

# **Mechanisms for Tracking Canadian Mercury Imports and Exports for Use and Disposal**

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## **I. Introduction**

### **1. Background**

The Commission for Environmental Cooperation's (CEC) North American Regional Action Plan on Mercury (NARAP) is intended to assist the governments of Canada, Mexico and the United States in reducing the exposure of North American ecosystems, fish and wildlife and humans to mercury, through the prevention and reduction of anthropogenic releases of mercury to the North American environment. Both national and international initiatives are envisioned to achieve this goal.

While Phase I of the Mercury NARAP provides overall direction and guidance, Phase II includes two specific action items requiring the attention of the CEC's Enforcement Working Group (EWG), which has completed successful work in the past on the transboundary movement of hazardous waste. As products containing mercury and mercury wastes are transported across borders by waste haulers and product suppliers, the EWG's expertise in transboundary movements fits well with these action items, namely:

#### Action Item 2a (1)

“[to] review and assess the adequacy of existing methodologies and processes for tracking imports and exports of mercury designated for manufacture or use in processes and products, with the goal of stimulating life cycle management practices at the national level”; and

#### Action Item 3a (iv)

“to undertake a review of national programs to determine the adequacy of national reporting mechanisms used to track the ultimate fate of mercury-containing wastes within North America, particularly waste transported across national boundaries for storage, handling, processing, disposal or long-term containment, and to make recommendations to improve such mechanisms.”

The CEC proposes to undertake a two-staged approach to completing the review. In the first stage, the EWG in concert with the CEC's Sound Management of Chemicals (SMOC) program have undertaken to commission a report on national regulatory/policy frameworks in the three CEC countries respecting mercury import and export for processing, and mercury waste for recycling or final disposal.

The current study is intended to provide the relevant information on the Canadian framework in order to complete the first phase, and help form the basis for a second phase study, in which recommendations will be made for corrective measures and/or

further work to improve reporting systems and address any problems arising from differences in regulatory approaches. This will assist in monitoring and managing mercury movements in a trinational context

## **2. Objectives**

The objectives of this study are threefold:

- To identify and assess existing Canadian mechanisms for tracking imports and exports of mercury designated for manufacturing or use in processing or products, and imports and exports of mercury-containing wastes destined for storage, processing, disposal or recycling;
- To assess, whether, to what extent and how effectively, the mechanisms and processes are able to track mercury, mercury-bearing product and mercury-containing waste imports and exports, including an assessment of gaps in the mechanisms; and
- To provide conclusions and recommendations for the improved tracking of imports and exports of mercury, mercury-bearing products and mercury-containing wastes.

## **3. Methodology**

A survey was undertaken of the mechanisms listed in the following section. This included a review of the relevant regulatory provisions, notices and orders. Follow-up interviews with government officials were conducted as necessary to understand how the mechanisms operate in practice, and how the information gathered through them is stored and used.

The mechanisms are summarized and assessed in terms of their ability to generate information on imports and exports of mercury and mercury-bearing products and mercury-containing wastes against the following criteria:

- Data comprehensiveness, including the degree to which the mechanism can be expected to capture all imports and exports on the basis of considerations such as reporting trigger thresholds and sectoral coverage;
- Data reliability and quality, including whether data is gathered as a result of a regulatory requirement, with penalties for non-compliance, or on a voluntary basis, and whether the data is subject to any quality control reviews; and
- Data usability, including whether data is submitted and assessed in a timely manner, and is stored in format that facilitates access and analysis, such as electronic databases, as opposed to hard copy records requiring manual searches.

Gaps in the mechanisms are highlighted and recommendations presented to address these shortcomings.

The information regarding each mechanism is summarized as follows, using the criteria of comprehensiveness, quality and reliability, usability for analysis:

<b>Mechanism</b>	<b>Comprehensiveness</b>	<b>Quality / Reliability</b>	<b>Usability/ Feasibility of Analysis</b>	<b>Comments</b>
(e.g. NPRI reporting requirements)	How complete is the information provided by the mechanism (e.g. what portion of imports, exports, and uses are likely covered, as a result of such factors as reporting thresholds or sectoral coverage)?	Are there any factors that compromise the reliability of the source (e.g. is the data collected as a result of a regulatory mandate or on a voluntary basis; is the data checked for accuracy and completeness)?	Does the form of information allow for efficient tracking and analysis (e.g. is the data stored in electronic databases which facilitate access and analysis, or would manual searches of records be required to generate useful information?)	Synthesis of the preceding columns and any additional relevant information.

#### 4. Potential Information Sources Surveyed

The following mechanisms were identified as potential sources of information regarding Canadian mercury imports and exports.

- Under the *Canadian Environmental Protection Act, 1999*:
  - Sections 48-53 in Part 3 (“Information Gathering”), including National Pollutant Release Inventory (NPRI) reporting requirements issued annually by notice published in the *Canada Gazette, Part I*.
  - Sections 100-103 in Part 5 (“Toxic Substances”) establishing rules for control of exports of toxic substances (including the *Export Control List Notification Regulations*).
  - Sections 185-192 in Part 7 (“Controlling Pollution and Managing Wastes”), Division 8 (“Control of Movement of Hazardous Waste and Hazardous Recyclable Material and of Prescribed Non-Hazardous Waste for Final Disposal”) and *Export and Import of Hazardous Waste Regulations*.
  - Sections 64-99 in Part 5 (“Toxic Substances”) establishing other regulatory requirements for toxic substances (e.g. any reporting requirements under the *Chlor-Alkali Mercury Release Regulations*) as well as the *Chlor-Alkali Mercury Liquid Effluent Regulations* made under the *Fisheries Act*.

2. Information collected by the Canada Customs and Revenue Agency (CCRA), on the basis of customs forms and other sources;
3. Information collected by Statistics Canada through surveys of manufacturing or sales of mercury-containing products conducted under the *Statistics Act*;
4. Information gathered as result of the Canadian Council of Ministers of the Environment's Canada-Wide Standards for Mercury.
5. Information collected by Natural Resources Canada and Environment Canada through surveys of mercury using facilities and of manufacturers, sellers or distributors of mercury-bearing products.
6. Information collected through the *Transportation of Dangerous Goods Act*, *Hazardous Products Act*, or *Pest Control Products Act*.

## II. Survey and Assessment of Potential Data Sources

### Introduction

In the following section each mechanism identified as a potential source of information regarding Canadian import, exports, use and disposal of mercury and mercury containing products and wastes is described. An assessment is provided of its potential efficacy and limitations on the basis of the criteria of comprehensiveness, quality and reliability of information, and usability for the purposes of the CEC's program.

The mechanism assessments are summarized in tables at the end of this section.

### Data Source Surveyed

#### i) *National Pollutant Release Inventory*

Section 46 of the *Canadian Environmental Protection Act* (CEPA) allows the Minister of Environment to publish a notice in the *Canada Gazette* requiring persons to provide information on a number of matters involving toxic and other substances that may be released into the environment under various circumstances. Section 49 requires the notice to indicate whether the Minister intends to publish the information provided and if so, whether in whole or in part.

If the Minister indicates in the notice an intention to publish the information and a person submitting information wishes to keep the information confidential, section 51 allows the person to make a request for that purpose, on the basis of any of three reasons listed in section 52:

- The information is a trade secret;
- Its disclosure would likely cause material financial loss, or prejudice to the competitive position of the person (or the person providing the information); and
- Its disclosure would likely interfere with contractual or other negotiations being conducted by the person providing the information, or on whose behalf it is provided.

Section 53 provides further procedures for the Minister to consider "additional justification" for a request for confidentiality, based on considerations of public health, safety and the environment, the effect of disclosure on the person providing the information, and the effect on a person's privacy, reputation or human dignity.

Sections 48 to 53 of CEPA require the Minister of Environment to establish and publish an inventory of releases of pollutants, using information the Minister collects on the basis of the notices provided for by section 46.

The National Pollutant Release Inventory (NPRI) is the inventory required by section 48. The inventory flows from a notice issued by the Minister each year. There are currently 268 substances listed on the NPRI. Facilities must report their environmental releases and transfers for treatment, disposal or recycling of these substances if they manufacture, process or otherwise use ten tonnes of a substance and have ten or more full-time employees (or 20,000 worker-hours per year). Reported fates include direct environmental releases to the air, land, water, and underground injection, off-site releases (i.e. landfill or underground injection), and transfers for treatment (physical, chemical or biological), energy recovery, or recycling, including transfers to recipients in other countries. Recipients of transfers of NPRI substances are identified in facility reports. However, transfers of substances as products, or as components of products are not reported under the NPRI.<sup>1</sup>

Information collected through the NPRI is placed by Environment Canada into databases that permit searches and analysis on the basis of multiple factors (e.g. facility, sector (by SIC code), substance, and geographic location (provincial, municipal or postal code level)). Searches can be conducted through the NPRI website query page.<sup>2</sup> Datafiles are also made available for more advanced user-designed searches and analyses.

