MERCURY MANAGEMENT

Philippines

Outline

- Legal and Regulatory Framework
- National Monitoring Framework
- Environmental Mercury Level
- Future plans

Legal and Regulatory Framework

RA6969: Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990

- **DAO 92-29: The Implementing Rules and Regulations**
  - Title II- Toxic Substances (Chemicals) Management [PICCS, PMPIN, PCL, CCO-Hg, CN, Asbestos, ODSs, PCB]
  - Title III- Hazardous Waste Management

- **DAO 2013-22: Revised Procedures and Standards for Management of Hazardous Wastes**
  - Table 2.1: Classification of Hazardous Waste

    Wastes with Inorganic Chemicals- Mercury and Mercury Compounds (D407)

Health Department Directive

- **DOH Administrative Order No. 2008-0021**

(Gradual Phase-Out of Mercury in all Philippine Healthcare Facilities and Institutions)

- Thermometers (December 2009)
- Sphygmomanometers (December 2010)
- Guidelines for setting up a proper temporary mercury storage area
- Specific storage requirements and standards

Joint Directive of the DENR and the Department of Energy

- **Joint DENR-DOE Administrative Order (JAO 2013-09-0001) (Lighting Industry Waste Management Guidelines)**

  - The JAO aims to regulate the end-of-life disposal of lighting products to control the dispersion of mercury and other toxic substances into the environment for the protection of public health and the environment

  - The implementation of the Extended Producer Responsibility (EPR) for lighting products and the operationalization of a Lamp Waste Management Facility (LWMF) is part of the Philippine Energy Efficiency Project (PEEP) of the DOE

Executive Order No. 79, s. 2012

- **Institutionalizing and Implementing Reforms in the Philippine Mining Sector Providing Policies and Guidelines to Ensure Environmental Protection and Responsible Mining in the Utilization of Mineral Resources**

  - Section 2: Full enforcement of environmental standards in mining

  - Section 11: Measures to Improve Small-Scale Mining Activities

    The use of mercury in small-scale mining shall be strictly prohibited.

REPUBLIC ACT 8749

EMISSION STANDARDS FOR MERCURY EMISSIONS FROM SOURCES AND AMBIENT AIR STANDARDS

Action plan on mercury and mercury-containing wastes

Minimize and, where feasible, eliminate mercury releases to air, water, and land from mercury wastes by adopting Environmentally Sound Management (ESM) of these wastes (following a lifecycle management approach)

Management of Mercury and Mercury-Containing Wastes

Implementing Agency:

Environmental Management Bureau

Department of Environment and Natural Resources

Funding Agency:

Division of Technology, Industry and Economics (DTIE)

Chemicals Branch

United Nations Environment Programme

Duration: February 2009 – June 2010

Output: National Action Plan on Mercury and Mercury-Containing wastes

Mercury Assessment for the Philippines Using the UNEP Mercury Toolkit (2008)

Top three (3) principal sub-categories releasing mercury in the Philippines are:

- **Primary Virgin Metal production – 65,927 kg Hg/year (32% of total releases) – ASGM;**
- **Extraction and Use of Fuel and Energy Resources – 31,940 kg Hg/year (20% of total releases)**
- **Other intentional use – products, e.g. thermometer, etc. – 29,471 kg Hg/year (20% of total releases)**

Over-all mercury emissions are distributed mainly to:

