

## PREFACE

This guidebook is intended to assist mercury-containing lamp waste generators (households, businesses, and institutions) in managing lamp wastes. It describes lamp wastes, identifies lamp waste generators, provides the laws that govern lamp wastes, and presents emergency response measures in the event of a broken lamp.

This guidebook will help determine:

- What are lamp wastes?
- Who are lamp waste generators?
- What are the laws that govern lamp wastes?
- How to manage lamp wastes?
- What emergency response measures to take in the event of a broken lamp?

The development of this guidebook was made possible through the initiative of the Philippine Efficient Lighting Market Transformation Project of the Department of Energy, in partnership with the Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR). Assistance was provided by the United Nations Development Programme-Global Environment Facility in undertaking the Policy Study on Lamp Waste Management.

## ACRONYMS

<b>CCO</b>	Chemical Control Order
<b>DAO</b>	DENR Administrative Order
<b>DENR</b>	Department of Environment and Natural Resources
<b>EEL</b>	Energy Efficient Lighting
<b>EMB</b>	Environmental Management Bureau
<b>HID</b>	High Intensity Discharge
<b>IRR</b>	Implementing Rules and Regulations
<b>kg</b>	kilogram
<b>m<sup>3</sup></b>	cubic meter
<b>mg</b>	milligram
<b>LGU</b>	Local Government Unit
<b>RA</b>	Republic Act
<b>TFL</b>	Tubular Fluorescent Lamp
<b>TSD</b>	Treatment, Storage, and Disposal
<b>UV</b>	Ultraviolet

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## 1.0 INTRODUCTION

A four-foot fluorescent lamp has an average rated life of at least 20,000 hours. To achieve this long life, lamps must contain a specific quantity of mercury. The two most common types of mercury-containing lamps are fluorescent lamps and high-intensity discharge (HID) lamps. These lamps use about one-fourth of the electricity consumed by incandescent lamps. In addition, mercury-containing lamps last about 10 times longer.

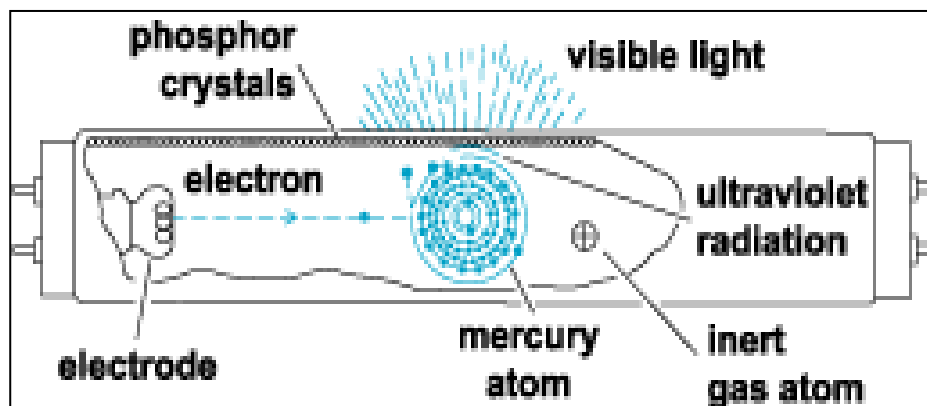
Unfortunately, mercury poses health and environmental impacts. When mercury-containing lamps are broken, compacted, crushed, or disposed off improperly, mercury is released into the air, water, and land, posing significant threat to people and the environment. This is the main reason why mercury-containing lamp wastes are regulated.

This guidebook provides information on the management, treatment, and disposal of mercury-containing lamp wastes. It describes lamp wastes, identifies lamp waste generators, provides the laws that govern lamp wastes, and presents emergency response measures in the event of a broken lamp.

### 1.1 MERCURY IN LAMPS

A typical fluorescent lamp (Figure 1) is composed of a phosphor-coated glass tube with electrodes located at both ends. The tube contains mercury, of which only a very small amount is in vapor form. When voltage is applied, the electrodes energize the mercury vapor, causing it to emit ultraviolet (UV) energy. The phosphor coating absorbs the UV energy, causing the phosphor to fluoresce and emit visible light. Without the mercury vapor to produce UV energy, there would be no light.

Figure 1. Composition of Typical Fluorescent Lamp



Source: <http://www.answers.com/topic/fluorescent-lamp>

The amount of mercury required in lamps is very small, typically measured in milligrams (mg) and varies by lamp type, manufacture date, manufacturing plant, and manufacturer. Studies have shown that each four-foot T-12 fluorescent lamp contains 7 to 40 mg of mercury.

Over the past two decades, mercury content in lamps has steadily decreased. The average four-foot lamp today contains over 75 percent less mercury than the same lamp would have contained in 1985. In 1989, the average mercury content in a fluorescent lamp manufactured in the United States was 48.2 mg, which decreased to 11.6 mg in 1999 for a typical four-foot lamp. In 1995, Philips Lighting introduced a low-mercury fluorescent lamp containing only 4.4 mg of mercury. Table 1 shows the typical mercury content of various mercury-containing lamps.