Beginning in 2000, a special threshold for reporting mercury and mercury compounds “manufactured, disposed or otherwise used” by a facility of 5 kg annually has been applied. In addition, unlike most other NPRI substances, for mercury and mercury compounds there is no longer a minimum concentration for mercury that triggers reporting. The employee reporting threshold has been removed with respect to mercury for biomedical, hospital waste and non-hazardous waste incinerators handling 100 tonnes or more of waste per year, as well as all hazardous waste incinerators, sewage sludge incinerators, and wood preservation facilities.<sup>3</sup>

### *Limitations*

The NPRI is focused on reporting of the fates of substances that are wastes and recyclables, and is the most detailed source of information available on the fate of individual substance wastes. It does not provide information on the substance use, beyond the indication that the substance has been “manufactured, processed or otherwise used” at a facility in at least the threshold amount, thus triggering reporting. In addition, facilities are not required to provide information on the presence of a substance in products manufactured by a facility, or on on-site, out-of-process recycling of a substance.



The NPRI is also subject to a number of other important limitations. The inventory provides exemptions from reporting for a number of sectors that may be significant sources of releases or transfers of mercury. These include educational, research, testing and mining facilities and dental practices.<sup>4</sup>

Although the normal NPRI threshold of 20,000 worker-hours has been removed in the case of mercury for certain incineration and wood preservation facilities, the threshold remains in place for other sectors.

NPRI requires receivers of transfers of substances to be identified, including receivers in other countries, in facility reports. The lack of unique identifiers within the inventory for receivers of transfers of substances means, however, that in order to identify receivers, NPRI records have to be searched manually. It would not be possible to conduct a computerized search, for example, for all facilities to which mercury was reported to have been transferred for treatment, storage, disposal or recycling.

ii) *Export Control List Notification Regulations*

Sections 100 to 103 of the *Canadian Environmental Protection Act* (CEPA) govern the export of specifically listed substances. Section 100 allows the federal Ministers of Health and the Environment to add or delete substances to Parts 1, 2 or 3 of the “Export Control List” (Schedule 3 of CEPA).

Part 1 of the Export Control List may include any substance whose use is prohibited in Canada by any federal law; Part 2 may include any substance that is subject to an international agreement that requires notification or consent of the country of destination before the substance is exported from Canada; and Part 3 may include any substance whose use is restricted in Canada by any federal law.

“Mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds” are item 16 in Part 2 of Schedule 3. Only Part 2 is relevant here, as neither Part 1 nor Part 3 currently includes mercury in any form.<sup>5</sup>

Section 101 prohibits anyone from exporting a substance listed in the Schedule without giving prior notice to the Minister of Environment in accordance with the regulations, which lay out the rules for notification and export (see below).

Substances in Parts 2 or 3 of the List can only be exported in accordance with the regulations.<sup>6</sup>

Section 102 is the regulation-making authority for the *Export Control List Notification Regulations*.<sup>7</sup> That regulation provides that notices for the export of a listed substance be given at least once per year and include the name, address and

phone number of the exporter, the name of the substance, the country of destination, and the expected date of export and quantity of the substance.<sup>8</sup>

Section 3 of the regulation requires exporters to report to the Minister, before January 31, details of the previous year's exports. This information is to include the name of the substance as it appears on the List, its common name and trade name, "if known"; the Chemical Abstract Service (CAS) registry number of the substance if specified in the List (there is no CAS registry number specified for the mercury products); the commodity code from the Harmonized Commodity Description and Coding System (i.e. tariff code); the name of the preparation, "if known"; the date and actual quantity of the substance exported; the country of destination; and the name and address of the "importer" (which is not defined; it will not necessarily mean the final receiver or end user). The exporter is to keep copies of the report and all shipping documents for five years.

According to Environment Canada staff, the reports filed by exporters go into a database available for use by Environment Canada enforcement staff.<sup>9</sup>

The regulations came into force on March 31, 2000 and repealed *the Toxic Substances Export Notification Regulations*.<sup>10</sup>

The current summary of export notices required by section 103 to be posted on the CEPA Registry can be found at [http://www.ec.gc.ca/CEPARRegistry/subs\\_list/ECLNRExLst2000\\_e.pdf](http://www.ec.gc.ca/CEPARRegistry/subs_list/ECLNRExLst2000_e.pdf). No exports of mercury or mercury compounds were reported under the regulations in 1999.

### *Limitations*

The export control list regulations only result in the reporting of exports of listed substances. There are currently no comparable mechanisms for the reporting of imports of such substances. Canada is developing an import notification regulation to implement its obligations under the *Rotterdam Convention on Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*. However, this regulation is not expected to require notices for imports of mercury.<sup>11</sup>

In addition, while the name of the "exporter" must be included in the annual report, and the "importer" identified, the final end user or receiver in the country of import will not necessarily be known. Similarly, the "exporter" may not be the manufacturer in Canada. It may, for example, be a distributor instead. As a result, the ultimate fate of the mercury products or wastes exported from Canada cannot be tracked by this system.

The tracking system is not timely; the notice precedes the shipments and the annual report may be months after the shipment(s). There is no real-time reporting requirement regarding the actual occurrence of exports.

The Export Control List only lists mercury compounds, and may not capture all mercury-bearing products, either because the notifier/shipper is not aware that the item shipped contains mercury, or because the mercury is in a form other than the compounds listed.

A discrepancy appears between the quantity of mercury exports reported by Environment Canada for 1999 (zero) on the basis of information provided under the regulations, and the export figures provided in the Natural Resources Canada Canadian Minerals Yearbook (1,778 kg exported in 1999, all to the United States), prepared by Statistics Canada on the basis of customs data.<sup>12</sup> [do we comment on this discrepancy again later?]

iii) *Export and Import of Hazardous Waste Regulations*

Division 8 of Part 7 of the *Canadian Environmental Protection Act* (CEPA) deals with the Control of the Movement of Hazardous Waste and Hazardous Recyclable Material and of Prescribed Non-Hazardous Waste for Final Disposal.

Division 8 is based on a prohibition on the import, export or conveyance in transit of a hazardous waste, hazardous recyclable material or prescribed non-hazardous waste. This prohibition and exceptions to it are found in s. 185. The exceptions are as follows:

- a fee, prescribed in regulation, must be paid;
- the necessary permit must be received; and
- the activity must be in accordance with conditions that are prescribed by regulation.

The conditions for the authorization of imports and exports are found in the *Export and Import of Hazardous Waste Regulations*<sup>13</sup> (EIHW) and require shipments to be preceded by a *notice* sent to the Canadian federal authority responsible for transboundary movements, namely the Chief, Transboundary Movements Division, Environment Canada. Environment Canada's consent (and the consent of other authorities) is a prerequisite to shipping. The notice must be sent within one year before the shipment(s).

The Canadian exporter of the waste must provide the notice in the case of exports of hazardous waste from Canada. The Canadian importer must provide the notice in the case of imports; and the carrier of the shipment or the person arranging for the transit is responsible for the notice when the shipment is intended only to transit through Canada.

The notice indicates the intended number of shipments anticipated over a period specified by the notifier, and the total quantity (in kilograms or litres) of each type of hazardous waste intended to be shipped during that period.

Following the notice and consent process, the shipment itself must carry a copy of the Notice and permit as well as a waste *manifest*. As the notice itself does not indicate actual shipments, the shipping manifests are essential in tracking the actual contents of shipments. The documents can be cross-referenced using a specific identification number. The total amount of waste shipped in a twelve-month period is not to exceed the amount indicated in the notice, and both notices and the corresponding manifests are therefore required to be sent to Environment Canada officials, who can then reconcile the amounts in the two documents. A Product Identification Number (PIN), EIIHW Regulation Identification Number,<sup>14</sup> and an International Waste Identification Code are used to identify wastes in the notice. Only the PIN is used in the manifest.

The Product Identification Number (PIN) is a four-digit number following the letters “UN”, and is used in both the notice and the manifest to identify the product being shipped as waste. PINs are listed in the *Transportation of Dangerous Goods Regulations*,<sup>15</sup> and can be found in Column III of List II of Schedule II of those regulations. Thirty-four mercury-containing items or compounds are listed in the Schedule (four additional mercury-containing items are listed as “prohibited for transportation”). Liquid wastes with a concentration of less than 0.1mg/litre of mercury are exempted from the *Transportation of Dangerous Goods Regulations*.<sup>16</sup> Some mercury compounds have a subsidiary classification of 9.2 and would be controlled down to 100ppm. Any waste that would leach mercury in concentrations of 0.1 mg/L using the prescribed leachate test is also regulated.

Examples of items with a PIN assigned include mercury compounds like mercurous nitrate (UN1627) and mercuric arsenate (UN1623), groupings of mercury-containing wastes like “mercury based pesticides, liquid, flammable, toxic” (although such pesticides would have originally been intended for use as goods, in this case they must be waste destined for treatment, disposal or recycling), generic categories (“mercury compounds, liquid”; “mercury compounds, solid”) and “mercury” alone. The actual quantity or “a reasonably accurate estimate” (again, in kilograms or litres) of each hazardous waste type shipped must be identified in the manifest. Each hazardous waste type shipped is again identified by PIN.

