

Kingdom of Cambodia

(2)

Ministry of Environment

Cambodia Mercury Inventory Report



MINISTRY OF ENVIRONMENT
Mercury Pilot Project
In collaboration with
UNITED NATIONS ENVIRONMENT PROGRAM (UNEP)
Chemicals Branch



MOE

Phnom Penh, February 2008



UNEP



Ministry of Environment
Department of Environmental
Pollution Control



UNEP

Cambodia Mercury Inventory Report

MINISTRY OF ENVIRONMENT
Mercury Pilot Project
In collaboration with
UNITED NATIONS ENVIRONMENT PROGRAM (UNEP) Chemicals Branch

© Ministry of Environment,
Phnom Penh, February 2008

The Cambodia Mercury Inventory Report was written by Mr. Kan Vibol, National Consultant. Technical support for the project was facilitated by the United Nation Environment Programme (UNEP) and financed by the Global Environment Facility (GEF) through a mercury pilot project with in-kind contributions from the Royal Government of Cambodia.

This report is published in Khmer and English by the Department of Environmental Pollution Control, the Ministry of Environment, the Royal Government of Cambodia to provide ground information mercury release sources and quantity in Cambodia. This report is a first outcome of the common chemicals information and data collection in the Kingdom of Cambodia.

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.

**DEPARTMENT OF ENVIRONMENTAL POLLUTION CONTROL,
MINISTRY OF ENVIRONMENT**

#48, Samdech Preah Sihanouk, Tonle Bassac, Khan Chamcar Morn,
Phnom Penh, Cambodia

Fax/Phone: **(855) 23 210 492 / (855) 23 220 392**

Email Address: **moepcd@online.com.kh**

MERCURY INVENTORY TEAM

- | | | | |
|----|-------------------|---------------------|--|
| 1. | Mr. Sarun Sambor, | Chief Officer, MoE | Project Coordinator, Ministry of Environment |
| 2. | Mr. Kan Vibol | Freeland Consultant | Ministry of Environment |
| 3. | Mr. Chap Yuthy, | Vice Chief Officer, | Member, Ministry of Environment |
| 4. | Mr. Chin Sothon, | Vice Chief Officer, | Member, Ministry of Environment |
| 5. | Mr. Phay Chanthy, | Vice Chief Officer | Member, Ministry of Environment |
| 6. | Mr. Nget Bol, | Technical staff, | Member, Ministry of Environment |
| 7. | Mr. Chap Marith, | Technical staff, | Member, Ministry of Environment |
| 8. | Mr. Ive Sophal, | Technical staff | Member, Ministry of Environment |
| 9. | Ms. Heng Heap, | Vice Chief Officer | Member, Ministry of Environment |

Official Speech of H.E. Heng Nareth

This mercury inventory report was the result of field survey at 12 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 Cambodia.

A background document entitled for preparation of the mercury inventory report is in the UNEP Toolkit for identification and quantification of mercury releases, November 2005 and the worth guidance from **H.E. Dr. Mok Mareth**, Senior Minister, Minister for the Environment.

On behalf of the My Senior Minister, Minister of Environment, I would like to express my sincere appreciation to UNEP for funding. Specials thanks for our Cambodian 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 Environment in Phnom Penh, Cambodia in February 19-20, 2008 respectively.

Finally, I would like to announce that, this mercury inventory report was adopted by the Ministry of Environment as official baseline information for official purposes use.

Phnom Penh, February 28, 2008

H.E. Heng Nareth



Advisor for the Ministry of Environment
Director of Department of Environmental
Pollution Control, Cambodia

Table of contents

Cambodia Mercury Inventory Report	2
Table of contents	1
List of tables	3
List of figures	3
Abbreviation	4
Preface	5
Summary	6
1 National Background Information	7
1.1 Country profile	7
1.1.1 <i>Physical Geography</i>	7
1.1.2 <i>Population</i>	7
1.2 Sectoral profile	7
1.2.1 <i>Agricultural profile</i>	7
1.2.2 <i>Industrial profile</i>	8
1.2.3 <i>Health Profile</i>	9
1.2.4 <i>Religious profile</i>	9
2 Preliminary inventory of mercury use and release in Cambodia	11
2.1 Introduction	11
2.2 Mercury release sources identified in Cambodia	11
2.3 Pre-Inventory Preparation	13
2.4 Release factors and sources	13
3 Quantification of mercury releases	14
3.1 Extraction and use of fuels/energy sources	14
3.1.1 <i>Mineral oil - extraction, refining and use</i>	14
3.1.2 <i>Natural gas - extraction, refining and use</i>	15
3.1.3 <i>Biomass</i>	15
3.1.4 <i>Summary of results for fuels</i>	15
3.2 Primary metal production - small scale gold mining	16
3.3 Production of other minerals and materials with mercury impurities	18
3.4 Intentional use of mercury in industrial processes	19
3.5 Consumer products with intentional use of mercury	19
3.5.1 <i>Thermometers with mercury</i>	19
3.5.2 <i>Batteries with mercury</i>	20
3.6 Other intentional products/process uses	21
3.7 Production of recycled metals (secondary metal production)	23
3.7.1 <i>Production of recycled ferrous metal (iron and steel)</i>	23
3.7.2 <i>Production of other recycled metals</i>	24
3.8 Waste incineration	24
3.8.1 <i>Incineration of municipal/general waste</i>	24
3.8.2 <i>Incineration of medical waste</i>	25
3.9 Waste deposition/land filling and waste water treatment	26
3.9.1 <i>Controlled landfills/deposits</i>	27
3.9.2 <i>Waste water system/treatment</i>	27
3.10 Crematoria and cemeteries	28
3.11 Identification of potential hot-spots	28
3.12 Overview of the Inventory Results	29
4 Conclusion	31
5 References	32
6 Appendices	33

