Recycling Council of Ontario

RCO – Take Back the Light –

Program requirements for mercury-containing lamps recycling processors

RECYCLING COUNCIL OF ONTARIO

RCO/TBTL – 2012

2011-05-27

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Foreword

This document provides the minimum requirements that a mercury containing lamp processor shall comply with in order to be approved by the Recycling Council of Ontario (RCO) to service its fluorescent lamp recycling stewardship program *Take Back the Light*.

Although provincial, state and federal regulations need to be considered for the recycling of mercury containing products, there were no industry standards available at the time this document was published. RCO commissioned the Bureau de Normalisation du Quebec (BNQ) to assist with the development of this document specifically for its *Take Back the Light* (www.takebackthelight.com) program.

The intent of this document is to provide direction on the best environmentally sound management (ESM) practices for mercury containing lamp recycling. It is based on current best practices in the industry and on ESM concepts that have been developed by international bodies such as the Organization of Economic Cooperation and Development (OECD) and the Bureau of International Recycling (BIR).

> NOTE – Environmentally Sound Management (ESM) is "a scheme for ensuring that wastes and used and scrap materials are managed in a manner that will save natural resources, and protect human health and the environment against adverse effects that may result from such wastes and materials." (An OECD working definition)[1]

These criteria aim to ensure that all lamps generated by participants in the TBTL program are recovered and processed in a way that minimizes negative environmental impacts under strict health and safety procedures, and that the maximum amount of each bulb collected is recycled, (i.e. that mercury and its other components—glass, metal and phosphor—are recovered for use in new products).

Processors interested in servicing the TBTL program will be expected to commission a third-party auditor recognized by the RCO to verify and validate its claims of recovery and recycling performance and compliance with this document.

[1] OECD, 2004, Guidance Manual on Environmentally Sound Management of Waste

Acknowledgements

RCO would like to extend a special thanks to the following people who contributed to the completion of this document through their participation in the consultation process and/or the sharing of their knowledge and expertise.

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This document was completed with current practices found in relevant literature and standards, and with input sought from primary stakeholders and experts. The *Electronics Recycling Standard 2009* of Electronics Product Stewardship Canada (EPSC) was used as a seed document.

NOTE – This document is not a consensus based standard as defined by the Standards Council of Canada.

Take Back the Light **fluorescent lamp recycling program**

The *Take Back the Light* program is a simple, low-cost, voluntary solution for businesses and organizations of any size to divert mercury containing lamps from the waste stream and recycle them responsibly.

Launched June 18, 2008 with the financial support of the Ontario Ministry of the Environment, *Take Back the Light* is Canada's first comprehensive fluorescent lamp recycling program. Originally designed for the industrial, commercial and institutional (IC&I) sector, the program can also support the recovery of household lighting products.

The program's goal is to responsibly recycle fluorescent lamps that would otherwise be disposed of, and to track these activities. It facilitates proper collection and management of mercury containing lamps and lamp component parts.

Take Back the Light ensures that the mercury found in bulbs is properly managed so that mercury does not reach disposal and contaminate the air, water and soil. While the recovery of mercury is the primary objective of the program, glass, metals, and phosphor are also reclaimed and recycled.

The context for mercury containing lamps is as follows:

- It is estimated that approximately 30 million fluorescent lamps are disposed annually in Ontario
- This figure represents approximately 312 kilograms of mercury
- It also represents over 8 million kilograms of glass, 100 000 kilograms of metal, and 128 000 kilograms of phosphor.
- In 2008, only 7% of fluorescent lamps were estimated to be recycled (Source: Recycling Council of Ontario)

Working with manufacturers, and users of mercury containing lamps, from the public and private sectors, "*Take Back the Light* empowers organizations to recycle their lamps by simplifying the process and using sheer bulk buying power to get the best possible price for lamp recycling," says Jo-Anne St. Godard, Executive Director of the Recycling Council of Ontario. "It provides a cost-effective and streamlined approach to handling spent fluorescent bulbs and other lighting waste."

For more information please visit www.takebackthelight.ca

About RCO

The Recycling Council of Ontario (RCO) is a not-for-profit, membership-based organization involved in policy, education and project work concerning the issues of consumption, waste generation, reduction and diversion, and recycling. The RCO is responsible for developing and operating the Take back the Light program.

The RCO believes that society must minimize its impact on the environment by eliminating waste. To that end, its mission is to inform and educate all members of society about the generation of waste, the avoidance of waste, the more efficient use of resources and the benefits and/or consequences of these activities.