**Table 1. Typical Mercury Content of Various Mercury-Containing Lamps**

Lamp Type	Mercury Content (mg)
Compact Fluorescent Lamps	1 to 25
Fluorescent U-tubes	3 to 12
Fluomeric Lamps	~2
Linear Fluorescent Lamps	
■ Mercury reduced	3 to 12
■ Non-mercury reduced	10 to 50
Mercury Vapor Lamps	
■ 75-watt	25
■ 1500-watt	225
Metal Halide Lamps	
■ 75-watt	25
■ 1500-watt	225
Sodium Vapor Lamps	
■ 35-watt	20
■ 1000-watt	145

Source: Environment Canada's Mercury and the Environment Program

## 1.2 WHY SHOULD I BE CONCERNED WITH MERCURY IN LAMPS?

Mercury has played an essential part in the development of modern, energy-efficient lightings for decades. Ironically, inherent to its characteristics is its high toxicity. Mercury has long been found to cause a variety of documented, significant adverse impacts on human health and the environment throughout the world. The succeeding sections present the health and environmental impacts of mercury.

### 1.2.1 Health Impacts

Mercury and its compounds are highly toxic especially to the developing nervous system, which is very sensitive to all forms of mercury. Exposure to high levels of mercury can cause permanent brain damage, central nervous system disorders, memory loss, heart disease, kidney failure, liver damage, vision loss, sensation loss, and tremors. Mercury is also a suspected endocrine disruptor, which means it damages the reproductive and hormonal development and growth of fetuses and infants. Even low-level exposure to mercury has caused serious health effects that include neurological damage, reproductive system damage, behavioral problems, and learning disabilities.



Children with Congenital Minamata Disease due to intrauterine methylmercury poisoning (Harada 1986)

Source: <http://www.teratology.org/jfs/Agricultural.html>

*One fluorescent lighting tube contains  
enough mercury to contaminate  
30,000 liters of water to an unsafe  
drinking level.*

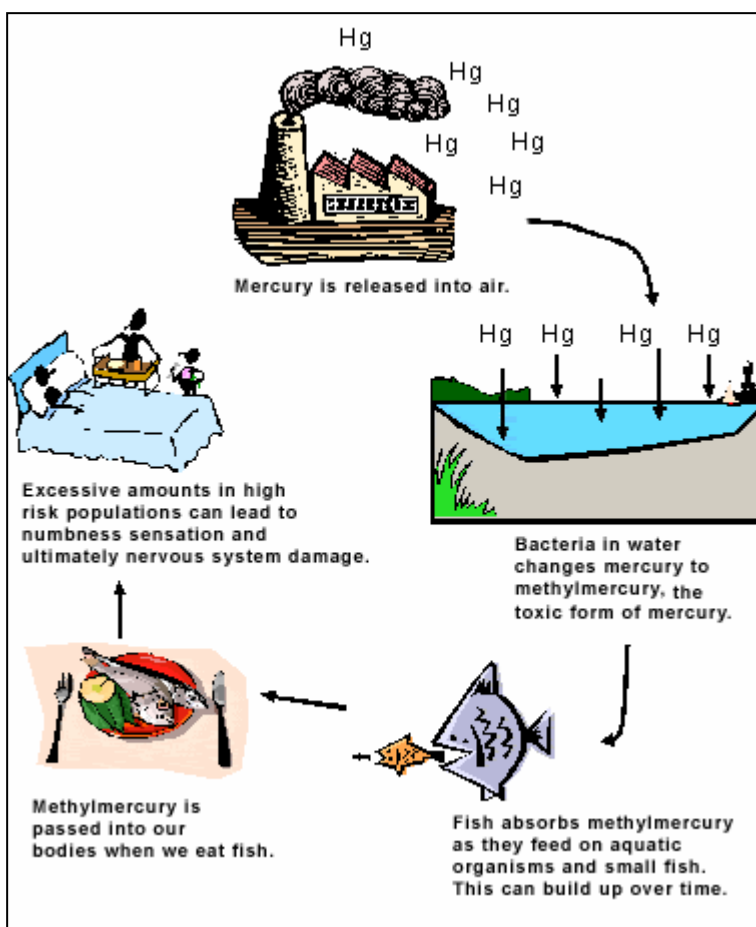
Human exposure to mercury can be through inhalation, absorption, ingestion, and skin/eye contact. The Occupational Health and Safety Administration sets the *Permissible Exposure Limit* of mercury at  $0.1 \text{ mg/m}^3$ . This value indicates that mercury exposure should not exceed this value during any part of the workday. In addition, the National Institute of Occupational Safety and Health has set the *Immediately Dangerous to Life or Health* limits for mercury compounds and organo mercury compounds at  $2 \text{ mg/m}^3$  and  $10 \text{ mg/m}^3$ , respectively. These values indicate the lowest mercury exposure causing death or irreversible health effects.

### 1.2.2 Environmental Impacts

Aside from being a potent neurotoxin, mercury bioaccumulates (higher concentrations in tissues of aquatic plants and animals than in water), biomagnifies (higher concentrations at increasingly higher levels in the food chain), and persists in the environment. Once in the atmosphere, mercury is widely disseminated and can circulate for years, accounting for its widespread distribution. Natural sources of atmospheric mercury include volcanoes, geologic deposits of mercury, and volatilization from the ocean. Alkali and metal processing, coal incineration, medical and other wastes, and gold and mercury mining also contribute greatly to mercury concentrations in the environment.