The International Waste Identification Code (IWIC) is used in the notice only (and not in the manifest), and will be important in identifying mercury in some cases. The IWIC system was developed by the OECD for the purposes of compliance with the Basel Convention, and is used to indicate general information about the waste such as the reason(s) for disposal, the intended mode of disposal or recycling, the form of the waste, one to three constituents of the

waste, one to two major potential hazards of the waste, and the activity generating the waste. The code allows the notifier to list from one to three constituents of the waste. The relevant code for “mercury; mercury compounds” is “C16”.

Where the waste is a mixture (such as contaminated soil) as opposed to a specific PIN-identified mercury or mercury-containing waste, the notifier may indicate the presence of mercury in the IWIC as one constituent of the waste. It should be noted however that the IWIC is only used in the EIHW notice. It is not used in the manifest, and therefore reference must be made back to the notice under which an individual manifested shipment has been authorized in order to identify mercury as a constituent of the manifested waste.

The EIHW Regulation Waste Identification Numbers used in the notices do not include a specific code for all mercury or mercury containing wastes, or mercury as a waste constituent.

The receiver of the waste (the importer in Canada, or the receiving party in the case of an export from Canada) must complete the manifest and return it to Environment Canada within three days of receiving it. In addition to this obligation, the receiver must certify in a letter to Environment Canada that disposal or recycling of the waste has been carried out. This *certificate* must be sent within thirty days of the completion of the disposal or recycling operation. The ultimate fate of the waste is thus tracked, and both the certificate and manifest can be checked for conformity with the information provided in the notice.

#### Limitations

An overall limitation of the EIHW regime for CEC’s purposes is that it deals with import or export of wastes and hazardous recyclables only. It does not track the fate of mercury products. Nor does the federal system fully track domestic waste movements. Intraprovincial shipments of mercury or mercury bearing wastes may fall under provincial hazardous waste manifesting systems. However, these systems were beyond the scope of this study.

Where mercury is included in a shipment as part of a mixture of wastes, as opposed to a specific waste product identified through its own PIN number, the indication of mercury as a waste constituent in the IWIC may be the only way of knowing that mercury is present.

The limitation of the use of IWICs is that they do not identify specific types or compounds of mercury. Further, they only stipulate the presence of a waste constituent, but do not specify the quantity or concentration of the constituent.

Furthermore, the accuracy of IWICs is contingent on the discretion and/or the knowledge of the shipper of the waste; in those cases where the shipments are expected to include more than three hazardous waste components, the person must choose just three such components. Where mercury or mercury compounds are a component of the waste, a decision must be made whether to include the mercury among the “top three” hazards. Alternatively, the shipper may not be aware that mercury or a mercury compound, for example, may be contained in the waste, and therefore not include it on the list of components.

A further limitation of the use of IWICs in identifying mercury in proposed shipments is that IWICs are used only in the notice, and not in the manifests required under the EIIHW regulations. Consequently, manifests would have to be linked back to the corresponding notice to determine whether the IWIC constituent code for mercury was used in the notice. In fact, both notices and manifests must be sent to Environment Canada for the purpose of reconciling the quantities proposed to be shipped in the notice with the actual quantities of waste reported in the manifest, so it is possible to establish such a linkage. However, if the presence of mercury in a waste is only indicated through a constituent code in the IWIC and no mercury PIN is used, there is no way of knowing the quantity of mercury or mercury compound contained in the material shipped, because such information is not included in the IWIC. Only the total quantity of the type of waste(s) in which the mercury is contained can be determined in the case where only an IWIC is used in the notice.

As the disposer or recycler must confirm receipt of shipments, the fate of wastes will be known. However, the origin or source of the waste may be unknown in some cases. Direct ‘cradle to grave’ tracking is only possible where the exporter of the waste is the generator. Otherwise reference has to be made to the domestic waste manifesting system of the country of export to determine the actual source of the waste, as the EIIHW regulation manifesting system would only track the wastes from their point of export, which may be a transfer station, to their final destination. This limitation applies both to wastes imported into Canada for disposal, and to wastes exported from Canada for disposal.<sup>17</sup>

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iv) *Chlor-Alkali Mercury Release Regulations and Chlor-Alkali Mercury Liquid Effluent Regulations.*

a) *Chlor-Alkali Mercury Liquid Effluent Regulations*

The federal *Fisheries Act* prohibits the deposit of a deleterious substance into “waters frequented by fish”, subject to authorization to deposit prescribed amounts or concentrations of such substances. Various regulations applying to different industry sectors set out how such authorization can be obtained.

The *Chlor-Alkali Mercury Liquid Effluent Regulations*<sup>18</sup> apply to every facility in Canada that produces chlorine and alkali metal hydroxide using a “mercury cell”, and specify a maximum concentration of mercury in effluent, expressed as a function of the facility’s output. The regulation essentially authorizes mercury discharges to a maximum concentration of 0.0025 kg per tonne of chlorine produced. The regulation requires the effluent to be monitored, sampled daily and reported to the federal Minister of Fisheries and Oceans on a monthly basis.

Schedule I ("Monthly Data to be Reported") of the Regulations requires reports on net mercury input to plant (i.e. use) and “mercury disposition”, including "mercury deposited with effluents", "mercury in products leaving the plant", "mercury impounded with solids", and "others" (emissions to air, as measured under the *Chlor-Alkali Mercury Release Regulations* could be included here). There are also requirements to report "total mercury in stores" at the beginning and end of each month.

b) *Chlor-Alkali Mercury Release Regulations*

The *Chlor-Alkali Mercury Release Regulations*<sup>19</sup> made under the *Canadian Environmental Protection Act* apply to the same facilities as the *Chlor-Alkali Mercury Liquid Effluent Regulations*. The regulations are the only example of the exercise of direct regulatory authority over mercury by the federal government as a result of its listing mercury as a “toxic” substance for the purposes of CEPA.

The regulations specify maximum concentrations of mercury releases to air for different parts of the facility (ventilation gases from the cell room, the hydrogen gas stream originating from denuders, and gases exhausted from the mercury collection equipment), expressed as a function of output. The results are to be averaged from three daily samples. The regulations also specify a maximum daily release of mercury into the air surrounding the plant from all sources within the plant.

Unlike the *Fisheries Act* regulations, reports are submitted to the Minister of Environment only when the Minister requests them. Release reports, if requested, must include release measurements from the three sources to the ambient air under normal operating conditions during the sixty days preceding the requested date of submission of the report. There is also provision for reporting, at the request of the Minister, information about plant operations, malfunctions or breakdowns, and about the air pollution control equipment used in the plant.

Both the *Fisheries Act* and *CEPA* regulations were designed to apply to those facilities producing chlorine and caustic soda by means of electrolysis. In this process, sodium chloride brine flows over a layer of mercury acting as the

cathode. Metal anodes are suspended a few millimetres from the brine, which flows in a thin, even layer over the surface of the cathode. Chlorine gas forms at the anodes and is collected and used for bleaching and other industrial purposes. At the cathode, sodium and mercury combine and flow to the “denuder”, where demineralised water is used to free the mercury from the sodium so it can be flowed back for use in the main process.

Only one chlor-alkali facility (the PCI Chemicals plant at Dalhousie, New Brunswick) remains in operation in Canada, the use of mercury cells for chlorine production having been largely replaced by other processes.<sup>20</sup>

### Limitations

The information gathered through these regulations is limited to the single operating Chlor-Alkali plant operating in Canada. However, between the two regulations, it is possible to construct a mass-balance assessment of the use and fate of all mercury at the facility.<sup>21</sup>

The total amount of mercury in effluent is an estimate based on the chlorine production of the facility, which may be estimated, for example, on the basis of the facility’s power consumption.<sup>22</sup>

#### v) *Canada Customs and Revenue Agency Data*

The Canada Customs and Revenue Agency (CCRA) collects information on customs forms from both importers and exporters, under the authority of the *Customs Act*. Goods imported to Canada must generally be reported. This information is reported on the Canada Customs Coding Form B3, which includes a number of fields for describing imported items, including their description, quantity, weight, and tariff code. The form also includes a field for the name and address of the “importer” and the name of the “vendor” (i.e. exporter).

In the case of exports, a Form B13A (97) Export Declaration is completed. This form has fields for the Canadian exporter’s name and address, the consignee’s name and address, the name of the exporting carrier, and the country of final destination. The form is less detailed in terms of identifying the exported items. Fields include the “item description”, HS Commodity Code (i.e. tariff code), quantity and unit of measure, and value.

The data gathered through these forms may provide useful information regarding imports and exports of mercury and mercury bearing products.

The tariff codes are the key to identifying imported and exported goods, the quantities in which they have been imported or exported, and their origins and fates.<sup>23</sup> However, coverage by the tariff codes for mercury and mercury-



containing products is inconsistent. For example, specific tariff codes exist for elemental mercury (2805.40) and mercury oxides (2825.90.20.20). The situation is more complex in the case of mercury bearing products. In some cases there are specific codes for such products (e.g. mercuric oxide batteries (8506.30.00) and mercury vapour lamps (8539.32.90)); in other cases there are codes for classes of things that may include mercury-bearing components (e.g. loudspeaker parts which may contain mercury arc rectifying valves and tubes (8505.19.10.00)), or products known to contain mercury (e.g. fluorescent lamps (8539.31.00)).