About BNQ

The Bureau de normalisation du Québec (BNQ) (www.bnq.qc.ca) is a Standards Development Organization (SDO) accredited by the Standards Council of Canada (SCC) (www.scc.ca). Established in 1961, it is a member of the National Standards System (www.scc.ca/en/nss/index.shtml) of Canada. BNQ develops provincial, national and international consensus based standards, codes and reference documents for products, processes, services and management systems in order to help improve their quality and their acceptance in all markets.

Contents

1 Scope

The purpose of this document is to introduce and maintain environmentally sound management principles where the processing and recycling of end-of-life mercury containing lamps is concerned. Specific objectives underlying the development of this document are provided in Section 1.1 and the organizations targeted for its adoption and use are identified in Section 1.2. The types of mercury containing lamps for which this guideline was prepared are identified in Section 1.3.

1.1 Objectives

This document defines the minimum requirements for ensuring that mercury containing lamps are recycled and processed in an effective manner that safeguards worker health and safety, prevents the release of mercury in the environment, and maximizes the recovery of lamp materials for the highest value end use.

This document provides the criteria and best practices for all activities in the processing chain of mercury containing lamps, down through to the point of final disposition of materials. It comprises requirements for management policies, procedures and processes in addition to performance requirements and criteria.

In order to be recognized by the RCO and participate in the *Take Back the Light* fluorescent lamp recycling program, processors shall comply with the requirements of this document.

1.2 Targeted Organizations

The requirements in this document are intended for mercury containing lamps processors (see definition in Clause 2.1.1) applying to service the *Take Back the Light* program. It does not apply to other entities involved in the chain of recycling such as generators, collectors and transporters unless the processor performs one or more of these roles as part of their lamp processing activities described in the definition for processor.

NOTE – According to the definition of processor used in this document (see 2.1.1), an organization that accomplishes any one of the operations listed in the definition can apply as a processor to service the *Take Back the Light* program.

A processor applying for TBTL has the responsibility to ensure that all materials it accepts are processed down through to the point of final disposition according to the applicable requirements of this document, including all partnering vendors, subcontractors and sub-processors.

1.3 Lamp types

The requirements in this document are intended for the recycling of all types of lighting products with a focus on mercury containing lamps, including but not limited to:

- Tubular Fluorescent lamps
- U-shaped or O-shaped Fluorescent lamps
- Compact Fluorescent lamps
- UV lamps
- High Intensity Discharge (HID) lamps (such as Mercury Vapour, Metal Halide (MH), etc.)
- Low Pressure Sodium lamps
- Shatter Shield lamps

2 Definitions and abbreviations

2.1 Definitions

2.1.1 Organizations

NOTES

1. An organization may fall under more than one of the types of entities defined below.

2. The activities performed by any of the entities defined below do not include consolidation, cross-docking, or brokering of received material without processing.
Adapted from EPSC-ERS 2009

Generator: entity that has spent lamps in its possession.

NOTE – A generator may be the manufacturer, retailer, distributor or consumer of lamps. The Generator may prepare spent lamps for collection or the generator may hire a Collector to provide this service.

Collector: entity that accomplishes or facilitates the accomplishment of any of the following tasks that occur between the generator and the processor.

- Collects spent lamps within the premises of the Generator
- Groups spent lamps on the Generator's premises or at an off-site location
- Packages spent lamps for transport
- Arranges for the Transporter to remove the collected spent lamps from the Generator or from its own premises

NOTE – Collector as defined above may also be referred to as "handler".

Transporter: entity that transports spent lamps, processed or unprocessed, from generators and/or collectors to processors, between processors and from processors to points of final

disposition. A transporter may also transport material resulting from the processing of lamps to markets for re-manufacturing.

Processor: entity that accomplishes or facilitates the handling, or changes the form of spent lamps or any of its constituent parts in any of the following ways.

- Dismantles, disassembles, shreds, crushes and separates the spent product into its constituent parts and materials
- Processes the lamps' constituent parts and materials to recover metals, energy, and/or other resources
- Disposes of materials by landfill and/or incineration with or without energy from waste (EFW) recovery
- Any other material processing or disposition activity

NOTE – Other terms are frequently and loosely used to identify organizations that perform one or many of the tasks associated with the term "processor" as defined above. Examples of such terms are recycler, primary recycler, full recycler, primary processor, secondary processor, downstream processor, etc. The single term "processor" was retained in this document to encompass all of these tasks as the requirements specified in this document apply equally to all of these organizations regardless if their business comprises one or many of these tasks.

2.1.2 Management

Chain of Custody is the documentation of all custody, control, transfer, analysis, processing, and locations of spent lamps and associated materials from the point of collection to the point of final disposition.