6.1	Appendix 1: Questionnaires used using mercury inventory activities-----	33
6.1.1	<i>Questionnaire to hospital and health care centre -----</i>	<i>33</i>
6.1.2	<i>Questionnaire to dental clinics -----</i>	<i>34</i>
6.1.3	<i>Questionnaire to Gold Mining -----</i>	<i>35</i>
6.1.4	<i>Questionnaire to waste disposition/landfilling -----</i>	<i>36</i>
6.1.5	<i>Questionnaire to Provincial Hospital Department -----</i>	<i>37</i>
6.1.6	<i>Questionnaire to waste disposition/landfilling -----</i>	<i>38</i>
6.1.7	<i>Questionnaires to Gold Mining, Requested to Local Authorities -----</i>	<i>39</i>
6.1.8	<i>Questionnaire to Provincial Industry Mine and Energy Department-----</i>	<i>40</i>
6.2	Appendix 2: List of interviewed gold miners, family level-----	41
6.3	Appendix 3: Number of thermometers used by healthcare centers -----	42
6.3.1	<i>Number of thermometers used by surveyed health centers -----</i>	<i>42</i>
6.3.2	<i>Inventory Issue Report: Thermometer Oral/Rectal (Code: QB0560)-----</i>	<i>42</i>
6.4	Appendix 4: Types and quantity of batteries imported, 2005 -----	45
6.5	Appendix 5: Number of amalgam use for dental filling-----	46
6.5.1	<i>Number of mercury amalgam use by surveyed provinces, 2007-----</i>	<i>46</i>
6.5.2	<i>Inventory Issue Report: Amalgam Gs Powder A Non Gamma, 250g (Code: NI0010) -----</i>	<i>46</i>
6.6	Appendix 6: Number of solid wastes collected and dumped by provinces -----	47

List of tables

Table 1: Crops production and area, 2003-2006	8
Table 2: Number of large manufactures, 2002-2005	9
Table 3: Classification sources of mercury release	11
Table 4: Mercury release from energy sources category	16
Table 5: Estimated mercury release from gold extraction	18
Table 6: Estimated mercury output distribution by pathway	18
Table 7: Mercury release from mineral production category	18
Table 8: Mercury release from consumer product: thermometers.....	20
Table 9: Mercury output distribution by pathway	20
Table 10: Mercury release from consumer product: batteries	21
Table 11: Mercury output distribution by pathway (batteries)	21
Table 12: Mercury release from other intentional use products category.....	23
Table 13: Mercury release from recycled metal production.....	24
Table 14: Estimated the release of mercury from waste incineration category	26
Table 15: Estimated mercury output distribution by pathway	26
Table 16: Mercury release from waste disposal category	28
Table 17: Mercury release from cremation category	28
Table 18: Summary of mercury release from all categories	29

List of figures

Figure 1: Overview of crematoria chambers: general one-chamber crematoriums in rural area (top three) and common two-chamber crematorium.....	10
Figure 2: Gold mining activities and surveyed overview at gold mining site.....	17
Figure 3: Inventory team conducted mercury survey activities at dental clinic	22
Figure 4: Mercury inventory team conducted survey at health care facilities and landfills	26

Abbreviation

$\mu\text{g Hg}/\text{Nm}^3$	Microgram mercury per normal metric cube
ADB	Asian Development Bank
APCS	Air Pollution Control System
CIPS	Cambodia Intercensal Population Survey
DEPC	Department of Environmental Pollution Control
EU	European Communities
g	gram
GDP	Growth Domestic Products
GEF	Global Environmental Facilities
GoC	Government of Cambodia
Hg	Mercury
JICA	Japan International Cooperation Agency
Kg	Kilogram
KoC	Kingdom of Cambodia
LPG	Liquefied Petroleum Gas
MIME	Ministry of Industry, Mine and Energy
mm	Millimeter
Mn	Manganese
MoE	Ministry of Environment
NA	Not Available
NGOs	Non-Governmental Organizations
NIS	National Institute of Statistics
POPs	Persistent Organic Pollutants
PPM	Phnom Penh Municipality
RGC	Royal Government of Cambodia
SEDP II	Second Socio-Economic Development Plan
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_10611

