

**Canadian Council of Ministers of the Environment**

***CANADA-WIDE STANDARDS***

***for***

***MERCURY EMISSIONS***

# **CANADA-WIDE STANDARDS for MERCURY EMISSIONS**

## **PREAMBLE**

The Canadian Council of Ministers of the Environment determined that mercury levels in fish and wildlife across Canada warrant additional efforts to reduce atmospheric emissions derived from both deliberate use of mercury and from incidental releases of mercury.

Restrictions on the human consumption of fish in order to safeguard the health of both high fish consumers (sustenance and commercial fishers) and sensitive populations (infants, children and women of childbearing age) are widespread. Some of these restrictions are derived from lakes naturally high in mercury, others in lakes and rivers contaminated by historical point source discharges and still others in waters remote from identifiable sources. Traditional lifestyles may be profoundly influenced by mercury contamination.

Mercury levels in fish pose an additional, largely unquantified risk to fish-eating wildlife. Isolated examples of toxicity to loons and otters suggest the potential for large scale and/or widespread impacts. Just as mercury levels in fish affect their consumption by humans, some levels in fish may affect wildlife which consume them. In both instances, the mercury causing the impacts is derived from both natural and anthropogenic sources.

The combined impacts of mercury contamination in Canada are difficult to quantify. The exact proportion of the impact which can be ascribed to natural mercury and to past and present anthropogenic releases cannot presently be quantified. Because it is a natural and persistent bioaccumulative element which can be transported many miles in the atmosphere, mercury can have impacts many years and many miles removed from its original source. A common thread through all mercury impacts is that deposition to waterbodies from anthropogenic emissions poses a threat to human and ecosystem health, and that reduced deposition will contribute, in time, to reduced impacts.

Under a variety of regional, national, binational and international programs, treaties and agreements, mercury has been consistently targeted for emission reductions. Such a policy position is consistent with the CCME Policy for the Management of Toxic Substances which identifies that mercury shall be managed through its lifecycle to minimize releases. This is consistent with the precautionary approach endorsed in the Harmonization Accord and Canada Wide Standards Sub-agreement. Ministers of the Environment have thus agreed to undertake and promote cost-effective actions to achieve further precautionary reductions in anthropogenic emissions (releases to the air) of mercury.

## **Canada-wide Standards for Mercury Emissions**

The Canada-wide Standards development process reviewed the nature of the mercury issue in Canada, and concluded that two distinctive source categories were amenable to further actions, namely life-cycle management of products containing mercury to minimize releases, and reduction or minimization actions for major point source emissions of incidental mercury.

Based upon available inventory information, it is estimated that of the year 2000 national mercury emissions (12 T/yr) three sectors will contribute the bulk of these emissions, namely the base metal smelting sector (2.57 T/yr), waste incineration sector (1.2 T/yr) and coal-fired electricity generation sector (1.1 T/yr). Standards have been developed for two of these three sectors that reflect room for improvement that is significant and cost-effective. Standards have been provided also that will be used to guide the development of new facilities should they be constructed. Efforts to develop a standard for the electricity generation sector have been complicated and progress has been delayed such that a workplan to develop standards for this sector will not be completed until early in 2000. Life-cycle standards for select mercury-containing products will also be completed early in 2000.

### **PART 1:**

#### **Base metal smelting**

##### Rationale for standard

The base metal smelting sector has historically been responsible for much of the mercury emitted in Canada. However the voluntary application of a number of process changes and stack treatments/scrubbers have combined to reduce mercury emissions from this sector by more than 90% since 1988. Due to reductions from this sector, Canada has complied with its obligations under the United Nations Economic Commission for Europe Heavy Metals Protocol. Despite this substantial progress additional reductions are possible. As of 2000, the mercury emissions from base metal smelting remain the single largest emission sector in Canada at 2.8 T/yr. Under the federal Strategic Options Process (SOP), industry and government recommended development by CCME of “environmental source performance guidelines” that reflect application of best available techniques. By following this approach, Canada’s domestic program will be consistent with international objectives for this industry.