Disposal is the point of final disposition for an item that has no further perceived value. Typically, this point of final disposition is in a landfill or destruction through some form of incineration.

Diversion Rate is the percentage of its total lamp and lamp packaging waste that a processor diverts from disposal through reduction, reuse, recycling and composting programs. Diversion rate = (total annual weight of materials diverted from disposal)/(total weight of materials generated including reused, recycled, composted and disposed) x 100%.

Point of Final Disposition refers to the final destination in the downstream flow of materials where the processed lamp material is to be used as a feedstock or raw material in a manufacturing process or ends up in the disposal stream.

Processing is a series of actions or steps that manually or mechanically changes the form of a mercury containing lamp for the purpose of resource recovery.

Waste Diversion is the action of diverting waste from landfill or incineration. It is a waste minimization strategy focused on the reuse, recycling or composting of materials for use in new products, thereby capturing resources that would have otherwise been waste.

2.1.3 Equipment and Materials

Spent lamps of the type described in Section 1.3 that are discarded by their owner or user.

NOTE – Spent lamps can be discarded for many reasons: end of life, obsolescence, out of specifications, batch of new lamps, etc. and as such require environmentally sound management.

2.2 Abbreviations

CIH	Certified Industrial Hygienist
EHS	Environmental, Health and Safety
OECD	Organization of Economic Cooperation and Development
OHS	Occupational Health and Safety
RCO	Recycling Council of Ontario
ROH	Registered Occupational Hygienist
TBTL	***Take Back the Light*** **program**

3 General Requirements for processors

3.1 Management

3.1.1 Regulatory requirements

The processor shall

a) Maintain a documented process to identify, monitor and update all applicable statutory and regulatory requirements and ensure compliance with this document and applicable statutory requirements on an annual basis, including but not limited to:

   i. All Provincial, State and Federal environmental statutes and regulations, including permits or certifications for operations, air emissions, or other discharges;

   ii. Provincial, State and Federal occupational health and safety statutes and regulations including Workplace Hazardous Materials Information System (WHMIS);

   iii. All Provincial, National and International transportation regulations, and;

   iv. Hazardous waste and/or dangerous goods disposal and management regulations (tracking, reporting, storage, handling, disposal and shipping).

b) Notify the RCO of any fines, regulatory orders and environmental incidents such as emission releases and spills that are causing or are likely to cause an adverse effect to the natural environment, as defined by the regulations that guide the operations of the processor operating in a particular jurisdiction, within 5 days of the incident and maintain and submit to the RCO a written record within 15 days of a completed investigation into the matter.

c) Maintain evidence of applicable transportation service provider's regulatory permits if transporting materials regulated as hazardous or as a dangerous good.

d) All documentation must be maintained for a minimum of two years unless superseded by regulatory requirement.

3.1.2 Emergency response plan

The processor shall

a) Implement and maintain an emergency response plan, appropriate to the scope of the facility, to prepare for and respond to emergencies including fires, spills, and medical incidents;

b) Practice and test the emergency response plan on a periodic basis to verify its efficiency and its relevance

c) Notify the RCO within 5 days of any emergency incident and maintain and submit to RCO a written record within 15 days upon completion of the investigation into the incident;

NOTE – The standard CSA Z731-03 *Emergency Preparedness and Response* provides criteria for effective emergency preparedness and response. Public Safety Canada also provides resources and information for emergency preparedness at http://www.publicsafety.gc.ca/prg/em/prprdnss-eng.aspx .

3.1.3 Environmental, health and safety (EHS) management

The processor shall maintain a documented and operational environmental, health and safety (EHS) management system to ensure adequate control over the environmental and occupational health and safety impacts associated with the facility's operations, with the following minimum features:

a) A written statement approved by senior management outlining corporate commitment to EHS management and continuous improvement, and disseminated to its employees and subcontractors;

b) The name, title, role and responsibilities of the persons in charge of and having authority over the implementation and monitoring the EHS management system and the chain of custody of lamps and materials accepted by the processor;

c) A documented process for identifying EHS hazards, assessing risks and significance of potential impacts, and determining necessary preventive actions on an annual basis and whenever new equipment is installed or reorganization of the facility or the human resources is carried out;

d) A list of the company or companies that are the Point of Final Disposition for the materials resulting from the processing of the spent lamps;

e) A documented process for monitoring the EHS performance monthly and documenting results;

f) A documented process for identifying and addressing the needs for corrective actions;

g) A documented annual review by senior management of the EHS management system and assessment of the need to improve or modify the EHS management system.

NOTE – The standards ISO 14001 and OHSAS 18001 provide comprehensive frameworks for Environmental management systems and for Occupational Health and Safety (OHS) management systems.