Figure 2 shows how mercury enters the food chain.

Figure 2. Mercury in the Food Chain



Source: <http://www.ynhh.org/online/nutrition/advisor/mercury.html>

## 2.0 WHAT ARE LAMP WASTES AND WHO ARE LAMP WASTE GENERATORS?

For the purpose of this guidebook, lamp wastes are any type of mercury-containing lamp that is already busted or spent. They are generated by various sectors, most especially the households, businesses, and institutions. The succeeding sections discuss these three sectors of lamp waste generators.

### 2.1 HOUSEHOLDS

According to the 2000 census, the total household population of the country is 15,278,808. Solid wastes from this sector contribute significantly to the overall wastes disposed to the environment.

A 2006 survey showed that the inventory of mercury-containing lamp wastes, in the form of tubular fluorescent lamps (TFLs), coming from the household sector amounts to 6.7 million pieces annually. This is equivalent to 133 kilograms (kg) mercury at an average of 20 mg mercury per TFL. In addition, the survey revealed that the largest generators of lamp wastes in the household sector are the middle class, accounting for almost 32 percent of the total wastes generated. This may be attributed to the fact that most household respondents (78%) have shifted to energy efficient lighting (EEL) systems, since they are aware of the cost benefits from shifting to EELs. The average number of lamps used per household was increasing proportionally to the income bracket. The lowest income bracket had the range of 3 to 14 lamps while the highest income bracket had the range of 24 to 75 lamps.

### 2.2 BUSINESSES

Based on data from the National Statistics Office, the number of business establishments in the country is about 742,946 in 2000. The business establishments comprised primarily of the commercial and industrial sectors. The combined electricity consumption of the two sectors is around 22.7 billion kilowatt-hours. Although a huge part of the energy consumption is for machineries in process operations (manufacturing) or heating, ventilating, and air conditioning systems (buildings and hotels and restaurants), they also use a lot of lighting for their business operations. Thus, it is expected that they generate huge amount of mercury-containing lamp wastes.

Based on the same survey, the total lamp wastes (assuming all are TFLs) generated by business establishments reached 11 million pieces annually, equivalent to 221 kg mercury. Most mercury-containing lamp wastes are generated by the large and micro size establishments. Though relatively few in number, the large establishments use numerous lights in their operations; whereas the micro size establishments use only a few lighting fixtures, but the number of establishments is huge. In terms of business operations, the manufacturing sector generates almost 38 percent of the wastes. This is followed by the wholesale and retail establishments at 28 percent.

### 2.3 INSTITUTIONS

Institutional lamp wastes are those generated by government offices, public hospitals, and public schools. Based on the same survey, the total lamp wastes (assuming all are TFLs) from institutions amount to 7.2 million pieces annually, equivalent to 145 kg mercury. The survey showed that public schools are the major sources (88%) of mercury-containing lamp wastes among government-owned buildings. Hospitals contribute 9 percent and the remaining 3 percent is due to building offices. This could be attributed to the fact that the country has many public schools and most of these are using tubular lamps.

### 3.0 WHAT ARE THE LAWS THAT GOVERN LAMP WASTES?

There are two major laws that directly or indirectly govern lamp waste management in the Philippines. These are Republic Act (RA) 6969, otherwise known as the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, and RA 9003 or more popularly known as the Ecological Solid Waste Management Act of 2000. These two laws are discussed briefly in the succeeding sections.

#### 3.1 RA 6969

RA 6969 was passed into law in 1990, with the goal of ensuring full protection of the people's health and the environment from unreasonable risks posed by industrial chemicals and chemical substances. The law provides the legal framework for the country's program to control and manage the importation, manufacture, processing, distribution, use, transport, treatment, and disposal of toxic substances and hazardous and nuclear wastes.

Through RA 6969, detailed mechanisms for its implementation were further issued in the form of DENR Administrative Orders (DAOs). With mercury as the hazardous component of lamps, the DAOs that are directly related to the handling of mercury-containing lamp wastes are:

- DAO 92-29: Implementing Rules and Regulations (IRR) for RA 6969
- DAO 04-36: Amending DAO 92-29
- DAO 97-38: Chemical Control Order (CCO) for Mercury and Mercury Compounds

DAO 97-38 was issued in December 23, 1997. The CCO established that the use of mercury and its compounds in electrical apparatus is allowed. The wastes resulting from its use require proper management and disposal approval from the DENR. Under the CCO, any mercury waste generator should comply with the following requirements:

- Register with the DENR-EMB as hazardous waste generator
- Submit Mercury Management Plan
- Submit Quarterly Reports
- Comply with the manifest system in the handling and disposal of mercury wastes

In terms of handling, the CCO requires that mercury wastes should be stored in containers that are corrosion-resistant and strong enough to withstand breakage. The storage system should also comply with appropriate labeling and packaging requirements, considering the ill-effects of mercury vapor.

Moreover, the CCO has provided appropriate information for users, transporters, workers, local government units (LGUs), and communities of facilities dealing with mercury and its wastes.

#### 3.2 RA 9003

RA 9003 outlines the specific roles and responsibilities of various stakeholders on solid waste management. The law contains relevant provisions on waste segregation at source and recycling. Under the IRR of RA 9003, lamp wastes are not explicitly mentioned, but may be defined under the category of special wastes.

