

Contact
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MERCURY SWITCHES

The Ontario Ministry of the Environment has supported the Mercury Switch-Out program administered by the Clean Air Foundation (CAF) since 2001.

Switch Out is a voluntary program that encourages autorecyclers to remove mercury switches from end of life vehicles before they are recycled in an electric arc furnace. The majority of mercury in cars is found in mercury switches that were used for convenience lighting in hoods and trunks, as well as in anti-lock brakes. Car manufacturers no longer use mercury tilt switches in vehicles.

In May 2004, Ontario entered into a 3-year partnership with CAF which includes Ontario's commitment to continue supporting the Switch Out program in 2004-2006. CAF has set deliverables for the Switch Out program over this time frame including:

- collection of 35,000 mercury switches (29.7 kg of mercury) in 2004-2005;
- collection of 90,000 mercury switches (72 kg of mercury) in 2005-2006; and
- collection of 300,000 mercury switches (240 kg of mercury) in 2006-2007.

PRINCE EDWARD ISLAND

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste or sewage sludge waste incineration facilities and no base metal smelters in Prince Edward Island.

PEI Municipal Solid Waste Incineration

Prince Edward Island Overview

Prince Edward Island has one municipal solid waste incinerator operating in the province, it processes an average of 32000 tonnes/year. The plant has a third party testing agency perform annual source emission testing, for particulate matter, metals (including mercury), hydrochloric acid and combustion gases, from the incinerator stack during normal working conditions. Testing for dioxins and furans is performed semi-annually. The incinerator is currently being equipped with carbon injection to satisfy the CWS requirements by early 2005.

PEI Medical Waste Incineration

Prince Edward Island Overview

Prince Edward Island's overall management strategy for new medical waste incinerators incorporates the CWS into the terms and conditions of permits to operate issued pursuant to the Environmental Protection Act's Air Quality Regulations. Existing medical waste incinerators in the province are small capacity burning less than 120 tonnes per year. The terms and conditions associated with the permits to operate these small units will require waste audit and diversion planning. The province is currently investigating other methods of waste destruction for future emissions reductions.

Contact

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CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Prince Edward Island Overview

Prince Edward Island's strategy for emission reductions from mercury-containing lamps is a function of an Island wide waste disposal concept called "Waste Watch". The program is administered by a crown corporation called the Island Waste Management Corporation. All waste on PEI must be sorted into the following categories: waste,

compost, and recyclables. Mercury-containing lamps cannot be placed curbside. Home owners must deliver the lamps to one of six Waste Watch Drop-off Centers in the province where they are collected for disposal.

As part of source separation, mercury-containing lamps must be removed from buildings prior to demolition. Contractors have been notified that mercury-containing waste cannot be disposed of at construction and demolition sites. In the future, owners/managers of industrial, commercial and institutional buildings will be notified of the requirements for proper removal and recycling/disposal.

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CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

The Dental Association of Prince Edward Island has 64 dentists licensed to practice on P.E.I.. There are currently 36 dental clinics in P.E.I. that perform mercury amalgam restoration work. A number of these offices are located in rural areas that are not serviced by central sewer systems. The majority of the clinics are located in Charlottetown, which are serviced by a municipal sewer system.

In 2002, the P.E.I. Department of Environment and Energy, in conjunction with Environment Canada, completed a report entitled "Dental Amalgam Waste Management Pilot Project Phase 1 Report". The report is being utilized by the P.E.I. Dental Association to assist dentists to select the most suitable separator for their clinic. According to the P.E.I. Dental Association, a number of dentists have installed separators and the remainder are going through the selection process. Early in 2005, the Department plans to contact Island dentists to confirm their voluntary compliance with the Canada -Wide Standard for Dental Amalgam Waste. Should the majority of dentists not be in compliance by June 30, 2005, P.E.I. will consider developing regulations, under the Environmental Protection Act's Waste Resource Management Regulations, to insure compliance. To monitor the progress of this Canada-Wide Standard, the PEI Department of Environment, Energy, and Forestry will analyze sludge from the waste water treatment facility located in Charlottetown.

P.E.I. has had very good cooperation with the P.E.I. Dental Association during the implementation of this Canada -Wide Standard and look forward to a smooth transition to compliance.

SASKATCHEWAN

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste, sewage sludge, or muncipal waste incineration facilities and no base metal smelters in Saskatchewan.

Saskatchewan Overview

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.

Medical Waste Incineration

Saskatchewan Overview

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 mercury from this sector. This reduction does not include further reductions realized by “determined efforts.”

Saskatchewan's overall approach to management of mercury 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 120 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 waste incinerators.

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.

For more information please refer to the "Determined Efforts" fact sheet at http://www.se.gov.sk.ca/environment/protection/standards/EBP255_PVC_Mercury_inHospitals.pdf.

Contact
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CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Saskatchewan Overview
Saskatchewan intends to promote the recycling of fluorescent lamps where the infrastructure and capacity are sufficient to make it relatively cost effective. Large facilities such as hospitals, office towers, etc. are examples where sufficient lamps are managed to make recycling cost-effective, however the dispersed nature of Saskatchewan's population may make this difficult in some areas.