##### Nature and application:

Based upon the performance of various technologies and practices as demonstrated at existing facilities in Canada, and in consideration of the recommendations made in the federal SOP for this sector, a two-part standard is recommended. This standard reflects the application of “best available techniques” on a facility-specific basis, and a uniform reporting mechanism based upon environmental source performance (atmospheric emission) guidelines. Standards are suggested for both existing facilities, to reflect actions taken to reduce emissions of mercury, and for new facilities, to ensure that smelters utilize the best available techniques to avoid or reduce metals emissions generally and mercury emissions specifically.

##### Numeric Targets:

For existing facilities: application by all primary zinc, lead and copper smelters of best available pollution prevention and control techniques economically achievable to achieve an environmental source performance (atmospheric emission) guideline of 2 g Hg/tonne total production of finished metals.

For new and expanding facilities: application of best available pollution prevention and control techniques to minimize mercury emissions throughout the life-cycle of the minerals in question to achieve an environmental source performance (atmospheric emission) guideline of 0.2 g Hg/tonne production of finished zinc, nickel and lead, and 1 g Hg/tonne of finished copper, and consideration of a mercury offset<sup>1</sup> program to ensure no “net” emission increases occur.

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<sup>1</sup> A new facility will recover and retire an amount of mercury equivalent to their annual emissions.

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### Timeframe for achieving the targets:

Existing facilities will be expected to make a determined effort<sup>2</sup> to meet this standard by 2008, coincident with implementation of the federal Strategic Options Report, while any new facility will be required to design for and achieve compliance immediately upon full scale operation. Jurisdictions will evaluate changes and upgrades to existing facilities to ensure they constitute determined efforts.

## Waste Incineration

### Rationale for standard

Waste incineration<sup>3</sup> has historically been responsible for a significant portion of the mercury emitted in Canada, however reductions in emissions have been apparent. Improved exhaust gas controls to reduce emissions of acid gases and fine particulates or activated carbon injection systems have decreased emissions of both mercury and dioxins and furans from the municipal solid waste<sup>4</sup> sector. At the same time, action has been taken by many product manufacturers to reduce the mercury content of consumer goods which could end their life cycle in domestic solid waste (e.g., alkaline batteries) and thus have reduced the mercury available in the waste stream. Mercury from this sector is estimated to be 446 kg/year. Many medical waste incinerators<sup>5</sup> have closed for economic or environmental reasons, but a range of medium- to small-sized facilities remain which alone are small sources, but as a sector are considerable, emitting an estimated 250 kg/yr. Two sectors in which emission reductions are not apparent, hazardous waste<sup>6</sup> (550 kg/yr) and sewage sludge (285 kg/yr) incineration, can achieve reductions either through source control or gas-controls. Control of mercury emissions has been recognized in a variety of jurisdictions, including some Canadian Provinces, with emission standards being developed by the Eastern Canadian Premiers and New England Governors (ECP-NEG), or the United Nations Economic

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<sup>2</sup> Determined efforts include the ongoing review of opportunities for reductions and implementation of in-plant changes and/or emissions control upgrades that are technically and economically feasible and which confer on-going reductions in emissions

<sup>3</sup> For the purpose of the Mercury CWS, an incinerator shall be considered to be a device, mechanism or structure constructed primarily to thermally treat (e.g., combust or pyrolyze) a waste for the purpose of reducing its volume, destroying a hazardous chemical present in the waste, or destroying pathogens present in the waste. This includes facilities where waste heat is recovered as a byproduct from the exhaust gases from an incinerator, but does not include industrial processes where fuel derived from waste is fired as an energy source as a matter incidental to the manufacture of the primary product.

<sup>4</sup> For the purpose of the Mercury CWS, municipal solid waste shall be taken to include any waste which might normally be disposed of in a non-secure landfill site if not incinerated (i.e., including non-hazardous solid wastes regardless of origin), but is not intended to include "clean" wood waste. Clean wood waste means waste from woodworking or forest product operations where the wood waste has not been treated with preservative chemicals (e.g., pentachlorophenol) or decorative coatings.