3.1.4 Occupational Health and Safety (OHS)

The processor must determine competency and experience requirements for personnel, temporary workers, contractors and subcontractors whose work is related to lamp and lamp packaging processing activities. The processor must also ensure that these requirements are being met.

The processor shall implement and maintain an Occupational Health and Safety (OHS) program to ensure compliance with applicable OHS legislation.

NOTE – Requirements below are not a summary of OHS regulations and do not preclude the processor from complying with all applicable regulatory requirements.

Notwithstanding any regulatory requirements, this OHS program shall entail the following minimum features:

a) Maintain a joint committee of management and worker staff that monitors and evaluates the effectiveness of the OHS programs and makes recommendations to

management for improvements. The committee shall conduct documented meetings at least on a quarterly basis and maintain a list of the current members of the committee.

b) Implement policies and procedures for hygiene, eating, drinking and smoking to reduce worker exposure to mercury and other toxic substances.

c) Maintain a thorough housekeeping program, which includes regular planned and documented OHS inspections by a competent person.

d) Safeguard hazardous mechanical processes to prevent worker injury.

e) Provide Personal Protective Equipment (PPE) to reduce injury or exposure to particulates, gases, vapours, chemicals and metals that may contact the skin and/or lungs either through the air or by the handling of materials, and enforce the use of this equipment.

f) Perform regular fit-tests and create and implement a full respiratory protection program if the use of this type of equipment is employed.

NOTE – For guidance on creating a respiratory protection program see CSA Standard Z94.4-02 titled, "Selection, Use and Care of Respirators".

g) Conduct a documented risk assessment of hazards and worker exposure to mercury and other toxic substances through air, absorption, ingestion or other means on an annual basis and whenever new equipment is installed or reorganization of the facility is carried out.

h) Maintain a process to identify health and safety training needs and provide regular documented OHS training, including, at minimum, new hire and refresher training, information from the risk assessment required, safe material handling, spill prevention, engineering controls, equipment safety, and the use and care of PPE.

i) Conduct air and surface sampling and analysis in both processing and communal areas, at a frequency determined through the risk assessment for contaminants such as metal containing dust and particulates, gases, vapours, chemicals, and ensure compliance with applicable exposure requirements or, if not practicable using current technology or engineered controls, provide adequate PPE to all exposed personnel. The risk assessment should be performed by a Registered Occupational Hygienist (ROH) or a Certified Industrial Hygienist (CIH) with certification/registration in good standing. Test results for mercury and other contaminants shall not exceed regulated exposure limits. Medical examinations such as blood testing should be conducted if sampling reveals exposure to such substances or is required by applicable regulations.

NOTE – The standard ISO 31000:2009 *Risk management - Principles and guidelines* provides principles and generic guidelines on risk management applicable to a broad range of stakeholders and activities in all industry sectors. ISO/IEC 31010:2009 *Risk management -- Risk assessment techniques* provides guidance on selection and application of systematic techniques for risk assessment.

j) Conduct an analysis of noise levels and post results in processing areas. Where noise levels exceed applicable statutory limits and engineered controls are not practicable, then adequate hearing protection must be provided.

3.2 Administration

3.2.1 Flow of material and chain of custody

3.2.1.1 The processor shall document the downstream flow and handling of lamps and processed materials from receipt at its facility through to each downstream processor or Point of Final Disposition, including details on how the lamps or materials are managed at each point.

3.2.1.2 The processor shall maintain a process to track and report the quantity and chain of custody of lamps and processed materials received, processed and shipped.

3.2.1.3 The following information shall be recorded in a written registry for all mercury-containing lamps and processed materials received or shipped:

a) Date, weight (in SI units) or number of units, description and origin of each shipment of lamps or materials accepted at the facility, and acknowledgement that the shipment was inspected and corresponds with the information on the manifest or bill of lading.

b) Date, weight (in SI units) or number of units, description and destination of each delivery of lamps or materials shipped from the facility.

c) On a monthly basis, the total weight or number of units of lamps and materials accepted to and shipped from the facility.

3.2.1.4 The registries, manifests, bills of lading, waste records and chain of custody of all lamps and materials processed shall be kept for a minimum of three years following the date of the last record and be made available to RCO upon request.

3.2.1.5 The processor shall identify the title of the person in charge of maintaining the registries and documents required above.

3.2.1.6 The processor shall maintain a documented closure plan that identifies at a minimum the financial requirements in the event of major pollutant releases, gross mismanagement or closure of the facility, and the financial mechanism for ensuring the availability of such funds, such as a security/performance bond or other similar financial instrument.