In other cases there are classes that may include mercury-containing products, but are not specific enough for certainty (e.g. for automotive switches (8536.50.12.00) there are no subcategories to identify mercury switches vs. other types; the class for medical instruments (90.25) has no subcategories for mercury-bearing instruments like thermometers). There is no class for mercury used in dental amalgams; they may fall under code 9021.29.00: “other dental fittings.” There are also classes for various forms of fuel and coking coal that may contain mercury (27.01 – 27.04.00.00).

As a result of a 1990 Memorandum of Understanding with the United States, Canadian exporters do not have to report exports for “regular goods” exported to the U.S., Puerto Rico or the U.S. Virgin Islands.<sup>24</sup> Rather, each country uses the other’s import data in place of its own export data.

Customs officials may share data with other law enforcement personnel.

Under the provisions of the *Statistics Act*, the Canada Customs and Revenue Agency (CCRA) is required by law to provide export and import returns and details of the means of transportation used to the Chief Statistician at Statistics Canada.<sup>25</sup> Statistics Canada then uses the data to generate monthly reports on merchandise trade. The data can also be used to generate more specialized analyses, such as those presented in the Natural Resources Canada Mineral Yearbook on commodity imports and exports.<sup>26</sup>

### Limitations

The Customs data systems are generally concerned with the transborder flow of goods and not their contents. As a result, with some exceptions, tracing the flow of mercury using customs data is not a straightforward matter.

Customs systems are not designed to track products or their contents from the cradle (i.e. the manufacturer) to the grave (i.e. the end user). They simply identify the exporter and importer of a given good. However, exporters will often be distributors as distinct from manufacturers, and importers will often not be the end users. Only in some instances will the trail lead to the point of disposal or final use, or the source of goods. The Form B3 identifies only the “importer” and

the “vendor”, which will often identify only the intermediate transaction in a series of transactions.

As the customs tariff codes were not designed for the purpose of tracking particular substances, their coverage of mercury-bearing products is inconsistent and incomplete.

Statistics Canada describes other limitations of customs data as follows:<sup>27</sup>

“Customs-based trade statistics are more accurate for measuring imports than they are for measuring exports. This is because Customs are typically more vigilant with respect to goods entering the country than they are with goods leaving the country.

“Customs-based export statistics may understate and/or incorrectly portray the destination of exports. They are understated when the proper documentation is not filed with Customs and are incorrectly portrayed when the country of final destination is inaccurately reported on the customs documentation. The latter occurs most frequently when goods are routed through an intermediary country before continuing on to their final destination.”

This suggests that measures for tracking final destinations of exports are unreliable, especially where exports travel through an intermediary country. For the present study, this could be relevant for any mercury shipments to Mexico through the US (the Canadian Minerals Yearbook shows mercury exports to the US only from 1994 to 1999, and to the US and France in 1993). The improper documentation problem is expressed as a more general problem that is likely relevant to mercury.

In addition, data concerning exports to the US are obtained directly from US customs. While this may not comprise a “limitation”, it may suggest discrepancies from import data if US collection methods are inconsistent with Canada’s.<sup>28</sup>

Finally, once customs data is placed into database formats by Statistics Canada, it becomes subject to the confidentiality provisions of section 17 of the *Statistics Act*. As described in detail in the following section, these limit Statistics Canada’s ability to share data with other agencies or provide data related to specific companies or facilities, as opposed to aggregate level analyses. As with information gathered by other departments or corporations, customs information can only be disclosed by Statistics Canada on terms agreed to by CCRA and the Chief Statistician, and as long as the disclosure complies with the same secrecy requirements as apply when it is collected by CCRA.<sup>29</sup>

In addition to its work with customs data supplied by CCRA, Statistics Canada also undertakes various surveys of particular sectors or products, which could include information on domestic production and consumption of specific products. In some cases the data is gathered through voluntary surveys, while in other cases participation in surveys is mandatory.

These surveys are listed at <http://www.statcan.ca/english/sdds/index.htm>. No surveys specific to mercury or mercury containing products have been undertaken to date. Two surveys which may include useful information regarding mercury bearing products are 2117: Electric Lamps (Light Sources) and 2196: Electric Power Thermal Generating Station Fuel Consumption.

### Limitations

Statistics Canada provides assurances regarding business confidentiality of the survey data.<sup>30</sup> This reflects the provisions of the *Statistics Act*, which requires generally that information not be disclosed in a manner that would identify an individual person, business or organization.<sup>31</sup> As a result, agencies such as CCRA, the RCMP and the courts, do not have access to individual survey responses.<sup>32</sup> In effect, there is no access for law enforcement purposes to those individual responses.

The Chief Statistician may publish data “in the form of an index or list of individual establishments, firms or businesses showing ... their names, addresses, telephone numbers, the products they produce, manufacture, process, transport, store, purchase or sell in the course of their business ...”.<sup>33</sup> Therefore Statistics Canada could use survey or customs data to publish a list of facilities or companies engaged in the manufacturing, use, sale, storage, import or export of mercury and mercury-bearing products, but could not identify the specific quantities of mercury or mercury-bearing products they manufacture, use or sell.

#### vii) *Information gathering and reporting under Canada-Wide Standards for Mercury.*

Under the auspices of the January 1998 National Accord on Environmental Harmonization, the Canadian Council of Ministers of the Environment, consisting of Canada’s federal, provincial and territorial Ministers of the Environment, has adopted a number of Canada-Wide Standards (CWS) related to mercury. These include emissions from base metal smelting and waste incineration facilities, mercury containing lamps, and dental amalgam waste. Each of these standards commits the participating jurisdictions to reporting obligations related to the mercury uses or emissions that they cover. A Canada-Wide Standard on Mercury Emissions from Electric Power Generating Plants is under development.

a) *Canada-Wide Standards for Mercury Emissions*

The CCME endorsed these standards, dealing with atmospheric emissions from the base metal smelting and waste incineration sectors in June 2000. The standards cover existing, new and expanded base metal smelting facilities and existing, new and expanded municipal waste, medical waste, and hazardous waste, and sewage sludge incinerators.

CCME Ministers are to receive jurisdictional reports, including information on the compliance of one incineration sector (not specified) with the standards in 2004, compliance by all incineration sectors in 2007 and compliance by all sectors in 2010. Consolidated national reports on these matters are to be posted on the CCME website following approval by the Ministers.<sup>34</sup>

The reports are to be limited to information on those facilities subject to the standard, as implemented by each jurisdiction. The information is intended to show compliance rates and performance characteristics on a sectoral and jurisdictional basis. It is not intended to provide a facility-by-facility record of performance.<sup>35</sup>

Facility-specific information (apparently including emission data, although this is unclear in the standard and annex) is to be provided by each jurisdiction. This is to be consolidated into a national data and compliance report to be provided to all jurisdictions and Ministers, along with a public report. The public report will not contain facility specific information as it may include proprietary (business) information.<sup>36</sup>

Environment Canada has committed to maintaining the RDIS or equivalent emissions database as a means of tracking emissions of mercury in Canada, and to support the ARET and NPRI offices as a major public reporting mechanism for the mercury emission rates from various sectors.<sup>37</sup>

Ontario has also committed to establish an emission monitoring and reporting system to monitor the performance and compliance with the standard. Reporting for non-electricity sectors is to begin January 1, 2002.<sup>38</sup>

*Limitations*

No data will be reported under the Canada-Wide Standard until 2004. The reporting framework includes no provisions regarding reporting standards, data quality or consistency by individual jurisdictions. Nor does the reporting framework include information on mercury in feedstocks as opposed to emissions. The relationship between NPRI reporting and reporting under the CWS is unclear.

b) *Canada-Wide Standard for Mercury-Containing Lamps*

The CCME Council of Ministers endorsed this standard in May 2001. The standard seeks 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. The standard has been developed with a view towards a largely voluntary approach undertaken by lamp manufacturers.<sup>39</sup>

Ministers are to receive reports by jurisdictions and/or partners in the delivery of the standard in 2004, 2007 and 2012. These are to be consolidated into single national reports, posted on the CCME website for public access following approval by the CCME Ministers. The 2004 and 2007 reports will document progress in reducing mercury content in lamps. The 2012 report will include an evaluation of the standard.

Each national report is to include, for the purposes of public reporting, a measure of the average mercury content in mercury-containing lamps, as reported by the Electro-Federation of Canada to Environment Canada. CCME jurisdictions have also committed to provide additional information on request, consistent with the normal reporting procedures for the jurisdiction in question.<sup>40</sup>

Environment Canada is to take a leadership role in regularly reviewing and reporting to Canadians on progress made by lamp manufacturers to reduce the amounts of mercury in lamps sold in Canada. Nova Scotia has completed an inventory that generated an estimate of the number of tubes available for recycling on an annual basis.<sup>41</sup>

*Limitations*

No data will be reported until 2004. The system relies on voluntary reporting by lamp manufacturers and importers. There are no provisions regarding data quality assurance.

c) *Canada-Wide Standard on Mercury for Dental Amalgam Waste*

The CCME Council of Ministers endorsed this standard in September 2001. The Standard seeks to apply “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. The standard was developed with a view towards a largely voluntary approach to implementation in conjunction with the Canadian Dental Association and Provincial Dental Associations.<sup>42</sup>

The Ministers are to receive reports by jurisdictions and/or partners in the delivery of the standard in 2004 and 2007, and a single public report is to be

prepared and posted on the CCME website. The report in 2004 is to reflect interim progress. The 2007 report will include an evaluation of the standard.<sup>43</sup>

The mercury reporting framework under the standard states that each report will include specific measurements for the purposes of public reporting including:

- a) dental amalgam waste quantities (e.g. kg. mercury in waste amalgam) collected, recycled and disposed of, along with the number of dentists adopting best practices; and
- b) average weighted mercury content of sewage sludge.

