GOVERNMENT OF THE REPUBLIC OF ZAMBIA

INVENTORY OF MERCURY RELEASE IN ZAMBIA

ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

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INVENTORY OF MERCURY RELEASE IN ZAMBIA

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Executive summary

Introduction

The Government of the Republic of Zambia through Zambia Environmental Management Agency (ZEMA) undertook a “Mercury Release Inventories in Africa” project between November 2011 and June 2012 under the United Nations Environment Programme (UNEP).

Mercury is recognized as a toxic and persistent element, and is documented that it has serious impacts on human health and the environment. When released it is transported in the atmosphere and is such a global problem. To reduce the risk from anthropogenic mercury releases to human health and the environment the UNEP governing council decided in 2009 to develop a global legally binding convention on mercury.

This mercury release inventory was made with the use of the "Toolkit for identification and quantification of mercury releases" made available by the United Nations Environment Programme's Chemicals division (UNEP Chemicals).

This inventory was developed on the Toolkits Inventory Level 1. The Toolkit is based on mass balances for each mercury release source type. Inventory Level 1 works with pre-determined factors used in the calculation of mercury inputs to society and releases, the so-called default input factors and default output distribution factors. These factors were derived from data on mercury inputs and releases from such mercury source types from available literature and other relevant data sources.

Results and discussion

An aggregated presentation of the results for main groups of mercury release sources is presented in Table 1.1 below.

Table 0-1 Summary of mercury inventory results

INVENTORY LEVEL 1 - EXECUTIVE SUMMARY

Source category	Estimated Hg input,	Estimated Hg releases, standard estimates, Kg Hg/y

	Kg Hg/y	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment /disposal
Coal combustion and other coal use	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Other fossil fuel and biomass combustion	2.7	2.7	0.0	0.0	0.0	0.0	0.0
Oil and gas production	33 689.2	8 422.3	336.9	0.0	0.0	5 053.4	0.0
Primary metal production (excl. gold production by amalgamation)	22 542.9	1 883.7	450.9	9 486.3	6 793.9	0.0	3 928.1
Gold extraction with mercury amalgamation	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other materials production	366.8	220.1	0.0	0.0	73.4	73.4	0.0
Chlor-alkali production with mercury-cells	-	-	-	-	-	-	-
Other production of chemicals and polymers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Production of products with mercury content	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use and disposal of dental amalgam fillings	1 957.0	39.1	649.7	0.0	70.5	375.7	375.7
Use and disposal of other products	354.3	72.8	100.5	72.8	0.0	108.2	0.0
Production of recycled metals	94.9	31.3	0.0	32.3	0.0	31.3	0.0
Waste incineration and open waste burning*1	4 700.0	4 430.0	0.0	0.0	0.0	0.0	270.0
Waste deposition*1	4 000.0	40.0	0.4	0.0	-	-	-
Informal dumping of general waste *1*2	6 000.0	600.0	600.0	4 800.0	-	-	-
Waste water system/treatment *3	1 842.8	0.0	1 658.5	0.0	0.0	184.3	0.0
Crematoria and cemeteries	381.4	0.0	0.0	381.3	0.0	0.0	0.0
TOTALS	**60 860.0**	**15 740.0**	**2 140.0**	**9 970.0**	**6 940.0**	**5 830.0**	**4 570.0**

As shown in the table 1-1, the following source groups contribute with the major mercury inputs: Oil and gas production (refining), Primary metal production (mainly copper production), Other materials production, Use and disposal of dental amalgam fillings, while Waste incineration and open waste burning (usually incineration of medical waste and open air burning of waste at the landfill and informally), Informal dumping of general waste and waste water system/treatment represent major flows of mercury. The origin of mercury in waste streams is mercury containing products and materials.

Detailed presentation of mercury inputs and releases for all mercury release source types present in the country are shown in the following report sections.

Data gaps

Major data gaps were the following: Data is generally not available and Data is presented in a format which is not easy to analyse. In some instances the data is not representative due to lack of central databases.

Mercury release source types present

Table 2-1 shows which mercury release sources were identified as present and absent, respectively in the country. Only source types positively identified as present are included in the quantitative assessment.

It should be noted however, that the presumably minor mercury release source types shown in Table 2-2 were not included in the detailed source identification and quantification work. These may however be present in some countries.

Table 0-1 Identification of mercury release sources in the country; sources present (Y), absent (N), and possible but not positively identified (?).

INVENTORY LEVEL 1 - MERCURY SOURCES IDENTIFIED

Source category	Source present?
	Y/N/?
Energy consumption	
Coal combustion in large power plants	N
Other coal uses	Y
Combustion/use of petroleum coke and heavy oil	Y
Combustion/use of diesel, gasoil, petroleum, kerosene	Y
Use of raw or pre-cleaned natural gas	?
Use of pipeline gas (consumer quality)	?
Biomass fired power and heat production	y
Charcoal combustion	y
Fuel production	
Oil extraction	N
Oil refining	Y
Extraction and processing of natural gas	N
Primary metal production	
Mercury (primary) extraction and initial processing	N
Production of zinc from concentrates	N
Production of copper from concentrates	Y
Production of lead from concentrates	?
Gold extraction by methods other than mercury amalgamation	Y
Alumina production from bauxite (aluminium production)	N