3.2.2 Selection of downstream processors

The processor shall maintain a documented procedure for the evaluation and selection of downstream processors through to the Point of Final Disposition

a) That assesses the downstream processor's ability to handle lamps and processed materials in a safe and environmentally sound manner, in accordance with this document and regulatory requirements, and

b) That provides evidence that they have in their possession the applicable permits and approvals for such operations.

3.2.3 Contracted Transportation

3.2.3.1 When the processor contracts any services for the transportation of mercury-containing lamps or hazardous processed material, the processor shall maintain a documented process for the evaluation and selection of the third-party transporter

a) That assesses its ability to handle lamps and processed materials in a safe and environmentally sound manner, in accordance with regulatory requirements, and

b) That provides evidence that the transporter has in its possession the applicable and valid permits and approvals for the transport of such materials, as well as for storage when applicable.

c) That provides evidence of the transporter has proper insurance coverage (such as *Environmental Impairment Liability* insurance)

3.2.3.2 A contract or an agreement shall be signed with the contractor comprising the following minimum information:

a) Identity of the processor, and of the contractor;

b) Acknowledgement that particular handling and transportation written instructions and precautions and training on those precautions were provided to the transporter personnel;

c) Permits or certificates required;

d) Particular applicable rule or regulatory requirement;

e) Responsibilities in case of an environmental incident or OHS accident.

3.2.3.3 A shipping document shall be prepared for each shipment of mercury-containing lamps or hazardous processed material comprising the following minimum information:

a) Point of origin of the shipment and point of delivery to the processing location;

b) Description and weight/number of units of lamps and material to be transported;

c) Clear indication of the content of hazardous, toxic or other regulated materials.

3.3 Insurance

The processor shall

a) Possess Comprehensive or Commercial General Liability Insurance including coverage for bodily injury, property damage, complete operations, and contractual liability of not less than $5,000,000.

b) If processing less than 3,000,000 lamps per year, provide proof of Financial Assurance that is satisfactory to Provincial, State and Federal statutes and regulations, including permits or certificate requirements or Environmental Impairment Liability Insurance of

not less than $1,000,000 per occurrence, $1,000,000 general aggregate which would include coverage for premises pollution liability and/or contractor pollution liability of not less than $1,000,000. Such insurance should include coverage enhancement for transportation of such materials as well as non- owned disposal site (NODs) coverage. Contractor's pollution liability policy should name the Recycling Council of Ontario and its directors, employees, subsidiaries and assigns as additional insured with respect to the operations conducted under this program.

c) If processing more than 3,000,000 lamps per year but less than 5,000,000 lamps per year, obtain Environmental Impairment Liability Insurance of not less than $1,000,000 per occurrence, $1,000,000 general aggregate which would include coverage for premises pollution liability and/or contractor pollution liability of not less than $1,000,000. Such insurance should include coverage enhancement for transportation of such materials as well as non- owned disposal site (NODs) coverage. Contractor's pollution liability policy should name the Recycling Council of Ontario and its directors, employees, subsidiaries and assigns as additional insured with respect to the operations conducted under this program.

d) If processing more than 5,000,000 lamps per year, obtain Environmental Impairment Liability Insurance of not less than $5,000,000 per occurrence, $5,000,000 general aggregate which should include coverage for premises pollution liability and/or contractor pollution liability of not less than $5,000,000. Such insurance should include coverage enhancements for transportation of such materials as well as non- owned disposal site (NODs) coverage. Contractor's pollution liability policy should name the Recycling Council of Ontario and its directors, employees, subsidiaries and assigns as additional insured with respect to the operations conducted under this program.

e) Have a written confirmation from its insurer that its Insurance includes the coverage specified in a) above.

f) Possess workers compensation coverage through either a provincial program or through a private insurance policy.

4 Facilities and equipment

4.1 Facilities

4.1.1 Storage and processing areas

All storage and processing areas shall be in compliance with all current applicable legislation and regulatory requirements.

4.1.2 Access

Unauthorized access to the premises and storage areas shall be controlled or otherwise prohibited through security measures.

Source: EPSC-ERS 2009

4.2 Processing rooms/areas

4.2.1 Room/area

Any separation or processing activities performed either manually or mechanically, shall take place in an area or room with a ventilation system that is completely self-contained or completely separate from the general building ventilation system.

4.2.2 Ventilation system

The ventilation system of the processing rooms shall be equipped with:

a) An emission collection system/apparatus engineered to reduce environmental emissions of, and worker exposure to, toxic substances and particulate matter below applicable statutory and regulatory requirements;

b) A means to recover mercury as liquid, vapour or as a compound, from the exhaust air flow scavenged from the processing rooms so that scavenged air complies with legislation and regulatory limits before being released into the environment. Contaminated air shall not be diluted with clean air so that final concentration falls below regulatory limits.