Special wastes include household wastes such as paints, thinners, household batteries, lead-acid batteries, spray canisters, and consumer electronic goods like radios, stereos, and television sets.

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RA 9003 requires the following:

- Segregation of compostable, recyclable, and special wastes
- Disposal of toxic materials present in the waste stream to appropriate hazardous treatment and disposal plants, consistent with RA 6969
- Disposal of household hazardous wastes in a separate containment area in a sanitary landfill

The LGUs are authorized to collect solid waste management fees, computed based on the type and amount/volume of wastes, distance of transfer station to the waste management facility, capacity or type of LGU, cost of construction, cost of management, and type of technology.

The law also provides incentives, both fiscal and non-fiscal, for the purpose of encouraging LGUs, enterprises, or private entities to develop, undertake, or actively participate in any program geared towards effective solid waste management.

#### 4.0 HOW TO MANAGE LAMP WASTES?

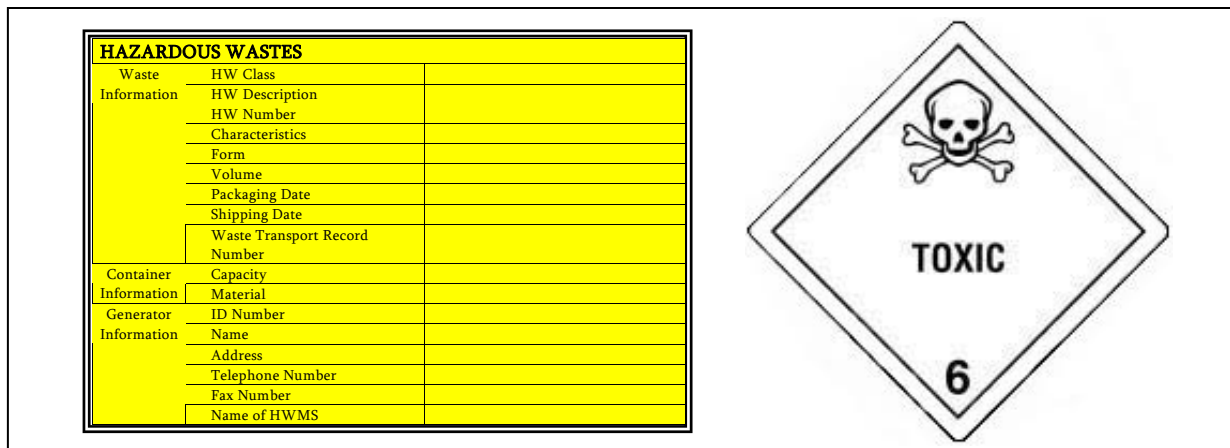
Proper handling and storage are good management practices. Described below are some practices in proper lamp waste management.

##### 4.1 PACKAGING AND LABELING OF LAMP WASTES FOR DISPOSAL

The following are some guides in proper lamp waste storage:

- A safe storage area should be designated to ensure that the lamps are not accidentally broken or crushed before they are sent to a treatment or disposal facility.
- When a used lamp is removed and replaced with a new lamp, the used lamp should be packaged in the cardboard box that contained the new lamp. The box must be clearly labeled and accompanied by a placard (Figure 3), with the date when the used lamp was stored in the box.

**Figure 3. Lamp Wastes Label and Placard**



If lamp wastes are placed into an accumulation container, only the container needs to be labeled as containing lamp wastes, not the individual lamps inside it. If an individual lamp is not in good condition and is showing signs of breakage, leakage, or damage; it must be individually over-packed in a closed packing container that is properly labeled and capable of preventing mercury leakage or release to the environment under reasonable foreseeable conditions. If the accumulation container is not in good condition, it must be over-packed, or the wastes must be removed and put into a container that is in good condition.

## 4.2 STORING OF LAMP WASTES

On-site lamp wastes storage is allowed, as long as each lamp remains intact and that the following guidelines are observed:



- Store in a manner that will prevent breakage of or damage to lamps
- Use signs and notices that show employees where and how to store lamps
- Label the lamp storage area or each container as “lamp wastes” or “used lamps” or “busted lamps”
- Clearly mark each container with the date when the first used lamp was stored in the box
- If on-site storage is not possible, present the lamp waste to a collector or a hazardous waste treatment or disposal facility



Lamp waste generators should never burn or dispose off lamp wastes onsite or at their premises. These types of treatment or disposal practices are prohibited.