<sup>5</sup> For the purpose of the Mercury CWS, medical waste is any waste which includes as a component any Biomedical Waste as defined in the February 1992 CCME *Guidelines for the Management of Biomedical Waste in Canada*, with the exception that animal wastes derived from animal health care or veterinary research and teaching establishments are excluded.

<sup>6</sup> hazardous waste incinerators do not include facilities that use waste derived fuel.

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Commission for Europe (UNECE) providing a basis for evaluating possible Canada-wide Standards.

Actions to reduce national emissions below the anticipated 2000 rate of 1.5 T/yr require that any new facilities meet stringent limits, and that the bulk of the emissions from existing facilities be controlled through retrofits with control technology that is efficient at removing mercury, or the mercury containing waste be diverted from incinerators. All facilities, and particularly smaller ones, may find that pollution prevention, waste segregation and diversion are options for either achieving the limit, or reducing “end-of-stack” expenditures, and during implementation all facilities should be encouraged to place a priority on reduced inputs rather than controlled releases. Attainment of the numeric standards adopted by the ECP-NEG for application to large municipal, and sludge incinerators, and by the UNECE for hazardous waste incineration is suggested as cost-effective means of reducing emissions from this sector. A review of the ECP-NEG limit for medical incinerators concluded that larger medical incinerators actually combust a considerable amount of municipal waste, and as such it is recommended they comply with the same limit as the municipal sector.

### Nature and application:

Emission limits are expressed as a concentration in the exhaust gas exiting the stack of the facility. New or expanding facilities will be expected to comply immediately with the standard, and it will be up to individual jurisdictions to determine what constitutes a significant expansion to trigger the standard. The limits for existing facilities are capable of being met using generally available technology (or waste diversion). Larger facilities will be subject to annual stack testing to verify compliance with the limit and smaller (medical, municipal) facilities will have the option of reporting on a successful mercury diversion plan or of conducting a one-time stack test, to illustrate progress towards the standard.

### Numeric targets:

For new or expanding facilities of any size, application of best available pollution prevention and control techniques, such as a mercury waste diversion program, to achieve a maximum concentration<sup>7</sup> in the exhaust gases from the facility as follows:

|   |                       |
|---|-----------------------|
| Municipal waste incineration <sup>8,9</sup> | 20 µg/Rm <sup>3</sup> |
| Medical waste incineration                  | 20 µg/Rm <sup>3</sup> |
| Hazardous waste incineration                | 50 µg/Rm <sup>3</sup> |
| Sewage sludge incineration                  | 70 µg/Rm <sup>3</sup> |

For existing facilities application of best available pollution prevention and control techniques, to achieve a maximum concentration<sup>7</sup> in the exhaust gases from the facility as follows:

|   |                       |
|---|-----------------------|
| Municipal waste incineration <sup>8</sup> |                       |
| > 120 Tonnes/year <sup>9</sup>            | 20 µg/Rm <sup>3</sup> |
| < 120 Tonnes/year <sup>10</sup>           | 20 µg/Rm <sup>3</sup> |

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|                                 |                       |
|---------------------------------|-----------------------|
| Medical waste incineration      |                       |
| > 120 Tonnes/year <sup>9</sup>  | 20 µg/Rm <sup>3</sup> |
| < 120 Tonnes/year <sup>10</sup> | 40 µg/Rm <sup>3</sup> |
| Hazardous waste incineration    | 50 µg/Rm <sup>3</sup> |
| Sewage sludge incineration      | 70 µg/Rm <sup>3</sup> |

<sup>7</sup> Stack concentrations of mercury will be corrected to 11% oxygen content for reporting purposes.

<sup>8</sup> Conical waste combustors are under separate consideration since the proposed standard for municipal waste incinerators cannot be achieved with these burners. Newfoundland will review the use of conical waste combustors and consider a phase-out strategy that will reduce mercury emissions. Such a strategy would be developed in conjunction with the Canada-wide Standard for dioxins and furans.

<sup>9</sup> Larger facilities must achieve this stack concentration as confirmed by annual testing.