A consolidated draft report will be made available to all jurisdictions and to the Ministers. The report will be finalized and released to the public following approval by the CCME.<sup>44</sup>

### *Limitations*

Data from the data collection activities will not be made available until 2004. In addition no standards are set regarding data collection or quality control by jurisdictions. Concerns regarding these matters have been raised in public comments on the standard.<sup>45</sup> Data will only be available on amalgam disposal, rather than use. Only three jurisdictions have made specific commitments re: data collection.

#### *British Columbia*

British Columbia has committed, in conjunction with Environment Canada and BC municipalities to developing an annual inventory of mercury levels in BC municipal biosolids as an indicator of treatment plant influent mercury loading.

#### *Canada*

Environment Canada has committed, in co-operation with the provinces/territories to develop an annual inventory of municipal sewage sludge quality as an indicator of treatment plant influent loading by mercury.

#### *Yukon*

The Yukon Territory has committed to conduct a survey of dental clinics to determine their current standard of amalgam collection and estimate the amount of mercury being released through sewers.<sup>46</sup>

### viii) *Natural Resources Canada and Environment Canada Surveys*

In addition to the work of Statistics Canada, Natural Resources Canada and Environment Canada have undertaken surveys of mercury use and sales of mercury bearing products of their own.

Natural Resources Canada (NRCan) monitors and publishes statistics annually on Canadian exports and imports in mercury, selected consumption (e.g. in “electrical apparatus, industrial and control instruments” and in “electrolytic preparation of chlorine and caustic soda and other uses”), in the annual Canadian Minerals Yearbook,<sup>47</sup> along with information on mercury prices and world mercury production.<sup>48</sup>

The Canadian trade figures are based on analyses of CCRA customs data conducted by Statistics Canada. The consumption figures are based on voluntary participation by industry in surveys conducted annually by NRCan. The information gathered through these surveys is provided on a “confidential” basis.

Environment Canada has also conducted surveys and studies of mercury use and consumption to support such initiatives as the CEC Sound Management of Chemicals Program,<sup>49</sup> Canada-US Binational Toxics Strategy<sup>50</sup> and Accelerated Reduction and Elimination of Toxics (ARET) program.<sup>51</sup>

#### Limitations

The voluntary nature of surveys such as those undertaken by NRCan and for ARET limits their value because they are not likely to list all consumption and uses, and are not subject to formal quality control structures.

No use has been made to date of the compulsory information gathering powers provided to the Minister of the Environment through s.46 of the *Canadian Environmental Protection Act* with respect to mercury beyond the establishment of the NPRI.

ix) Information gathering and reporting under *the Transportation of Dangerous Goods Act, Pest Control Products Act* and *Hazardous Products Act*.

a) *Transportation of Dangerous Goods Act*

The Transportation of Dangerous Goods (TDG) regime deals with the handling, offering for transport and transport of dangerous goods. The system is designed to ensure public safety during the course of transporting dangerous goods<sup>52</sup> (including wastes). The measures include requirements for the certification of drivers, placards and manifests to accompany dangerous goods shipments, packaging rules, and emergency plans in the case of spills.

The Act is thus concerned primarily with ensuring public safety during the journey, and not tracking the ultimate sources or fates of materials being shipped, although the Minister can issue a written notice to a manufacturer, distributor, or importer to divulge information about the chemical composition of a product.

The main relevance of the TDG regime to the tracking of mercury products is that the “Product Identification Numbers” listed in Schedule II of the TDG regulations and referred to in TDG shipment manifests must also be cited in the notices required by the CEPA EIHW Regulations (see section II (2) (iii) above on EIHW Regulations).

#### Limitations

The major limitation of the TDG regime for the purposes of the present study is that no documentation (i.e. the TDG manifests) about shipments is provided to Canadian governments on a routine basis, although Inspectors would have access to records on demand. The regime is intended to ensure safety during the journey, and thus is not concerned with the ultimate source or fate of the shipment.

#### b) *Pest Control Products Act*

The *Pest Control Products Act* (PCPA) is the federal law regulating the manufacturing, import and sale of “pest control products”, including pesticides. All mercury-containing pesticides were de-registered under the Act in December 1995, although retail stocks of some of these products were allowed to be used until the end of 1997.<sup>53</sup> As a result, no mercury-based pesticides are now available for legal import, use or sale in Canada.<sup>54</sup> The Act is administered by the Pest Management Regulatory Agency (PMRA), which reports to the Minister of Health.

The current regime for the export of a pest control product is different than for sale and importation. The Act prohibits a person from exporting or transporting between provinces a pest control product unless it was manufactured in an establishment that meets prescribed conditions and operational rules. The establishment must itself also be prescribed by regulation.<sup>55</sup>

There is, consequently, the possibility that mercury-containing pesticides whose sale or import is not permitted through the registration process, can nevertheless be manufactured and exported if the establishment where they are manufactured meets conditions prescribed elsewhere. The *Pest Control Products Regulations*<sup>56</sup> cover the registration of products for sale and import, but do not mention the registration of facilities or export rules, thus making the manufacture and export of mercury-containing pest control products legal even though they are not registered for sale in and import into Canada. Exports of such pesticides would



not be tracked under the current PCPA, which makes no provision for the tracking of exports of products otherwise subject to the Act.

However, since mercury pesticides are subject to the *Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, they are included in Part 2 of the *Export Control List* (see section II.(2) (ii) above). PMRA and Environment Canada have agreed that export of PIC pesticides will be regulated under CEPA, 1999 in order to comply with the voluntary PIC procedure.

In addition, a proposed new PCPA (Bill C-53) currently before Parliament would, if enacted, provide the legislative authority to establish export controls on pest control products under the Act.

#### Limitation

Even if mercury-based pesticides remained registered under the Act, there would be no means of tracking imports, sales or monitoring their use. Similarly, although it may be possible for “de-registered” pesticides to continue to be manufactured and exported from Canada, there are no mechanisms for tracking such activities under the *Pest Control Products Act*,<sup>57</sup> although such exports would be tracked through the *CEPA Export Control List Notification Regulations*.

#### c) *Hazardous Products Act*

Health Canada administers the *Hazardous Products Act* and Regulations. Under the Act products listed under Part I of Schedule I of the Act, are prohibited from sale, advertisement or import.<sup>58</sup> The only mercury-bearing products contained in this list are toys, equipment, and other products for use by a child in learning or play, which have decorative or protective coatings containing any compound of mercury.<sup>59</sup> Regulations may also be made controlling the advertising, sale or importation of restricted products listed under Part II of Schedule I of the Act. No specific mercury-bearing products are listed under that Part of the Schedule.

Schedule II of the Act includes seven classes of controlled products, including poisonous and infectious, corrosive and dangerously reactive materials. However, the *Controlled Products Regulations*<sup>60</sup> only provide criteria for the definition of each class, rather than listing specific materials.

The Act permits the Minister to require disclosure of information regarding the formula, composition, chemical ingredients or other matters regarding a product, material or substance that may be added to Schedules I or II of the Act.<sup>61</sup>

Section 13 of the Act prohibits the sale for use in the workplace of controlled products, listed in Schedule II of the Act, subject to the provision of a Material Safety Data Sheet (MSDS), including information on the identity of the product

where it is a pure substance, or its ingredients where these ingredients are included in the *Ingredient Disclosure List*<sup>62</sup> issued under the Act. Elemental mercury, mercury compounds, and eleven specific mercury compounds are listed on the Ingredient Disclosure List. Section 14 requires the provision of Material Safety Data Sheets for imported products. Inspectors under the Act have access to the MSDS and other materials at facilities where products are manufactured, prepared, preserved, processed, packaged, sold or stored.<sup>63</sup>

#### Limitations

The *Hazardous Products Act* has no pre-market surveillance powers and as such does not result in the ongoing generation of information regarding import, export, manufacturing use or sale of mercury bearing products, although powers to obtain some information on product characteristics and constituents are available to the Minister of Health. Information on the presence of mercury-bearing products at facilities could be obtained by Inspectors under the Act via the review of Materials Safety Data Sheets, although this would require the impractical action of undertaking visits to each facility in Canada where mercury or mercury bearing products might be present.