## 4.3 RECORD KEEPING OF LAMP WASTES

At any time lamp wastes are stored or shipped off-site, records (particularly the Hazardous Waste Manifest) need to be kept on-site. Handlers should keep track of the following:

- Number of lamps removed from service during each calendar year
- Storage location of the lamps
- Manifest

## 4.4 TREATMENT/DISPOSAL OF LAMP WASTES

Lamp wastes from various sources may be disposed through any of the following options:

- *Treatment, Storage, and Disposal (TSD) Facility.* The EMB has a list of accredited TSD facilities that manage mercury-containing lamp wastes (Annex B). Coordinate with the EMB to obtain an updated list of accredited TSD facilities or visit their website at <http://www.emg.gov.ph>. It is strongly encouraged to check whether the TSD facility is capable of managing lamp wastes. The following are key factors in choosing TSD facility:
  - Responsive service
  - Technical capability
  - Experience and references
  - Treatment verification provided in writing
  - Environmental compliance history
  - Up-to-date permits (facilities and transportation)

Figure 4. Fluorescent Lamp Crusher

- *Lamp Crushing.* Considered as a form of preliminary treatment for lamp wastes, primarily for volume reduction (Figure 4). The crushed lamps are considered hazardous wastes and must be handled and disposed off in accordance with the requirements of RA 6969. Moreover, lamps may not be crushed without approval from the EMB. If you wish to crush your lamps, you will need to manage the lamps and comply with the requirements of RA 6969. Lamp crushing should be done in a controlled manner that prevents the release of mercury. The crushing procedures developed by the equipment manufacturer, including specific instructions for the frequency of filter replacement, and the employees using the equipment should be thoroughly familiar with the procedures and emergency responses. Testing for leaking mercury is advised.



Source: <http://www.compactorsunlimited.com>

- *City or Municipal Garbage Collection System to Sanitary Landfill.* Lamp wastes may be disposed through the city or municipal garbage collection system for small quantity generators, provided that the city or municipality:
  - Can handle and collect lamp wastes from households for disposal into a permitted hazardous waste landfill, government-approved recovery facility, municipal landfill provided the landfill has a designated cell, or hazardous waste facility that is permitted and registered by the EMB and the National Solid Waste Management Commission
  - Has entered into agreement with entities duly accredited and registered by the EMB for the collection of special hazardous wastes
- *Lamp Distributors for Recycling Potential.* Some lamp distributors are developing waste management services, offering a convenient, one-stop shopping arrangement for lamp purchasing and spent lamp management. Ask your lamp distributor if they provide this service.

In evaluating the disposal options, the waste generator needs to consider liability issues, disposal cost, and impact of mercury emissions to health and the environment.

#### 4.5 RECYCLING OF LAMP WASTES

Recycling is a viable option for the proper handling of mercury-containing lamps. It can reduce the risk of future financial liability associated with hazardous wastes. However, there is still no safe lamp recycling facility in the country. An effective lamp-recycling program, as an option for the management of mercury in lamps, is seen as an option which can contribute to waste minimization efforts.

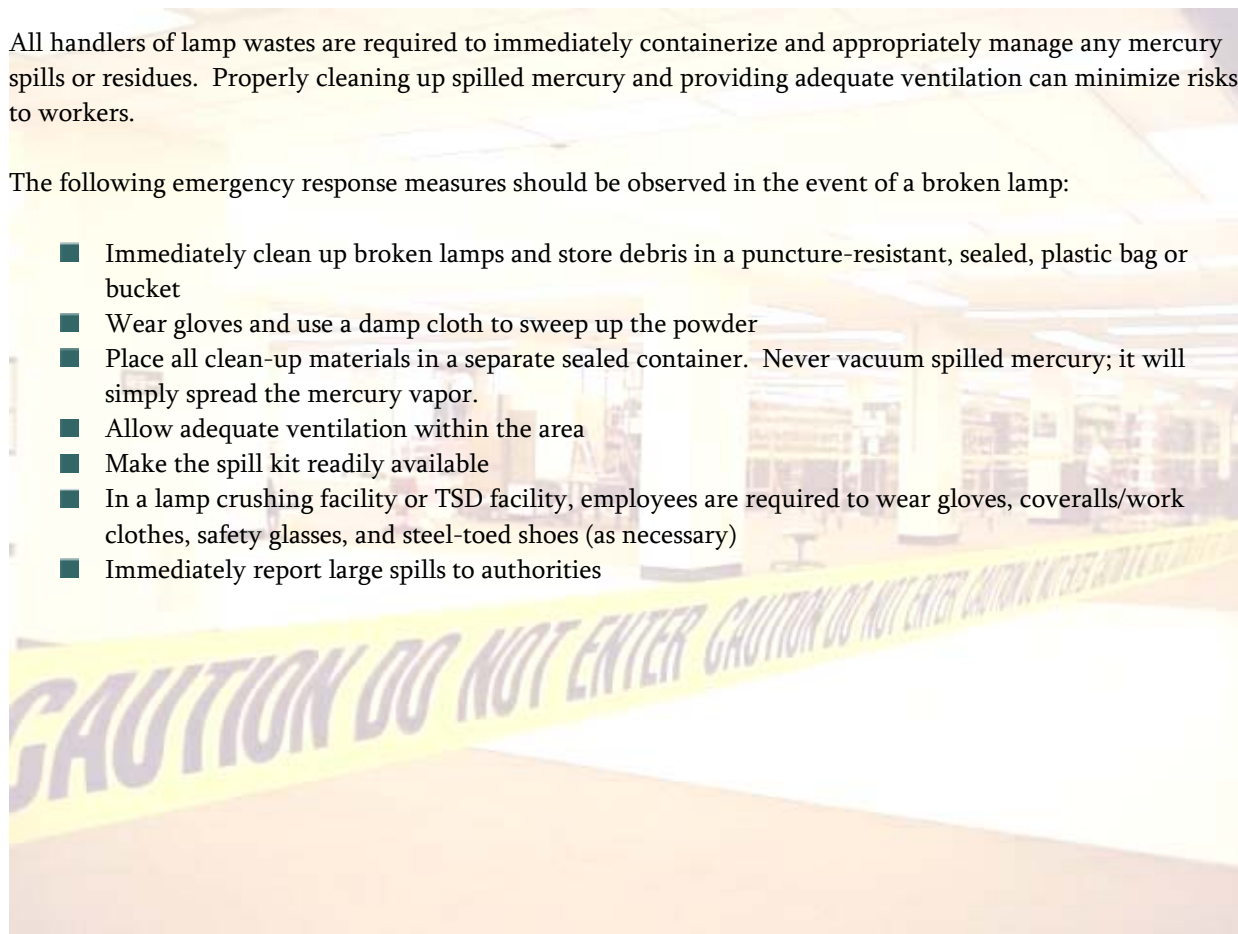
Lamp recyclers in other countries can separate the tubes into their component materials: aluminum and brass end caps, glass, mercury, and phosphor powder. The recyclable glass can be reused for any non-food application, while the aluminum end caps and brass tips can be cleaned and sent for recycling to a smelter. Phosphor powder can be chemically separated and recycled to produce clean phosphor for use in paint pigments or in the plastic industry. In addition, mercury can be recovered and reused.