Reductions in tube mercury content is to be pursued primarily via a federal tracking of industry commitments. Residents and corporations may choose to select low-mercury lamps and so contribute to the achievement of this CWS. Residents may also wish to recycle lamps at household hazardous waste sites.

Saskatchewan Environment will not directly track fluorescent lamp mercury content or recycling rates that could be accessed by the public, however this information may be made available indirectly through the agencies undertaking this work. At the present time, there are no lamp recycling companies within Saskatchewan and all such material must be shipped out of province for processing.

Low mercury content, high efficiency tubes will reduce electricity use and therefore have the co-benefit of reduced mercury emissions from coal-fired power plants which serve the province. The multi-pollutant benefits of this CWS are limited - recycling does not necessarily reduce emissions of pollutants because of the transportation costs associated with shipping used tubes to the recycling centres. It is conceivable that recycling could reduce emissions from glass manufacture and aluminium smelting (vs disposal) as these are the recyclable components of the lamp; the mercury content is typically resold to be purified and used in new lamps or other applications.

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Saskatchewan Overview

Saskatchewan intends to promote the appropriate management of Dental Amalgam Waste so mercury does not enter the environment. Appropriate management may include landfilling in an approved, confined, engineered landfill with leachate collection systems, recycling to either produce reusable materials such as mercury, silver or copper, or for stabilization/immobilization in a form that may be retired permanently.

Saskatchewan will achieve through "Best Management Practices" a 95 per cent reduction in mercury releases from dental amalgam waste discharges to the environment, by 2005, from the base year of 2000. "Reduction in mercury releases" refers to the amount of mercury, either in the form of elemental mercury or mercury containing compounds, removed from the dental waste stream. "Best Management Practices" are defined as including the use of an International Organization for Standardization (ISO) certified amalgam separator or equivalent to remove mercury from the waste stream.

Reductions in mercury amalgam are to be pursued primarily via a federal tracking of the dental industry commitments. Therefore, residents and corporations may have a limited role to the achievement of this CWS.

Saskatchewan Environment will not directly track mercury amalgam waste or recycling rates that could be accessed by the public, however this information may be made available indirectly through the agencies undertaking this work. The federal government is committed through a Memorandum of Understanding with the Canadian Dental Association to receive amalgam waste management data on an annual basis and to conduct analyses to produce a summary report addressing the reported compliance with the Best Management Practices.

Progress in the reduction of dental amalgam is to be pursued primarily via a federal tracking of the dental industry commitments. The annual federal reports as a result of this federal tracking will be reviewed and verified by provincial officials to determine if the dental industry is in compliance within the Province of Saskatchewan.

The multi-pollutant benefits of this CWS are limited - recycling or disposal does not necessarily have a benefit to the reduction of other emissions. However, the Canada-wide standard is independently beneficial and is a result of the invocation of the precautionary approach where it is recognized that mercury is persistent, bio-accumulative and toxic, even though, there is no evidence of environmental harm resulting from current management of amalgam waste.

YUKON

CANADA-WIDE STANDARDS FOR MERCURY EMISSIONS

There are no hazardous waste, sewage sludge, or municipal waste incineration facilities and no base metal smelters in the Yukon.

Medical Waste Incineration

Yukon Overview

Only one biomedical waste incinerator, located at Whitehorse General Hospital, is currently in operation in the Yukon and holds an Air Emissions Permit under the Yukon *Air Emissions Regulations*. In response to the CWS, the hospital assessed the operation of the incinerator in 2000 and consequently retrofitted the pollution control equipment for maximum efficiency. The pollution control equipment was not designed for treating mercury wastes and steps were taken to ensure that waste amalgam from community dental clinics is no longer incinerated.

The recent renewal of the hospital's Air Emissions permit requires the permittee to develop and submit to the Department of Environment a Pollution Prevention Plan for review addressing the reduction of mercury and dioxin and furan emissions. Implementation of the Plan must occur within 3 months of the Plan being accepted. Follow-up actions include the option of a one-time stack test to assess the level of particulate matter, mercury and dioxins/furans, an audit of the waste diversion program, pollution control upgrading, or other measures as determined by the Department. A report documenting the compliance measures under these new clauses must be submitted by July 1, 2006.

CANADA-WIDE STANDARD FOR MERCURY-CONTAINING LAMPS

Yukon Overview

It is the policy of the Yukon Government to purchase low-mercury T-8 lamps. Government buildings are retro-fitted for T-8 bulbs as old bulbs are changed out, budget permitting.

