



EPA

**The Republic of Yemen
Ministry of Water and Environment
Environmental Protection Authority (EPA)**

Yemen Mercury Inventory Report

Mercury Release Inventories - Asian Pilot Project

INVENTORY OF MERCURY RELEASES IN Yemen

Preliminary Inventory

September 2008

Drafted by:

**The National Coordination Team
Eng. Helal Ali
Al-Reiashi,
Deputy General Director of Environmental Monitoring and Survey EPA**

**Yemen Sana'a Dec. 2007
General Authority for Environmental Protection (EPA)**

Forword:

The Yemen Mercury Inventory Report was written by Mr. Helal Al-Reiashi, National Consultant. Technical support for the project was facilitated by the United Nation Environment Programme (UNEP) and through a mercury pilot project with in-kind contributions from the Yemen Government.

This report is published in Arabic and English by the Environmental Protection Authority (EPA), the Ministry of water and environment, the Government of Yemen to provide ground information mercury release sources and quantity in Yemen. This report is a first outcome of the common chemicals information and data collection in Yemen.

Copies of this profile have been made available to interested stakeholders such as governmental officers, relevant ministries, civil organizations, libraries, universities, regional and international governments, the public, and the media. This publication may be freely copied or reprinted for public use purposes, however, must be respected to the owner right. For further information regarding this profile, please refer to the contact address provided as below.

MERCURY INVENTORY TEAM

1 -Eng. Helal Ali Al-Reiashi ,	Deputy General Authority for Environmental Protection
2 -Rageeb Ahmed Ali	Ministry of Social Affairs and Labor,
3- Ahmed Ali	Occupational Health and Safety
4- Abdullah Abdul Malik Numan	Ministry of Oil and Minerals
5-Dr. Showqui Aldubee	Ministry of Agriculture and Irrigation,
6- Dr. Abdel Fattah Abdul Haq Thabit	General Administration for Plant Protection
7- Eng. Abdullah Ahmed Obadi	Yemen Consumer Society
8-Dr. Yassin Abdel Warith	Ministry of Public Health and Population
9-Dr. Rashad Al-Namoos	Ministry of Public Health and Population Althorwarah Hospital
10-Dr. Abdo Al- Subari	Ministry of Oil and Minerals
11- Eng. Abdu Ahmed Sinan	Ministry of Industry and Trade
12- Dr. Ahmad Al-Aghil	Agricultural Society
13- Mehdi Morshed Tarah	Chamber of Commerce and Industry

Preface

All over history, mercury has been known and used for gold and silver processing. In many parts of the world, mercury has been used in batteries, chlor-alkali production, dental amalgam, fluorescent lights, switches, and thermometers. Much of the mercury contained in these end-of-use products.

In 2007, Yemen got assistance from the United Nations Environmental Program (UNEP) to study the mercury releases from all identified sources. In 2007, UNEP-Chemicals provided the workshop training to the inventory team from the Ministry of water and environment Environmental protection Authority (MWOE), Yemen, by indicating a specific need data and information for gathering related to mercury releases.

After training, the inventory team initiated and identified hotspot areas of possibly mercury releases sources based on local knowledge and current activities (as compared with activities mentioned in the UNEP Toolkit for identification and quantification of mercury releases, November 2005). Based on this material, the inventory team decided to select 10 provinces (including municipalities) out of 24 provinces and municipalities through the country. The inventory stage was conducted from Dec. to Feb. 2008 and then by March 2008 was the period of data entry and analysis.

The main purposes of this inventory is to produce based line information on mercury release sources, exposure routes and possible quantities released into the environment. Inventories for such releases form an important tool in the decision process of mitigating environmental impacts from the pollutants. When Yemen has decided that mercury pollution is a potential priority problem that needs to be evaluated further, it will typically need to estimate both the relative and the absolute contributions to mercury releases from the different sources present in the country. This information can be used to determine which release source types are significant and which sources should be addressed through release reduction initiatives.

Combined with additional knowledge of the specific release source types and available options for bringing about release reductions, the most cost-effective reduction measures can be identified for selection in the decision making process. Often, such inventories are also vital in the communication with stakeholders such as industry, trade and the public.

In addition, baseline information on mercury releases, and subsequent up-dates, can be used to monitor progress towards pre-set goals, and thereby identify successful approaches which could serve as examples in other areas, as well as areas where the applied measures do not prove adequate and further attention and initiative is needed.

Official Note of Chairman EPA

This mercury inventory report was the result of field survey at 10 provinces (including municipalities) and the long discussion of different stakeholders from both public and private sectors the consultation workshop in February 19-20, 2008. The inventory report team was sponsored by UNEP-Chemicals Branch.

This mercury inventory report provide based useful information for governmental ministries, private companies, civil society, and stakeholders with responsibilities for the management and using of mercury and help them in promoting improvement of human health care and environment protection in Yemen.

On behalf of the Minister, Minister of Water & Environment, I would like to express my sincere appreciation to UNEP for funding. Specials thanks for our Yemen Inventory Team provide the best outputs, hard works, and strongest commitment for mercury data collection and development of the inventory report. I'm deeply indebted for all views and comments were made by representatives of the governmental institutions, private sector and other stakeholders and all participants at a consultation workshop at the Ministry of water and environment Environmental protection Authority in Sana'a, Yemen in February 19-20, 2008 respectively.