# Data Source Assessment

## Summary Tables

<b>Mechanism</b>	<b>Comprehensiveness</b>	<b>Data Quality and Reliability</b>	<b>Data Usability</b>	<b>Comments</b>
National Pollutant Release Inventory	<p>Only provides indication of manufacturing, processing or use, no details on quantities MPO.</p> <p>Provides no information on transfers as product or in product</p> <p>Covers all fates of mercury wastes (releases, transfers and disposal). 5 kg threshold improves coverage significantly from previous 10 tonne threshold.</p> <p>Exemptions for key sectors (research, testing, education, mining, dental practices)</p> <p>Employee thresholds remain in place for all sectors except hazardous waste and sewage sludge incinerators, large biomedical, hospital and municipal waste incinerators, and wood preservation facilities, for which no employee thresholds apply.</p>	<p>Data quality generally considered to be high. Data flows from legal reporting mandate. Data reviewed by Environment Canada, but no active enforcement/auditing program to date.</p> <p>Data may be based on estimates rather than actual measurements of releases and transfers.</p>	<p>Very high – data is collected and managed in electronic format.</p> <p>One significant gap is inability to track receivers of transfers except through manual searches of records.</p>	<p>Best coverage on fates of mercury wastes and recyclables. Very limited information on use.</p>

<b>Mechanism</b>	<b>Comprehensiveness</b>	<i>Data Quality</i>	<b>Data Usability</b>	<b>Comments</b>
Export Control List Notification Regulations	<p>Only provides information on exports.</p> <p>Coverage limited to mercury and specific mercury compounds, does not include all mercury-bearing products.</p> <p>Only provides information on country of import, and importer, not necessarily end user.</p>	<p>Data generated as a result of legal reporting requirement.</p> <p>Discrepancies between 1999 CCRA customs data and reports under CEPA suggest underreporting by exporters.</p>	<p>Unknown due to lack of reports regarding mercury exports, although reports received re: other substances are put into database.</p>	<p>Data generated of very limited scope. Apparent underreporting problems.</p>

Mechanism	Comprehensiveness	Data Quality	Data Usability	Comments
Export/Import of Hazardous Waste Regulations	<p>Limited to transboundary movements of wastes and hazardous recyclables.</p> <p>Coverage re: mercury containing wastes uncertain, especially where mercury is present as part of a mixture (e.g. contaminated soil) as opposed to being identified as a specific waste (e.g. waste mercury based pesticides).</p> <p>Even when identified as part of a mixture through IWIC code, data on actual quantity or concentration of mercury present is not available through manifests.</p> <p>Transboundary cradle to grave tracking difficult if transfer is not directly from generator to site of disposal.</p> <p>System provides proof of destruction at certified facility.</p>	<p>Data generated as a result of a legal reporting requirement, and EHW reg. are identified as an enforcement priority by Environment Canada.</p> <p>Relies on ability of notifier and consignor to correctly identify wastes.</p>	<p>Notice and manifest information are entered into a database, that permits searches and cross-referencing for notices and manifests.</p> <p>Problems are with data comprehensiveness/completeness and difficulties tracking waste where transfer is not directly from generator to site of disposal/recycling.</p>	Provides information on imports and exports of PIN identified mercury wastes and may provide information on mercury in waste mixtures.
Chlor-Alkali Mercury Release Regulations (CEPA) and Chlor-Alkali Mercury Liquid Effluent Regulations (Fisheries Act)	Together the regulations provide very detailed information (mass balance of mercury use and fate), but limited to single operating chlor-alkali facility in Canada	Data generated as a result of legal reporting requirement.	High, but limited to single facility	Provides very detailed information on single chlor-alkali plant in Canada.

Mechanism	Comprehensiveness	Data Quality	Data Usability	Comments
Canada Customs and Revenue Agency Customs Data	<p>May provide information on tranboundary movement of mercury and certain mercury-containing products.</p> <p>Does not permit cradle to grave tracking unless transaction is directly between manufacturer and end-user.</p> <p>Coverage of mercury bearing products via tariff codes is incomplete.</p>	<p>Data is generated as a result of legal reporting requirement re: customs forms.</p> <p>Relies on US customs information re: exports to US.</p> <p>Relies on ability of exporter or importer to identify correct customs tariff code for product.</p>	<p>Customs forms go to Stats Can for entry into searchable databases.</p> <p>Customs forms are available to law enforcement agencies, although Stats Can databases, which may permit more detailed analysis, may not be available due to confidentiality provisions of the <i>Statistics Act</i>.</p>	<p>Only information source on imports of mercury as product and mercury-bearing products.</p> <p>System is not designed to provide life-cycle coverage, and customs tariff codes do not cover all mercury-bearing products.</p>
Statistics Canada Surveys	<p>Can provide aggregate information on manufacturing, use or sale of mercury or mercury-bearing products.</p> <p>No targeted surveys re: mercury to date.</p> <p>Facilities manufacturing or selling mercury-bearing products might be identified, but company- or facility-specific information on quantities cannot be provided to public or other government agencies.</p>	<p>Surveys can be voluntary or mandatory in nature.</p> <p>Stats Can includes statements on data quality and reliability in reports.</p>	<p>Information on use, manufacturing or sales of mercury or mercury bearing products can only be provided in the aggregate. Facility- specific data cannot be provided, beyond identification of facility as being engaged in the production or sale of mercury-bearing products.</p>	<p>Significant potential in terms of generated aggregate data on mercury use, and manufacturing and sale of mercury- bearing products, but not appropriate for cradle to grave tracking or detailed facility specific information.</p>

<b>Mechanism</b>	<b>Comprehensiveness</b>	<b>Data Quality</b>	<b>Data Usability</b>	<b>Comments</b>
Information generated as a result of Canada-Wide Standards for Mercury	Data to be collected is limited to very specific products and activities (waste dental amalgam, mercury-containing lamps, and emissions of mercury from incinerators and base metal smelters).	<p>Uncertain. CWS provide limited guidance on data collection and quality.</p> <p>Data on waste amalgam will depend on mass balance calculations re: amounts collected for recycling/disposal and amounts in sewage sludge. Amounts in sewage sludge will reflect sources other than waste amalgam.</p> <p>Data on mercury-containing lamps will be from voluntary reporting by Electro-Federation Canada (industry association) to Environment Canada.</p> <p>Unclear whether emission reporting from incinerators or base metal smelters is to be mandatory or voluntary at provincial level. NPRI may be key data source. See NPRI comments above.</p>	<p>No data will be available until 2004.</p> <p>Data is intended to be consolidated into national reports, in spreadsheet format.</p> <p>Little detail provided in CWS re: data collection and quality</p>	Usefulness and quality of data to be collected under CWS is uncertain.



<b>Mechanism</b>	<b>Comprehensiveness</b>	<b>Data Quality</b>	<b>Data Usability</b>	<b>Comments</b>
Natural Resources Canada and Environment Canada surveys of mercury-using industries and facilities	Surveys appear to be comprehensive, but rely on ability of agencies to identify all users of mercury or manufacturers/distributors of mercury-bearing products.	Surveys are voluntary in nature.  Information-gathering powers under CEPA not used to date other than the NPRI.	Confidentiality commitments regarding surveys limit ability to use data beyond generation of aggregate figures. Company or facility-specific data not available for regulatory purposes.	Most comprehensive data sources available to date although rely on voluntary reporting, and are designed to generate aggregate information, rather than facility or company specific data necessary for regulatory life-cycle management.
<i>Hazardous Products Act, Transportation of Dangerous Goods Act, and Pest Control Products Act</i>	Mechanisms do not generate useable data on transportation or use of mercury or mercury-bearing products. TDG manifests and HPA MSDSs are not provided to governments as normal practice.  No data on sales, use or exports is generated under the PCPA.	Information on presence of mercury or mercury-bearing products which may be available in TDG manifests and HPA MSDS is the product of legal reporting requirement, but the systems are not designed for data collection.	Information might be gathered via inspectors reviewing TDG manifests and HPA MSDS, but this would be an impracticably expensive and time-consuming approach.	No data generated re: mercury use, disposal, imports or exports.



### III. Conclusions and Recommendations

#### Conclusions

There is no single comprehensive data source in Canada regarding the import, export, manufacturing, use, and disposal of mercury, or mercury bearing products and wastes.

There are a number of sources that do provide useful information about particular aspects of the life-cycle and use of mercury in Canada. In general these sources provide much better coverage of the disposal of mercury and mercury-containing wastes, than of the use or manufacturing of mercury-bearing products

Perhaps the most significant and useful source of information on the fate of mercury wastes is the National Pollutant Release Inventory, particularly in the context of the reduction of the reporting threshold for the manufacturing, processing or use of mercury or mercury compounds to 5kg per year, beginning with the 2000 reporting year. Facilities meeting this threshold are required to report their mercury releases and transfers to the NPRI. This includes direct environmental releases to the air, land, water, and underground injection, off-site releases, and transfers for treatment or recycling, including transfers to recipients in other countries. Recipients of transfers of NPRI substances are identified in facility reports.

The NPRI does suffer from a number of limitations from a life-cycle perspective. While facilities have to identify themselves as users or processors of mercury if they meet the 5kg threshold, the actual amounts used or processed do not have to be reported. Nor do transfers of mercury in product.

Other gaps in the NPRI exist as well. Exemptions from reporting exist for a number of sectors that may be significant users or processors of mercury, or generators of mercury wastes. These include education, training and research facilities, mining operations, and dental practices. Employee thresholds for reporting remain in place for all sectors except hazardous waste and sewage sludge incinerators, large biomedical, hospital and municipal waste incinerators, and wood preservation facilities. In addition, the lack of unique identifiers for recipients of transfers means that analyses of the fate of transfers can only be conducted on the basis of manual searches of facility reports, rather than through the NPRI databases.