The Yukon is pursuing its commitment to foster the recycling of fluorescent lamps where feasible. The initial step involved a joint venture with the government's Property Management Agency and the Department of Environment in a pilot project to collect used fluorescent lamps from government-operated buildings and schools throughout the territory. A bulb crusher was purchased in January 2003 and currently services all bulbs removed from government buildings. The lamps are handled and crushed by Property

Management with the disposal cost covered by the Department of Environment as part of the government's annual Special Waste Collection program.
The City of Whitehorse holds Household Hazardous Waste (HHW) Collection days for the public to dispose of special wastes, including mercury bulbs. The bulbs are collected and crushed by Property Management in the bulb crusher. To date, 4 barrels of mercury bulbs from government buildings and the special waste collection have been diverted from the landfill.

There is potential to hold Household Hazardous Waste collections in other Yukon communities where old bulbs could be disposed of properly by the public. It is recognized, however, that the dispersed nature of Yukon's population may make recycling difficult in some areas even where quantities are sufficient.

The Yukon continues to explore partnership opportunities with other parties so that more bulbs may be dealt with responsibly. Discussions with the City of Whitehorse have started regarding a second bulb crusher to deal with bulbs generated by businesses and the public. If the plan is implemented, the crusher will be housed at the City landfill where people can drop off their used bulbs year-round and have them crushed by trained staff.

The Yukon will not prepare a public accounting for progress on recycling, though major facility owners and corporations may choose to do so individually. While promotion of lamp recycling and encouragement of the purchase of efficient, low mercury lamps will be pursued, the Yukon has not set any milestones or deliverables for these activities.

CANADA-WIDE STANDARD ON MERCURY FOR DENTAL AMALGAM WASTE

Yukon Overview

As a signatory to the *Canada-Wide Standard on Mercury for Dental Amalgam Waste* (CWS), the Yukon Territory is dedicated to helping dental clinics reduce the amount of mercury entering the environment. The Government of Yukon encourages dental clinics to voluntarily conform to the Memorandum of Understanding (MOU) between Environment Canada and the Canadian Dental Association (CDA). Steps to encourage voluntary compliance include ensuring clinics are familiar with the MOU and CWS and sending copies to those who are not.

A three-part survey was conducted in January 2004 which sought to identify the level of amalgam use in Yukon dental clinics, the current methods of mercury amalgam handling and disposal, and the use of Best Practices in the clinics. A follow-up report to the survey was sent to all dental clinics summarizing the results along with some background information on mercury.

There are 7 private clinics, 23 Territorial school clinics, and 3 nursing stations providing dental services in the Yukon. Five private clinics and 8 school clinics returned surveys for a response rate of 43.3%.

The survey revealed several disposal methods for Yukon amalgam, including disposal through the garbage, inclusion in the Special Waste Collection conducted annually through the Yukon Department of Environment, and incineration with biomedical waste.

In 2003, school clinics disposed of 31 kg of mercury waste (accumulated over several years) through the Special Waste Collection. In 2004, 7 kg of mercury waste was collected from the schools and 4 kg from a private clinic. These figures are taken from the Special Waste Collection records. Exact amounts of mercury-contaminated waste materials are unavailable for clinics not using this service.

The responding dental clinics report that they generally stock three sizes of amalgam capsules: 600, 800, and 1000mg. Several clinics have moved away from mercury amalgam altogether and all private clinics offer composite resin as an alternative. Mercury products for the most part are properly and securely stored using the mercontainers in which they were shipped. Current disposal practices in private clinics however, consist mainly of waste amalgam being thrown into the garbage. In contrast, school clinics appear to be using the Special Waste Collection increasingly, thereby ensuring the mercury waste is disposed of in a proper manner. Though the annual Special Waste Collection has been advertised for the past 11 years, people handling special wastes are still becoming aware of the service. A stronger effort is being made to educate dental clinics of the Collection and of the benefits of using the Collection. A single clinic was in the practice of disposing waste amalgam with the community's biomedical waste destined for incineration. Following the survey, a letter was sent to Health and Social Services requesting incineration of mercury products discontinue.

Traps and filters remain the only equipment used to deal with mercury wastes in most clinics. Until recently, there were no amalgam separators installed at any of the dental clinics. Three clinics now have separators which conform to the ISO 11143 standards.

There are currently no measurements taken to record the amount of mercury entering sewers. In the future, the amount of mercury entering the sewer systems from clinics may be estimated based on the amount of amalgam retrieved through the three new amalgam separators.

The release of contaminants to the City of Whitehorse sewers are addressed in the *Sewer and Water Bylaw 99-02*. Bylaw provisions prohibit the release of substances to the sewer system which may cause a hazard to any human, animal, property, or vegetation. The bylaw lists mercury as a restricted waste with a limit of 0.10 mg/L when present in waters entering the sanitary sewerage system.

The Government of Yukon will continue to work with the dental profession to improve the performance of Yukon Dental Association (YDA) members with regards to the

handling of waste mercury products in their clinics. Toward this end, the YDA recently hosted a guest speaker from Environment Canada that give a talk on mercury in the dental field at an educational meeting in the fall of 2004. This meeting emphasized the importance of proper handling and disposal techniques for special wastes and the importance of having the right equipment in the clinics to deal with waste amalgam, and promoted a positive working relationship between the Government of Yukon and Yukon dentists in achieving the goals set out in the CWS.