<sup>10</sup> Smaller facilities must make determined efforts<sup>2</sup> to achieve this stack concentration. The effectiveness of the pollution prevention measures will be established by way of a one-time stack test conducted after implementation of the plan or by the provision of an inventory documenting an audit of a waste diversion program, which is deemed an acceptable substitute.

### Timeframe for achieving the targets:

Any new or expanding facility will be required to design for and achieve compliance immediately upon attaining normal full scale operation, compliance to be confirmed by annual stack testing or an equivalent emission rate as confirmed by an audit of a waste diversion program.

Existing facilities will endeavour to meet the standards on the following schedule:

|                              |      |
|------------------------------|------|
| Municipal waste incineration | 2006 |
| Medical waste incineration   | 2006 |
| Hazardous waste incineration | 2003 |
| Sewage sludge incineration   | 2005 |

## **PART 2:**

### REPORTING ON PROGRESS:

Ministers will receive reports by jurisdictions in 2004, 2007 and 2010, and will ensure that a single public report is prepared and posted on the CCME web site for public access. The 2010 report will include an evaluation of these standards and a recommendation whether changes should be considered.

These reports will be accompanied by other information on additional outcomes, activities, research or issues which are relevant to the mercury CWSs and/or sector under consideration. Examples of such reporting includes speciation measures relevant to design of stack control measures, other environmental programs with implications for compliance with the standards,

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etc..

Each jurisdiction will detail the means of ensuring compliance/achievement in a manner consistent with the typical or desired programs for the affected facility/sector, so as not to impose an unnecessary level of reporting duplication upon the jurisdictions. In those sectors where the CWS calls for determined efforts, jurisdictions will report on their evaluation of these efforts.

During the years prior to the date for achievement/compliance of a standard, jurisdictions will provide information explaining the status of their implementation of each mercury CWS so that a consolidated summary of jurisdictional progress can be prepared for the public. More details and a mock-up report are available in Annex 1.

### **ADMINISTRATION:**

Jurisdictions will review and renew Part 2 and Annex 1 five years from coming into effect.

Any party may withdraw from these Canada-Wide Standards upon three month's notice.

These Canada-Wide Standards come into effect for each jurisdiction on the date of signature by the jurisdiction.



# Annex 1

## Mercury Reporting Framework

### Introduction

Under the Harmonization Accord and its Canada-wide Environmental Standards Sub-Agreement, all jurisdictions are to report to the public and to Ministers on their progress towards achieving the CWSs for mercury.

This reporting framework is intended to provide a transparent and consistent mechanism for reporting by jurisdictions in a fashion which minimizes resource requirements for government and industry alike, while maximizing the availability of information on achievement of these standards.

The framework addresses:

- 1) frequency, timing and scope of reporting
- 2) guidance as to the means of determining compliance/achievement of the CWS
- 3) common measurement parameters for reporting purposes
- 4) data management and public reporting

### Frequency, timing and scope of reporting

There will be reporting on a schedule which is tied into assessing the performance of the governments in meeting the benchmarks and timelines relevant to the standards. A report issued in 2004 will include compliance by one incineration sector and progress in all others towards implementation, the report in 2007 compliance by all incineration sectors and progress for base metal smelting, and the third report in 2010 an overall evaluation of compliance for all standards and any recommendations for revisions. Jurisdictions will submit spreadsheets which will contain all relevant information necessary for a single public report to be posted on the CCME web site for public access.

Reports will be limited to information on those facilities which are subject to achievement and/or compliance with the Canada-wide Standards as endorsed by the Ministers of the Environment (insert date) and as implemented variously by the responsible jurisdictions or industries. This information is intended to show compliance rates and performance characteristics in a manner which documents sectoral performance as well as jurisdictional performance. It is not intended to provide a facility-by-facility record of performance.

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### **Means of determining compliance/achievement of the CWS**

The Canada-wide Standards for mercury lend themselves to achievement through voluntary action, or through compliance with regulated or legally enforceable limits. As such, it is necessary to provide some means to ensure that a level playing field exists so that the numeric value provided in the CWS is applied equally or similarly in each jurisdictions. One means to do this is to require identical compliance procedures, but this may require that some jurisdictions apply compliance procedures for mercury CWSs that are different than those used for locally determined or regulated parameters such as SO<sub>2</sub>, PM, ammonia, etc. An example is where the mercury CWS is expressed as the average of 3 stack tests, whereas a jurisdiction may normally utilize the median value of 3 tests to determine compliance.