Significant information regarding the fate of mercury wastes may also be obtained through the information contained in notices and manifests for transboundary hazardous waste movements filed under the CEPA *Export/Import of Hazardous Waste Regulations*. Except for what are likely to be unusual situations where mercury or mercury product wastes are specifically identified through Product Identification Numbers, the information on imports of mercury-bearing wastes generated through these mechanisms may be incomplete. This is particularly true where wastes may be mixtures of a number

of contaminants, as would be the case with contaminated soils. In such cases, the presence of mercury might be indicated by a constituent code within the IWIC number in the notice of intent to import or export. However, the indication of the presence of mercury in this manner is at the discretion of the notifier, and may not be provided if mercury is one of many contaminants present. Furthermore, in such situations, as the IWIC code is not included in the waste manifest, it would only be possible, by correlating manifests with notices, to know that mercury was present in a shipment, but not how much was actually present.

Gaps also exist in the tracking framework with respect to the full life cycle of products. The hazardous waste import/export regime is set up to track wastes from their point of export in one country to their point of disposal in another. However, in many cases the point of export may not be the point of generation. Rather the exporter may be a waste transfer facility operated for the purpose of consolidating waste shipments prior to export. In such cases the generator of a waste cannot be identified through the EIIHW regulation notice and manifesting system. Instead it would be necessary to review the domestic waste manifests from the country of origin to identify the original waste generator. As the CEC has concluded before, under the current rules the tracking of hazardous waste from cradle to grave, where the cradle is in one country and the grave is in another, is extremely difficult.

The third major source of information on mercury imports and exports would be information gathered through customs forms accompanying imports and exports of mercury and mercury-bearing products. However, as with other information sources, the information that can be generated in this way suffers from some significant limitations. Customs tariff codes only exist for some mercury-bearing products, and in some cases, tariff codes cover categories that could include products that both do and do not contain mercury. In addition, customs forms only identify the exporter and importer, who may not necessarily be the manufacturer and end-user of a product. In some cases the importer and exporter could be product distributors on each side of the border.

In theory exports of mercury and certain mercury bearing compounds are required to be reported under the *Export Control List Notification Regulations* made under CEPA. The information provided in these reports is limited to identifying the exporter, substance, country of import and importer. Information is not provided on exports of mercury-bearing products, or identifying the end-user in the country of import.

No exports of mercury were reported under the regulations in 1999. Underreporting may be occurring, as Statistics Canada and Natural Resources Canada reported exports of 1778 kg of mercury and mercury compounds in 1999, on the basis of customs information. There are no reporting requirements regarding imports of mercury under CEPA, except for the provisions of the *Export/Import of Hazardous Waste Regulations* regarding mercury and mercury-bearing wastes.

The *Chlor-Alkali Mercury Release Regulation* made under CEPA and the *Chlor-Alkali Mercury Liquid Effluent Regulations* made under the federal *Fisheries Act* include

reporting provisions on air and water releases of mercury by Canada's only operating Chlor-Alkali plant, located in Dalhousie, New Brunswick. The *Fisheries Act* regulations also require information on mercury use and disposition in product and waste, permitting a mass balance calculation to account for the fate of all mercury used by the facility.

Commitments to national reporting on mercury use on a mass-balance basis are provided under the Canada-Wide standard on Waste Dental Amalgam, adopted in May 2001. Mercury levels in lamps sold in Canada are to be reported under the Canada-Wide Standard on Mercury-Containing Lamps adopted in September 2001. However, reporting under both standards is not to begin until 2004, and the requirements regarding data consistency and quality among jurisdictions are uncertain. Similar considerations apply to data to be gathered on mercury emissions from the base metal smelting and incineration sectors under the June 2000 Canada-Wide Standard on Mercury Emissions.

Statistics Canada conducts surveys on the use, manufacturing and sales of certain products, such as electric lamps and fuel use by electrical power generating stations, which may contain useful information regarding mercury-bearing products. Surveys are conducted on both voluntary and mandatory bases. However, the data gathered through these surveys is subject to strict confidentiality requirements under the *Statistics Act*, and cannot be made available to law enforcement agencies. Aggregate data on mercury use or the sale of mercury-bearing products could be provided, along with information indicating that individual companies or facilities manufacture or sell mercury-bearing products. However, information on specific quantities of products manufactured or sold by individual companies or facilities cannot be made available to other government agencies or the public.

Natural Resources Canada conducts annual surveys on mercury use in Canada for the purposes of the Canadian Mineral Yearbook. However data is gathered on the basis of a voluntary survey of known mercury-using facilities, and is subject to confidentiality commitments regarding facility- or company-specific data. Environment Canada has conducted surveys of mercury use along similar lines. No use has been made of the compulsory information gathering powers available to the Minister of the Environment under section 46 of CEPA with respect to mercury or mercury compounds or products, other than the reporting requirements contained within the NPRI.

There are no reporting requirements regarding the transportation of dangerous goods, such as mercury or mercury-bearing products under *the Transportation of Dangerous Goods Act* or Regulations, except with respect to transboundary movements of mercury-bearing wastes, where the provisions of the EIAW regulations apply. Similarly there are no regular reporting requirements regarding the mercury content of products or their sale, import or use under the *Hazardous Products Act* or Regulations.

All mercury-based pesticides have been de-registered under the *Pest Control Products Act* and therefore are no longer available for legal sale in Canada. However, the Act and regulations contain no requirements regarding reporting on the use or sale of registered

pesticides. As a result no information is available regarding historical use or sale of mercury based pesticides.

In summary there is no comprehensive data source available able to track the life cycle use and disposal of mercury in Canada, or mercury imports or exports from their point of origin to their ultimate fate.

Fragments of information can be assembled from individual data sources. However, all of the data sources surveyed suffered from significant limitations in terms of comprehensiveness, data reliability and usability from the perspective of the CEC's goals. Information from these sources would also form the basis of any reporting activities that Canada has undertaken through international agreements, such as the OECD Prior Informed Consent Convention, the UNECE Heavy Metals (AARHUS) Protocol and the UNECE Basel Convention.

## Recommendations

1. Amend the NPRI Order to remove exemptions from reporting for facilities in the research, education, testing and mining sectors.
2. Establish common unique identifiers for recipients of transfers of wastes and recyclables reported under the NPRI (Canada), TRI (USA) and RETC (Mexico), to facilitate electronic analysis of the fates of transfers for treatment, recovery, recycling and disposal across North America.
3. Expand the reporting requirements under the *CEPA Export Control List Notification Regulations* to include exports of designated mercury-bearing products, and to require that information be provided on the recipient and intended end use of mercury, mercury compounds and mercury-bearing products exported from Canada.
4. Establish requirements for notifications of imports of mercury, mercury bearing products or wastes under Canada's regulations currently being developed to implement the *Rotterdam Convention on Prior Informed Consent (PIC)*
5. Modify the *Export and Import of Hazardous Waste Regulations* to require the identification of mercury as a waste constituent where wastes containing mercury are not identified as mercury wastes with a TDG PIN number, and to require information on the specific quantity or concentration of mercury contained by such wastes in the waste manifest.
6. In co-operation with the United States and Mexico, establish mechanisms under each country's hazardous waste manifesting systems to permit the tracking of

wastes from cradle to grave (i.e. generator to site of disposal/recycling) where the “cradle” is in one country and the “grave” is in the other. Among other things, this would involve the creation of a document that accompanies a waste shipment from its point of generation to its final fate, even when these occur in different countries.

6. In co-operation with the Canada Customs and Revenue Agency, establish Tariff Codes specific to mercury-bearing products that are currently reported under Codes that may currently combine both mercury-bearing and non-mercury-bearing versions of products
7. Use the information gathering powers provided to the Minister of the Environment under section 46 of CEPA to require that facilities that import, manufacture or sell mercury-bearing products report annually their use of mercury, and/or their imports or sales of mercury-bearing products.

## IV References

### Interviews

Luke Trip  
Manager, Mercury Programs  
Sustainable Consumption  
Environment Canada

Ted Bryan  
Chemicals Control Division  
Environment Canada

Suzanne Leppinen

Head, Import/Export Section  
Transboundary Movement  
Environment Canada

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*Chlor-Alkali Mercury Release Regulations* (SOR/90-130, as amended)

*Export and Import of Hazardous Waste Regulations* (SOR/92-637, as amended)

*Export Control List Notification Regulations* (SOR/2000-108)

*Customs Act* (R.S.C. 1985, c. 1 (2nd Supp.)), as amended)

*The Customs Tariff*  
([http://www.cca-adrc.gc.ca/customs/general/publications/customs\\_tariff\\_toc2001-e.html](http://www.cca-adrc.gc.ca/customs/general/publications/customs_tariff_toc2001-e.html))

*Fisheries Act* (R.S.C. 1985, c. F-14, as amended)

*Chlor-Alkali Mercury Liquid Effluent Regulations* (C.R.C. 1978, c. 811, as amended)



*Hazardous Products Act* (R.S.C. 1985, c. H-3, as amended)

*Controlled Products Regulations* (SOR/88-66, as amended)

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*Pest Control Products Act* (R.S.C. 1985, c. P-9, as amended)

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User's Guide to the Export/Import Notice [http://www.ec.gc.ca/tmb/eng/notice\\_e.html](http://www.ec.gc.ca/tmb/eng/notice_e.html)

### **Environment Canada, Export and Import of Hazardous Wastes Regulations**

User's Guide to the Hazardous Waste Manifest  
[http://www.ec.gc.ca/tmb/eng/manifest\\_e.html](http://www.ec.gc.ca/tmb/eng/manifest_e.html)

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<http://www.statcan.ca/english/sdds/2201.htm>.