Finally, I would like to announce that, this mercury inventory report was adopted by the Ministry of water and environment Environmental protection Authority as official baseline information for official purposes use.

**The Ministry of water and
environment Environmental
protection Authority
Director of Department of
Environmental
Pollution Control, Yemen**

Table of contents

Yemen Mercury Inventory Report	1
Preface	3
Official Speech of Chairman EPA	4
Table of contents	5
List of tables	7
List of figures	Error! Bookmark not defined.
Abbreviation	8
Summary	9
2 Preliminary inventory of mercury use and release in Yemen	10
2.1 Introduction	10
2.2 Mercury release sources identified in Yemen	10
2.3 Pre-Inventory Preparation	11
2.4 Release factors and sources	12
3 Quantification of mercury releases	13
3.1 Extraction and use of fuels/energy sources	13
3.1.1 Mineral oil - extraction, refining and use	13
3.1.2 Natural gas - extraction, refining and use	Error! Bookmark not defined.
3.1.3 Biomass	15
3.1.4 Summary of results for fuels	16
3.2 Primary metal production - small scale gold mining	16
3.3 Production of other minerals and materials with mercury impurities	17
3.4 Intentional use of mercury in industrial processes	19
3.5 Consumer products with intentional use of mercury	19
3.5.1 Thermometers with mercury	19
3.5.2 Batteries with mercury	21
3.6 Other intentional products/process uses	25

3.7	Production of recycled metals (secondary metal production)	27
3.7.1	<i>Production of recycled ferrous metal (iron and steel)</i>	27
3.7.2	<i>Production of other recycled metals</i>	27
3.8	Waste incineration	28
3.8.1	<i>Incineration of municipal/general waste</i>	28
3.8.2	<i>Incineration of medical waste</i>	29
3.9	Waste deposition/land filling and waste water treatment	30
3.9.1	<i>Controlled landfills/deposits</i>	30
3.9.2	<i>Waste water system/treatment</i>	31
3.10	Crematoria and cemeteries	31
3.11	Identification of potential hot-spots	32
3.12	Overview of the Inventory Results	32
4	Conclusion	36
5	References	38
6	Appendices	39
6.1	Appendix 1: Questionnaires used using mercury inventory activities	39
6.1.1	<i>Questionnaire to hospital and health care centre</i>	39
6.1.2	<i>Questionnaire to dental clinics</i>	40
6.1.4	<i>Questionnaire to waste disposition/landfilling</i>	42
6.1.5	<i>Questionnaire to Provincial Hospital Department</i>	43
6.1.6	<i>Questionnaire to waste disposition/landfilling Authorities</i>	43
		<i>Error! Bookmark not defined.</i>
6.1.7	<i>Questionnaire to Industry and Trade</i>	44
6.2	Appendix 2: Number of thermometers used by healthcare centers and Hospitals	45
6.3.1	<i>Number of thermometers used by surveyed health centers</i>	<i>Error! Bookmark not defined.</i>
6.4	Appendix 3: Types and quantity of batteries imported, 2005	45
6.5	Appendix 4: Number of amalgam use for dental filling	45
6.5.1	<i>Number of mercury amalgam use by surveyed 2007</i>	45
6.5.2	<i>Inventory Issue Report: Amalgam Gs Powder A Non Gamma, 250g</i>	45
6.6	Appendix 5: Number of solid wastes collected and dumped by provinces	45

List of tables

Table 1: Number of large manufactures, 2002-2005	Error! Bookmark not defined.
Table 2: Classification sources of mercury release	11
Table 3: Mercury release from energy sources category.....	16
Table 4: Estimated mercury release from gold extraction.....	Error! Bookmark not defined.
Table 5: Estimated mercury output distribution by pathway	Error! Bookmark not defined.
Table 6: Mercury release from mineral production category	17
Table 7: Mercury release from consumer product: thermometers.....	Error! Bookmark not defined.
Table 8: Mercury output distribution by pathway	21
Table 9: Mercury release from consumer product: batteries.....	23
Table 10: Mercury output distribution by pathway (batteries)	24
Table 11: Mercury release from other intentional use products category.....	26
Table 12: Mercury release from recycled metal production.....	28
Table 13: Estimated the release of mercury from waste incineration category.....	29
Table 14: Estimated mercury output distribution by pathway	Error! Bookmark not defined.
Table 15: Mercury release from waste disposal category	31
Table 16: Mercury release from cremation category	31
Table 17: Summary of mercury release from all categories	33

Abbreviation

$\mu\text{g Hg}/\text{Nm}^3$	Microgram mercury per normal metric cube
APCS	Air Pollution Control System
MHOP	Ministry of Health and Population Survey
EPA	Environmental Protection Authority
g	gram
GDP	Growth Domestic Products
GEF	Global Environmental Facilities
GoY	Government of Yemen
Hg	Mercury
LPG	Liquefied Petroleum Gas
MIMT	Ministry of Industry, and Trade
mm	Millimeter
Mn	Manganese
MoWE	Ministry of water and environment
NA	Not Available
NGOs	Non-Governmental Organizations
MoPS	Ministry of Planning & Statistics
MoAI	Ministry of Agriculture, and Irrigation
MoC	Chamber of Commerce
UNEP	United Nations Environmental Programme
VCM/PVC	Vinyle-chloride-monomer (for PVC production)/ poly-vinyle-chloride (plastic type)
WB	World Bank

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_15553