In an effort to streamline implementation, each jurisdiction will determine the exact means of ensuring compliance/achievement in a manner consistent with the typical or desired programs for the affected facility/sector. It is anticipated that minor variations in jurisdictional requirements will result in minimal variation across the country which is insignificant with respect to the overall reduction activities which range from 50-99% for various facilities.

### **Common measurement parameters for reporting purposes**

Each facility report will include specific measures corrected so as to be compatible and consistent for the purposes of public reporting. Mercury emissions must be corrected for the O<sub>2</sub> content of gases, to ensure compliance with the standards.

Each jurisdiction will determine the sector within which each subject facility will be reported. For example, a jurisdiction may determine that a small mixed waste incinerator (for example, burning both medical and municipal waste) may be subject to either standard, based upon the preponderance of waste (>50% as one type) or based upon the provincial designation of facility type. Sectoral assignments will be updated to reflect the most recent characteristics of the facility under consideration prior to reporting.

While little confusion is likely to exist over the implementation of mercury CWSs for “greenfield” facilities, it is possible that significantly expanded or modified facilities can/should be considered as new for the purposes of achievement/compliance with the mercury CWS. It will be the responsibility of the jurisdictions to determine at which point a facility no longer qualifies as an “existing” facility and must conform to the standard for “new or expanded” facilities as a result of significant modifications/alterations to the facility operations or physical plant.

### **Data management and public reporting**

Facility-specific information will be supplied in a spreadsheet format to facilitate reporting. A consolidated data-report and achievement/compliance report will be made available to all jurisdictions and to the Ministers, along with the draft public report, prior to formal release of the public report. The public report will be released upon approval by the Ministers of the

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Environment.

Jurisdictions will provide a report in spreadsheet format prior to September 30 so that the consolidated spreadsheet can be prepared along with the public report (draft) for review and approval. A consolidated spreadsheet will be prepared and distributed to all jurisdictions within 30 days of receipt of the final jurisdictional spreadsheet. Along with the consolidated spreadsheet a draft public report will be provided for review and consideration prior to the Ministers' meeting at which public release is anticipated. That public report (draft format attached) will be posted to the CCME web site upon approval by the Ministers. Jurisdictions are encouraged to provide reference to the CCME web site and/or pointers in their own web sites in order to ensure a single location for mercury CWSs reporting should errors/miscalculations have to be corrected at some time.

In addition to the consolidated public reporting on mercury CWSs, jurisdictions must provide a contact for facility-specific information in the advent that the public wishes to access compliance or achievement information. Such data will be supplied in a manner consistent with the normal data-reporting/compliance reporting procedures of the jurisdiction in question - the consolidated spreadsheet will not be made publicly available in that it may include proprietary (business) information.

# Canada-wide Standards for Mercury Emissions

Example public report format only

## CWS-Hg for Municipal Solid Waste Incinerators in Canada (This report covers those processing more than 120 Tonnes/yr only)

### Report overview:

This is a consolidated report on the achievement of or compliance with Canada-Wide Standard for mercury emissions from the Municipal Solid Waste Incineration sector in Canada. Several facilities located in the Province of Quebec are not addressed in this report. This report provides an progress indicator for the jurisdictional activities to implement the standards, an indicator for facility compliance and/or achievement with the standard, a consolidated graphic showing the net reductions in emissions from this sector against two baseline years, and a national summary for the sector.

### Sector overview:

The incineration of solid waste is utilized for two reasons in Canada - either to reduce volumes to minimize landfilling, or to achieve generate electricity (energy from waste). During the development of the Canada-wide Standard for this sector, a total of 13 major facilities and more than 100 minor facilities were evaluated. A baseline year of 2000 has been selected from the original total of 13 major facilities located in 7 jurisdictions all facilities remain in operation.