4.2.3 Air testing

All air sampling and testing shall be performed by competent personnel trained to perform air sampling tests, at a frequency and in locations as identified according to the risk assessment, to ensure that releases of regulated materials, such as mercury, mercury vapour and phosphor powder, are kept within regulated limits. The risk assessments should be performed by a ROH or a CIH.

The results shall be recorded in a written registry; the registry shall be kept for three years following the date of the last record.

NOTE – General air quality requirements are addressed in 3.1.4.

4.2.4 Waste water

All water used for washing phosphor from lamps or for otherwise processing lamps or related materials shall be collected to prevent environmental emissions and worker exposure.

Materials transported by this water shall be recovered so that this water complies with legislation and regulatory limits before being released into the environment. Contaminated water shall not be diluted with clean water so that final concentration does not exceed regulatory thresholds.

4.3 Equipment

4.3.1 Design

All equipment and machinery used for lamp crushing or processing shall meet the following requirements:

a) Be equipped with mercury vapour collection means;

b) Be designed so that under normal conditions of operation, mercury in vapour or liquid form, phosphor powder or any other "materials of concern" as per Table 1 cannot escape from the equipment and be released into the surroundings;

c) Be designed so that all mercury, phosphor powder or other "*material of concern*" as per Table 1 accumulated in the equipment can be removed and recovered safely;

d) A means shall be provided to recover mercury vapor and phosphor powder from the exhaust air flow scavenged from the equipment and machinery mercury vapour and phosphor powder collection systems and from collected water, so that scavenged air and water complies with legislation and regulatory limits before being released into the environment. Contaminated air or water shall not be diluted with clean air or water so that final concentration falls beyond regulatory limits.

4.3.2 Operation

4.3.2.1 All equipment and machinery used for lamp crushing and/or processing shall

a) be operated in a room conforming to clause 4.2.

b) be verified and maintained so that they operate according to specifications and applicable regulations at all times.

4.3.2.2 The processor shall ensure that each operator of any equipment or machinery

a) has received instruction and training on

i. the operation of the equipment, the maintenance of seals and sealing surfaces, the replacement and safe handling of filters and other consumables, and the need for a well-ventilated room conforming to clause 4.2,

ii. the proper use of personal protection equipment (PPE);
NOTE – Typical PPE includes mercury vapour and phosphor powder respirator, protective suit, eye protection, gloves and boots,

iii. the use of mercury spill clean-up kit,

b) has quick and easy access to a mercury spill clean-up kit.

4.3.3 Maintenance and cleaning

4.3.3.1 Maintenance and cleaning of any equipment shall

a) be carried out by trained personnel;

b) be performed according to the manufacturer's instructions and recommendations,

c) be performed in a room conforming to clause 4.2, and

d) be recorded in a written registry.

4.3.3.2 The maintenance registry shall

a) comprise the following information:

i. Description of the maintenance work;

ii. Location where the maintenance was performed;

iii. Date of maintenance;

iv. Name of the person who performed the maintenance.

b) be kept by the processor for three years following the date of the last record.

4.3.4 Consumables

Any consumables or disposable parts, such as filters for equipment, machinery or the ventilation system, contaminated with mercury or other materials as per Table 1 shall be managed safely and properly, ensuring compliance with applicable regulation, minimizing health and environmental harm. These parts shall be processed in order to recover the mercury and other materials and be processed and disposed or recycled in accordance with Table 1.

5 Material Separation

5.1 Material Diversion

The processor must demonstrate an annual diversion rate greater than 90% for lamps and lamp packaging materials they receive for processing. The processor must also include all documentation, diversion methodology and explanations for how the diversion calculation was achieved.

5.2 Handling and storage

Spent lamps shall be handled and stored in ways that prevent release of mercury in the environment.

5.2.1 Handling of spent lamps

The processor shall provide the collector of spent lamps with the following:

a) Lamp containers for storing and transporting lamps, or a source of supply for such containers; the lamp container shall be designed to prevent mercury from escaping the container.

b) Written instructions and precautions for proper handling and storage of spent lamps and storage/transportation containers.

c) Written instruction for handling and clean-up of spilled, broken lamps.

5.2.2 Receiving and Storage

5.2.2.1 All lamps, lamp materials and components, whether processed, undergoing processing, or processed, shall be stored indoors.