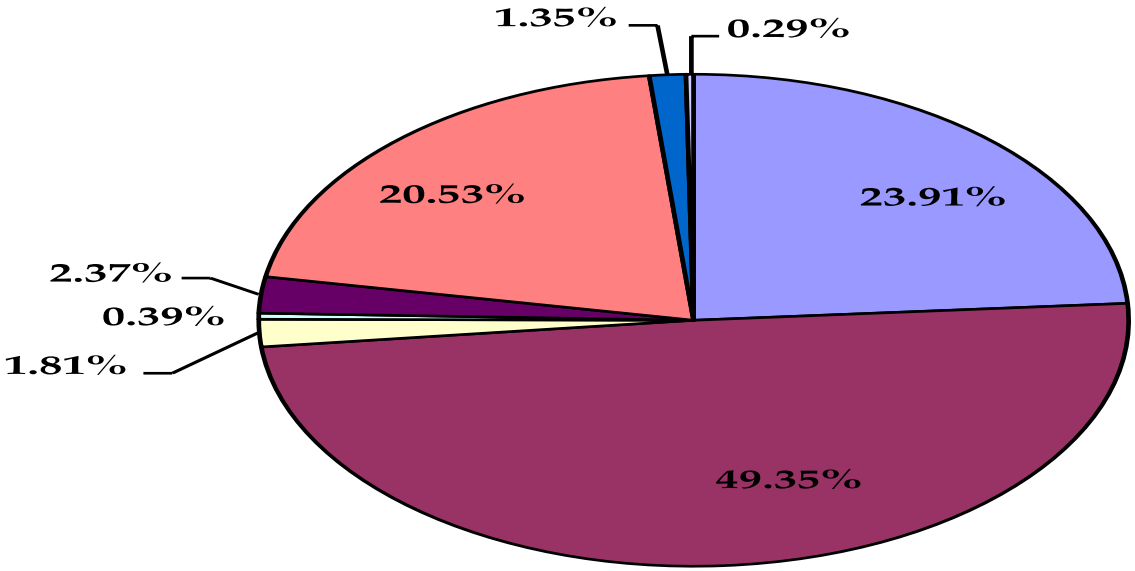
- **air (45%); land (19%); water (18%); and the rest to general waste and others.**

National Monitoring Framework

Sources of Emissions

- Relevant Source
  - Coal-fired power plants
  - Coal-fired industrial boilers
  - Smelting and roasting processes used in production of non-ferrous metals
  - Waste incineration facilities
  - Cement clinker production facilities

Summary of the Mercury Inventory in the Philippines



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23.91 % Extraction and use of fuels/energy resources
49.35% Primary (virgin) metal production
Primary (virgin) metal production

eries

Crematoria and cemeteries

Mercury Standards and Water Quality Criteria

- Water Quality Criteria
  - Total Mercury 0.002 mg/L

- Effluent Standards
- Inland water class C
  - Mercury total 0.005 mg/L

  - Marine Water
  - 0.01 mg/L

Emission Standards

Emission Source

Mercury 5 mg/Ncm as elemental Hg

Non-burn Technologies

0.05 mg/Ncm

Environmental mercury level

- Total mercury is monitored in water bodies that are close proximity to mining, electroplating and other's similar activities.
- Priority rivers were monitored, comprised of 27 water bodies. Mercury level remained below 1 μg/L.
- Two rivers exceeded the criterion in one sampling event reaching 4.3 μg/L and 430

Environmental mercury level

- Source emission samplings were conducted to power plants using coal. The results were below the emission standard of 5 mg/Ncm as elemental Hg.

300 MW Coal-Fired Power Plant

PARAMETER	300 MW mg/Ncm	STANDARDS mg/Ncm
Particulate Emissions	1,588	200
Antimony	0.03	10
Arsenic	0.0054	10
Cadmium	0.0048	10

300 MW Coal-Fired Power Plant

PARAMETER	300 MW mg/Ncm	STANDARDS mg/Ncm
Copper	0.0740	100
Lead	0.058	10
Nickel	0.100	20
Zinc	0.274	100

300 MW Coal-Fired Power Plant

PARAMETER	300 MW mg/Ncm	STANDARDS mg/Ncm
MERCURY	0.0028	5
Sulfur Oxides (as SO2)	1,361	1,500
Nitrogen Oxides (as NO2)	702	1,000
Carbon Monoxide	2	500

Coal Specification/APCD

	300 MW
Coal Type	bituminous
% sulfur	0.9
Ash content	16.9
APCD	Electrostatic precipitators

Research and Development

- Leachate characterization study
  - From solid waste disposal facilities
  - Impacts of leachate on groundwater

- Monitoring Plan (air) – preliminary phase
- Near power plants , mining areas, coal-fired boilers

- Automated, continuous atmospheric mercury speciation
  - Air mercury measurement
  - Gaseous oxidized mercury
  - Particulate bound mercury

  - Ambient water monitoring (wet and dry deposition) - CVAFS

Thank you