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<http://www.statcan.ca/english/survey/business/asked.htm>

## V. List of Acronyms

CCME	Canadian Council of Ministers of the Environment
CCRA	Canada Customs and Revenue Agency
CEPA	Canadian Environmental Protection Act
CWS	Canada-Wide Standards
EIHW	Export and Import of Hazardous Wastes Regulations
HPA	Hazardous Products Act
IWIC	International Waste Identification Code
MPO	Manufactured, processed or otherwise used (in context of the NPRI)
MSDS	Materials Safety Data Sheet
NPRI	National Pollutant Release Inventory
PCPA	Pest Control Products Act
PIN	Product Identification Number
TDG	Transportation of Dangerous Goods (Act; Regulations)

## Endnotes

- <sup>1</sup> Environment Canada, National Pollutant Release Inventory: National Overview 1999 (Ottawa: Minister of Public Works and Government Services, 2000).
- <sup>2</sup> <http://www.npri-inrp.com/queryform.cfm>.
- <sup>3</sup> *Canada Gazette, Part 1, December 25, 1999*, pp. 3847-3860.
- <sup>4</sup> *Canada Gazette, Part 1, December 25, 1999*, pg. 3856.
- <sup>5</sup> Mercury products prohibited under the *Hazardous Products Act* (see section II (2) (ix)(c) of this report) could be listed under Part 1 of the Export Control List, but to date this has not been done.
- <sup>6</sup> *Canadian Environmental Protection Act*, s.101 (3).
- <sup>7</sup> SOR/2000-108.
- <sup>8</sup> *Export Control List Notification Regulations*, s.2(1).
- <sup>9</sup> Telephone communication with Ted Bryan, Chemicals Control Division, Environment Canada, November 8, 2001.
- <sup>10</sup> SOR/92-634.
- <sup>11</sup> Telephone Interview Ted Bryan, Chemicals Control Division, Environment Canada, November 8, 2001.
- <sup>12</sup> See Canadian Minerals Yearbook, 1999. Mercury: page 33.3
- <sup>13</sup> SOR/92-637.
- <sup>14</sup> From Schedule III of the EIHV Regulations.
- <sup>15</sup> SOR/85-77 or SOR/DORS/2001-286
- <sup>16</sup> Item 18, s.3.27.
- <sup>17</sup> On this problem in North America see Tracking and Enforcement of Transborder Hazardous Waste Shipments in North America: A Needs Assessment (Montreal: Commission for Environmental Co-operation, 1999).
- <sup>18</sup> C.R.C. 1978, c. 811
- <sup>19</sup> SOR/90-130.
- <sup>20</sup> Telephone interview, Luke Trip, Environment Canada, October 25, 2001.
- <sup>21</sup> See, for example, Environment Canada Environmental Protection Series: Compliance with Chlor-Alkali Mercury Regulations, 1986-1989: Status Report (Report EPS 1/HA/2, November 1994).
- <sup>22</sup> *Chlor-Alkali Mercury Liquid Effluent Regulations*, s.8(2).
- <sup>23</sup> The Customs Tariff can be viewed at [http://www.cca-adrc.gc.ca/customs/general/publications/customs\\_tariff\\_toc2001-e.html](http://www.cca-adrc.gc.ca/customs/general/publications/customs_tariff_toc2001-e.html)
- <sup>24</sup> See <http://www.cca-adrc.gc.ca/E/pub/cp/rc4114eq/rc4116-e.html>.
- <sup>25</sup> *Statistics Act*, s.25.
- <sup>26</sup> Canadian Minerals Yearbook, 1999. Mercury: pg. 33.3.
- <sup>27</sup> (<http://www.statcan.ca/english/sdds/2201.htm>)
- <sup>28</sup> On this issue see: Statistics Canada Canadian Merchandise Trade – Customs Basis – Data Quality Statements – Statistical Data Documentation System Reference No. 2201.
- <sup>29</sup> *Statistics Act*, s.12 (2)(b).
- <sup>30</sup> <http://www.statcan.ca/english/survey/business/participate.htm>.
- <sup>31</sup> *The Statistics Act*, s.17.
- <sup>32</sup> [www.statcan.ca/english.business/asked/htm](http://www.statcan.ca/english.business/asked/htm).
- <sup>33</sup> *Statistics Act*, s.17 (2) (f).
- <sup>34</sup> CCME, Canada-Wide Standard on Mercury Emissions, June 2000
- <sup>35</sup> CCME, Canada-Wide Standard on Mercury Emissions, June 2000, Annex 1 – Mercury Reporting Framework.
- <sup>36</sup> CCME, Canada-Wide Standard on Mercury Emissions, June 2000, Annex 1 – Mercury Reporting Framework.
- <sup>37</sup> CCME, Canada-Wide Standard on Mercury Emissions, June 2000 – Initial set of actions for the Mercury Canada-Wide Standards for Emissions from Incinerators and Base Metal Smelters,
- <sup>38</sup> See Ontario Environmental Bill of Rights Registry No. RA00E0016
- <sup>39</sup> CCME, Canada-Wide Standard for Mercury Containing Lamps, May 2001, Annex 1 – Mercury Reporting Framework.

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<sup>40</sup> CCME, Canada-Wide Standard for Mercury Containing Lamps, May 2001, Annex 1 – Mercury Reporting Framework.

<sup>41</sup> CCME, Canada-Wide Standard for Mercury Containing Lamps, May 2001, Initial set of actions for the Canada-wide Standard for Mercury-Containing Lamps.

<sup>42</sup> CCME, Canada-Wide Standard on Mercury for Dental Amalgam Waste, September 2001, Annex 1 – Mercury Reporting Framework.

<sup>43</sup> CCME, Canada-Wide Standard on Mercury for Dental Amalgam Waste, September 2001.

<sup>44</sup> CCME, Canada-Wide Standard on Mercury for Dental Amalgam Waste, September 2001, Annex 1 – Mercury Reporting Framework.

<sup>45</sup> [http://www.ec.gc.ca/CEPAREgistry/Documents/notices/g1-13516\\_n1.pdf](http://www.ec.gc.ca/CEPAREgistry/Documents/notices/g1-13516_n1.pdf)

<sup>46</sup> CCME, Canada-Wide Standard on Mercury for Dental Amalgam Waste, September 2001 - Initial Set of Actions.

<sup>47</sup> See, for example, Canadian Minerals Yearbook, 1999. Mercury: pg. 33.3

<sup>48</sup> NRCan is instituting a new approach the CMY in which statistics for each commodity will be published annually, although detailed comments on new developments will no longer be provided. E-mail, Patrick Chevalier Senior Advisor, Mineral and Metals Sector, NRCan.

<sup>49</sup> Transboundary Air Issues Branch, Status of Mercury in Canada Report #2: A Background Report to the Commission for Environmental Co-operation North American Task Force on Mercury (Ottawa: Environment Canada, May 2000).

<sup>50</sup> Reference to 2000 Environment Canada Mercury Inventory in draft 2001 Progress report. [http://epa.gov/glnpo/reports/GLBTSprogress11-2001\\_2.pdf](http://epa.gov/glnpo/reports/GLBTSprogress11-2001_2.pdf). Also reference to 1988 baseline – likely ARET figures.

<sup>51</sup> <http://www.ec.gc.ca/aret/homee.html>.

<sup>52</sup> See *Transportation of Dangerous Goods Act, 1992*, Title.

<sup>53</sup> Transboundary Air Issues Branch, Status of Mercury in Canada Report #2: A Background Report to the Commission for Environmental Co-operation North American Task Force on Mercury (Ottawa: Environment Canada, May 2000), pg.32.

<sup>54</sup> The *Pest Control Products Act*, s.5, requires that a pest control product be registered under the Act in order for its import, sale or use to be legal.

<sup>55</sup> See *Pest Control Products Act*, s.5(2).

<sup>56</sup> C.R.C., c.1253.

<sup>57</sup> Notification and reporting of exports of certain pesticides occurs under the *Export Control List Notification Regulations* made under CEPA, although mercury-based pesticides are not specifically listed in Schedule 3, Part 2 of CEPA, for the purposes of the regulation. See section on the *Export Control List Regulations*.

<sup>58</sup> Presumably “sell” includes offering for export sales, although this may need to be confirmed.

<sup>59</sup> *Hazardous Products Act*, Schedule 1, Section 9(d).

<sup>60</sup> SOR/88-66.

<sup>61</sup> *Hazardous Products Act*, s.10(1), s.20(1).

<sup>62</sup> SOR/88-64.

<sup>63</sup> *Hazardous Products Act*, s.22(1).