5.3 Lamp processing and disposition

Lamps may be dismantled using manual, mechanical, chemical or heat treatment processes provided the operation is in compliance with this document and all applicable regulatory requirements, including permits.

Separated materials shall be managed according to the specifications listed in Table 1, depending on their mercury content or the presence of any other hazardous components.

Export to non-OECD/non-EU countries is not allowed for any materials contaminated with mercury.

5.4 Specification of lamp component parts and materials

The processor shall record the following information in a written registry for any shipment of lamp component parts and materials leaving their processing facility:

a) Specification of the component or materials

b) Documented measurement methods used to determine these specifications.

6 Transportation & Export

All transportation operations inbound and trans-boundary shall comply with applicable regulation.

More information and guidelines regarding compliance with regulations in Canada can be found in Annex B.

Table 1
material processing and disposition

Material	Minimal acceptable process‡	Point of Final Disposition	
		Acceptable	Unacceptable
Metal - Ferrous	Metal recovery	Used as raw material in the production process of new products	Landfill, incineration
Metal – Nonferrous	Metal recovery	Used as raw material in the production process of new products	Landfill, incineration
Ceramics	Size reduction	Reused as an aggregate substitute; or used as raw material in the production process of new products	Landfill†, incineration†
Glass (leaded)	Beneficiation and material separation of glass and lead and to remove mercury content if necessary	Glass - Recycled into new products; reused as an aggregate substitute; or used as raw material in the production process of new products	Landfill†, incineration†
		Lead - Used as raw material in the production process of new products	Landfill, incineration
		Mercury - Used as raw material in the production process of new products	Landfill, incineration
Glass (non-leaded)	Beneficiation	Recycled into new product; reused as an aggregate substitute; or used as raw material in the production process of new products	Landfill†, incineration†

Mercury	Material separation and purification e.g.: Retort furnace and then triple distillation	Use as raw material in the production process of new products	Landfill
Packaging materials - Paper, cardboard - Plastics - Other	Cleaned of any mercury and diverted from disposal	Paper - Used as raw material in the production process of new products	Landfill, incineration
		Cardboard - Used as raw material in the production process of new products	Landfill, incineration
		Plastics and other - Used as raw material in the production process of new products	Landfill†, incineration†
Phosphor powder - not decontaminated (may contain mercury)	Material separation to remove mercury content e.g.: Retort furnace	Use as raw material in the production process of new products	Landfill
Process residuals (other than the above)			Landfill, incineration‡

† Landfill may be allowed when no service, proper reuse or recycling options are available.

‡ Re smelting, incineration, or similar process for materials contaminated with mercury shall allow for recovery of mercury vapour released during the process.

Annex A
Informative References

CSA Z731-03 *Emergency Preparedness and Response*

ISO 14001:2004, *Environmental management systems -- Requirements with guidance for use*

ISO 31000:2009, *Risk management - Principles and guidelines*

ISO/IEC 31010:2009, *Risk management -- Risk assessment techniques*

OHSAS 18001:2007, *Occupational health and safety management systems – Requirements*

Public Safety Canada, Resources and information for emergency preparedness (http://www.publicsafety.gc.ca/prg/em/prprdnss-eng.aspx , April 2011)

Ontario *Environmental Protection Act*, R.S.O. 1990, c. E.19

Annex B
Transportation & Export guidelines and information

A.1 Transportation

Components of spent lamps and/or the materials resulting from the processing of spent lamps could possess characteristics that would classify them as subject to the Transportation of Dangerous Goods Act in Canada (TDGA) or the Universal Waste Rule (UWR) in the United States.

Materials classified as "Environmental Hazardous Substances" are regulated under TDGA, which is determined through a Toxicity Characteristic Leaching Procedure (TCLP) leachate test and comparing the results to the criteria on TDGA schedules.

Section 5 of the TDGA states:

> No person shall handle, offer for transport, transport or import any dangerous goods unless
>
> a) the person complies with all applicable prescribed safety requirements;
> b) the goods are accompanied by all applicable prescribed documents; and
> c) the means of containment and transport comply with all applicable prescribed safety standards and display all applicable prescribed safety marks.

Materials that contain mercury could be classified as environmental hazardous substances. It is advised that the facility review their operations and the materials they transport to ensure that they are complaint with the requirements of TDGA.

More information on TDGA is available at the following websites:
http://www.tc.gc.ca/eng/tdg/act-menu-130.htm

http://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm

A.2 EXPORT

The export and import of wastes or recyclable materials that fall under the requirements of TDGA are regulated through the federal Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulation, 2005 (EIHWHRMR) of the Canadian Environmental Protection Act. It is the responsibility of the importer or exporter to ensure the proper classification of their hazardous waste.