## 5.0 WHAT EMERGENCY RESPONSE MEASURES TO TAKE IN THE EVENT OF A BROKEN LAMP?

All handlers of lamp wastes are required to immediately containerize and appropriately manage any mercury spills or residues. Properly cleaning up spilled mercury and providing adequate ventilation can minimize risks to workers.

The following emergency response measures should be observed in the event of a broken lamp:

- Immediately clean up broken lamps and store debris in a puncture-resistant, sealed, plastic bag or bucket
- Wear gloves and use a damp cloth to sweep up the powder
- Place all clean-up materials in a separate sealed container. Never vacuum spilled mercury; it will simply spread the mercury vapor.
- Allow adequate ventilation within the area
- Make the spill kit readily available
- In a lamp crushing facility or TSD facility, employees are required to wear gloves, coveralls/work clothes, safety glasses, and steel-toed shoes (as necessary)
- Immediately report large spills to authorities



## REFERENCES

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- Canada-wide Standards for Hg Containing Lamps. Canada Council for Minister of Environment. May 2001
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Republic Act No. 7160, An Act Providing for a Local Government Code of 1991

Republic Act No. 8749, An Act Providing for a Comprehensive Air Pollution Control Policy and for other Purposes, 1999

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Republic Act No. 9275, An Act Providing for a Comprehensive Water Quality Management and for other Purposes, 2004

Use and Release of Mercury in the United States, Chapter 3: Manufacturing Processes Involving Mercury. US EPA. 2002  
[www.epa.gov/ORD/NRMRL/pubs/600r02104/600r02104chap3.pdf](http://www.epa.gov/ORD/NRMRL/pubs/600r02104/600r02104chap3.pdf)

## GLOSSARY

**Container** – Any portable device, in which a material is stored, transported, treated, disposed off, or otherwise handled.

**Disposal** – Discharge, deposit, dumping, spilling, leaking, or placing of any solid or hazardous waste into or on any land or water so that such solid or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwater.

**Hazardous Waste** – Solid or liquid waste that can pose a substantial or potential hazard to human health or the environment when improperly managed.

**Lamp Waste** – Referred to as busted or spent lamps, are any type of mercury-containing lamp that includes fluorescent, high pressure sodium, mercury vapor, and metal halide lamps that are generated by a wide variety of generators including domestic, retail establishments, manufacturing establishments, and office buildings.

**Lamp Waste Collector** – Any person contracted to receive or collect lamp wastes from generators, consolidates the lamp wastes, and then sends the lamp wastes on to treatment and disposal facilities.

**Lamp Waste Generator** – Any person who generates the lamps, i.e, the person who used the lamps, then determined that they are no longer usable and this should be discarded.

**Landfill** – Means a waste disposal site designed, constructed, operated, and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation of the facility

**Manifest** – Transport document for hazardous waste tracking by EMB, originated and signed by the generator in accordance with instructions in DAO 92-29 and DAO 04-36.

**Special Hazardous Wastes** – Refer to substances discarded from households and consumer or industrial goods or products which become hazardous at the end of its useful life by virtue of its toxic or hazardous content which may be released to the environment upon indiscriminate disposal.

**Storage** – Containment of hazardous wastes, either on a temporary basis or for a period of years, consistent with the guidelines as prescribed by the DENR and in such a manner as not to constitute disposal of such wastes.