The EIHWHRMR was created to transpose Canada's obligation from ratification of the Basel Convention, which is intended to prevent developed nations from dumping hazardous wastes in developing nations. Spent lamps and some materials generated from the processing of them may be considered environmentally hazardous and/or leachable toxic wastes and are regulated under

EIHWHRMR. Thus, controls are normally applied to the export of hazardous wastes to foreign destinations which involve a "prior informed consent" regime, which requires notification and consent from the recipient government prior to export.

Although the United States is an OECD member country, it has not ratified the Basel convention so special consideration should be made to spent lamp shipments to the USA. If the USA is used as transit of material to other destinations, the full requirements of EIHWHRMR may apply.

In order to export spent lamp materials that are defined as hazardous waste or hazardous recyclable material, the following steps must be taken:

1. Complete the notification information requirements set out under the EIHWHRMR. The notification requirements include such information as:

    1.1. The nature and quantity of hazardous waste or hazardous recyclable material involved;

    1.2. The addresses and the sites of the exporter, the importer, and the carrier(s);

    1.3. The proposed disposal or recycling of the waste or material;

    1.4. Proof of written contracts between exporters and importers;

    1.5. Proof of insurance coverage; and

2. Have a signed written contract between the generator* and receiver of the hazardous waste or hazardous recyclable material as required by the EIHWHRMR (exports and imports only) and ensure that the Canadian importer or Canadian exporter (as the case may be), and all carriers have valid insurance coverage (all movements) required under the EIHWHRMR.

*The definition of 'generator' used here is in the context of the EIHWHRMR, is not the same as 'generator' defined in 2.1.1 of this document.

3. The notification requirements and insurance must be submitted to Environment Canada's Transboundary Movement Branch for review and approval.

4. Obtain a PERMIT issued by the Minister of the Environment for the export, import or transit of hazardous wastes or hazardous recyclable materials before proceeding with any shipments. The valid dates set out in the PERMIT.

5. Use an authorized carrier and authorized recycling/disposal facility set out in the PERMIT to accept the hazardous waste or hazardous recyclable material. Ensure that the volume in the shipment does not exceed the quantity provided and approved in the PERMIT.

6. Ensure that the Movement Document is correctly completed, signed and accompanies each approved shipment of hazardous waste and hazardous recyclable material entering or exiting Canada.

7. Comply with all requirements of the Transportation of Dangerous Goods Regulations (TDGR) during the movement of the hazardous waste or hazardous recyclable material, where applicable.

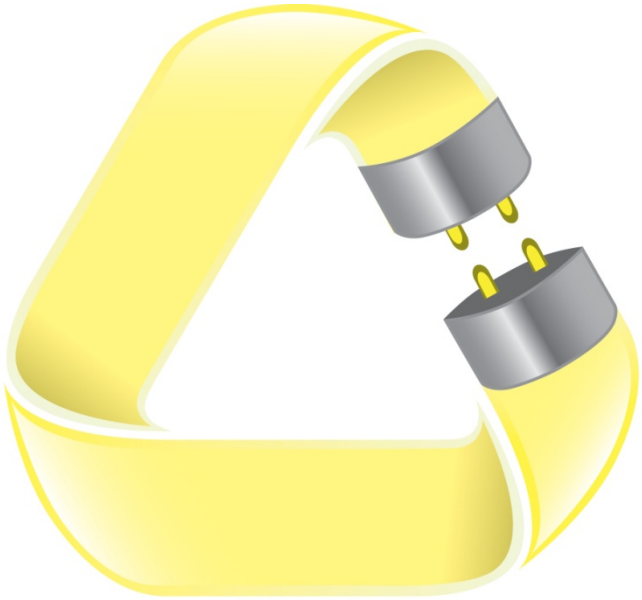
8. Ensure that a copy of the Movement Document as well as a copy of the Permit is provided to the carrier(s) and both are dropped off at the point of entry/exit to a Canadian Border Services Agency agent.

9. Submit copies of the completed Movement Document and certificate of recycling/disposal to Environment Canada to fulfill your obligations under the EIHWHRMR.

10. Retain the Movement Documents at your place of business in Canada for 3 years following the completion of the movement.

Detailed information on how to complete a notice and meet the requirements of the EIHWHRMR are outlined further in the User Guide to Classification and Implementation, which is available at www.ec.gc.ca/tmb/eng/guides e.html.

In addition to these requirements, some producers or owners of spent lamps may impose requirements that exceed those listed above, such as only allowing export if the recipient of the spent lamp material is compliant with applicable local waste handling, storage, and disposal regulations.



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