**Transporter** – Person engaged in the off-site transportation of hazardous waste by land, air, or water.

ANNEXES

ANNEX 1. LIST OF EMB-ACCREDITED LAMP WASTE TRANSPORTERS (AS OF APRIL 2007)

1.	<b>Semirecycling Co., Inc.</b> Bgy. 7268 Jose Topacio St., Industrial Estate I, Clark Special Economic Zone, Clark Field, Pampanga Tel. No. (045) 893-4063 Fax No. (045) 893-4064
2.	<b>Asia Metal Trading Corporation</b> Lot 28, New Cavite Industrial City, Stateland, Manggahan, General Trias, Cavite Tel. No. (046) 402-2320 Fax No. (046) 437-2319
3.	<b>Batnag's Trading</b> Bgy. Santol, Tanza, Cavite Tel. No. 0920-9111347
4.	<b>Cleanway Technology Corporation</b> Meridian Industrial Complex II, Bgy. Maguyam, Maguyam Road, Silang, Cavite Tel. No. (02) 529-8329 Fax No. (046) 865-2952
5.	<b>GASELCO Trading</b> JM St. Bgy. Mabuhay, Carmona, Cavite Tel. No. (02) 259-9784/997-6374
6.	<b>RN3K Trading</b> Bgy. Sta. Clara, General Trias, Cavite Tel.No. 0917-5779574
7.	<b>Southcoast Metal Enterprise, Inc.</b> Panorama Bldg., 2 Phase IV, CEZ, Rosario, Cavite Tel. No. 0466-4379788 Fax No. 046-4379789
8.	<b>Aliron Philippines, Inc.</b> Lot B2-1E, Carmelray Industrial Park 2, Calamba City, Laguna Tel. No. (049) 549-0129; 549-0130 Fax No. (049) 549-0130
9.	<b>D &amp; V Pobar Trading</b> Bggg Macabiling, Sta. Rosa, Laguna Tel. No. (049) 837-6756 Fax No. (049) 420-8109
10.	<b>Maritrans Recycler, Inc.</b> Unit 3 D.M. Ragasa Warehouse, 763 National Highway, Parian, Calamba City, Laguna Tel. No. (049) 545-9055; 545-3487 Fax No. (049) 545-9056; 345-9524
11.	<b>Tapia's Enterprises</b> Bgy. Wakat, Nagcarlan, Laguna

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12.	<b>Unified Engineering &amp; Manpower Multi-Purpose Cooperative</b> Purok San Miguel, Polomolok, South Cotabato Tel. No. (083) 382-0454 Fax No. (083) 500-8028
13.	<b>EnviroGreen Trading</b> Rm B19 Lester Bldg., Km 22, Quirino Highway, Lagro, Quezon City Tel. No. (02) 417-7729 Fax No. (02) 417-5101
14.	<b>Rodlea Trading</b> 3 Saint Martin St., Payatas A, Quezon City Tel. No. (02) 430-2365 Fax No. (02) 951-2729

A GUIDEBOOK ON THE MANAGEMENT OF MERCURY-CONTAINING LAMP WASTES

ANNEX 2. LIST OF EMB-ACCREDITED LAMP WASTE TSD FACILITIES (AS OF APRIL 2007)

1.	<b>DoloMatrix</b> 102 E. Rodriguez Jr. Ave, Bo. Ugong, Pasig City Tel. No. (63-2) 671-9086, 671-1975 Fax No. (63-2) 671-5925
2.	<b>Southcoast Metal Enterprise, Inc.</b> Panorama Bldg., 2 Phase IV, CEZ, Rosario, Cavite Tel. No. 0466-4379788 Fax No. 046-4379789
3.	<b>Solvtech Consultancy Resources</b> Blk 11 Lot 6A, Phase I, Sterling Technopark Maguyam, Silang, Cavite Tel. No. (02) 872-5211; 541-3045 Fax No. (02) 826-3285
4.	<b>JORM Trading Co.</b> General Trias Drive, Bgy. Tejero, General Trias, cavite Tel. No. (046) 437-8623 Fax No. (046) 437-8632
5.	<b>Asia Metal Trading Corporation</b> Lot 28, New Cavite Industrial City, Stateland, Manggahan, General Trias, Cavite Tel. No. (046) 402-2320 Fax No. (046) 437-2319
6.	<b>Cleanway Technology Corporation</b> Meridian Industrial Complex II, Bgy. Maguyam, Maguyam Road, Silang, Cavite Tel. No. (02) 529-8329 Fax No. (046) 865-2952
7.	<b>Cleveland Envirotech Solutions, Inc.</b> Km. 29 Ngy. Tungkong Mangga, San Jose del Monte, Bulacan Tel. No (044) 691-0653; (02) 299-6734 Fax No. (044) 691-6727
8.	<b>Autolube Trading</b> Bgy. Kaypian, City of San Jose del Monte, Bulacan Tel. No. (02) 417-7729; 417-5101 Fax No. (02) 417-5101
9.	<b>Maritrans Recycler, Inc.</b> Unit 3 D.M. Ragasa Warehouse, 763 National Highway, Parian, Calamba City, Laguna Tel. No. (049) 545-9055; 545-3487 Fax No. (049) 545-9056; 345-9524

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For more information on lamp waste management, please contact:

### Philippine Efficient Lighting Market Transformation Project (PELMATP)

3rd Floor NPTL Building, Energy Center, Meritt Road

Fort Bonifacio, Taguig City

Tel. No.: (632) 840-1401 to 21 local 364

Email: pelmatp@doe.gov.ph

### Environmental Management Bureau

Hazardous Waste Management Section

DENR Compound, Visayas Avenue, Diliman, Quezon City

Tel. No.: (632) 927-1517 or 18

Fax No.: (632) 927-1518

Email: emb@emb.gov.ph

URL: www.emb.gov.ph

### REGIONAL OFFICES

<p><b>National Capital Region (NCR)</b> (Manila Caloocan City, Pasay City, Quezon City, Mandaluyong City, Makati City, Muntinlupa City, Las Piñas City, Valenzuela) 29 Hizon Building, Quezon Avenue, Quezon City Tel. No. (02) 781-0497 / 71 781-0482-85</p>	<p><b>Region 6 (Western Visayas)</b> (Aklan, Antique, Capiz, Guimaras, Iloilo, Negros Occidental) Pepita Aquino St., Port Area, Iloilo City Tel. No.: (033) 337-9801 Fax: (033) 337-9801</p>
<p><b>Cordillera Autonomous Region (CAR)</b> (Abra, Benguet, Kalinga Apayao, Ifugao, Mountain Province) DENR Forestry Compound, Pacdal District, Baguio City Tel. No.: (074) 446-2881 Fax: (074) 442-4531</p>	<p><b>Region 7 (Central Visayas)</b> (Bohol, Cebu, Negros Oriental, Siquijor) Greenplains Subdivision, Banilad, Mandaue City Tel. No.: (032) 345-3905, 346-9426 Fax: (032) 346-1647</p>
<p><b>Region 1 (Ilocos)</b> (Ilocos Norte, Ilocos Sur, La Union, Pangasinan) 3rd Floor Marcos Building, San Fernando City, La Union Tel. No. (072) 242-3057; 242-3597; 888-3833 Fax: (072) 242-3032</p>	<p><b>Region 8 (Eastern Visayas)</b> (Biliran, Eastern Samar, Northern Samar, Leyte, Southern Leyte) 3rd Floor P&amp;M Building, Torres St., Tacloban City Tel. No.: (053) 325-2149 Fax: (053) 325-2149</p>
<p><b>Region 2 (Cagayan Valley)</b> (Batanes, Cagayan, Isabela, Nueva Viscaya, Quirino) EMB Nursery Compound, San Gabriel Village, Tuguegarao City, Cagayan Tel. No.: (078) 844-4321 Fax: (078) 844-6662</p>	<p><b>Region 9 (Western Mindanao)</b> (Basilan, Zamboanga del Norte, Zamboanga del Sur) GMV Drive, Governor Camins Avenue, Zamboanga City Tel. No.: (062) 992-6547 Fax: (062) 992-6548</p>
<p><b>Region 3 (Central Luzon)</b> (Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac, Zambales) 4th Floor Melvi Building, San Fernando, Pampanga Tel. No. (045) 861-2253 Fax: (045) 888-0988</p>	<p><b>Region 10 (Northern Mindanao)</b> (Bukidnon, Camiguin, Misamis Occidental, Misamis Oriental) DENR 10 Compound, Macabalan, Cagayan de Oro City Tel. No.: (088) 726- Fax: (088) 856-9362</p>
<p><b>Region 4 (Southern Tagalog)</b> (Aurora, Batangas, Cavite, Laguna, Marinduque, Occidental Mindoro, Oriental Mindoro, Palawan, Quezon, Rizal, Romblon) 1515 L and S Building, Roxas Boulevard, Pasay City</p> <p><b>Region 4-A Mainland</b> Tel. No.: (02) 536-9784 Fax: (02) 536-9784</p>	<p><b>REGION 11 (Southern Mindanao)</b> (Davao del Norte, Davao del Sur, Davao Oriental, South Cotabato, Saranggani, Compostela Valley) Door 2, Flebet's Building, Km 7, Lanag, Davao City Tel. No.: (082) 235-1259 Fax: (082) 235-1354</p>
<p><b>Region 4-B Island</b> Tel. No.: (02) 400-5960 Fax: (02) 405-0041</p>	<p><b>REGION 12 (Central Mindanao)</b> (Lanao del Norte, North Cotabato, Sultan Kudarat, Cotabato City, Marawi City) 4/F Siyambio Bldg., Roxas St., Koronadal, South Cotabato Tel. No.: (083) 288-4847 Fax: (083) 288-4848 or 228-6225</p>
<p><b>Region 5 (Bicol)</b> (Albay, Camarines Sur, Camarines Norte, Catanduanes, Masbate, Sorsogon) Regional Center Office, Rawis, Legaspi City Tel. No.: (052) 482-0197 Fax: (052) 820-5065</p>	<p><b>REGION 13 (Caraga)</b> (Agusan del Norte, Agusan del Sur, Surigao del Norte, Surigao del Sur, Butuan City, Surigao City) Sultan Hotel, Bancasi, Butuan City Tel No.: (085) 342-5332 Fax: (085) 815-1045</p>



Mercury-Containing  
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**WARNING:**  
CONTAINS MERCURY

**Philippine Efficient Lighting Market Transformation Project  
- Project Management Office (PELMATP-PMO)**

Department of Energy  
3rd Floor NPTL Building, Energy Center, Merritt Road  
Fort Bonifacio, Taguig City, Philippines  
Telephone Numbers: (632) 840-1401 to 21 local 364  
Fax Number: 840-2093  
Website: <http://pelmatp.doe.gov.ph>  
<http://www.doe.gov.ph>  
<http://www.undp.org>  
E-mail: [pelmatp@doe.gov.ph](mailto:pelmatp@doe.gov.ph)



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