



Ministry of Environment



UNEP

# **Final Report on**

# **Mercury Wastes Management**

# **Project in Cambodia**

**Prepared by:** Project Team for Mercury Waste Management Project of  
Department of Environmental Pollution Control

**Funded by:** Government of Norway through  
SSFA by UNEP/DTIE Chemicals Branch

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# 1 PROJECT BACKGROUND

## 1.1 Generation information

- Project Title: **Project on Management of Mercury and Mercury-Containing Waste**
- Project Number: BAC:2008-NFL-2310-2630-2644-2201
- Duration: April 2009 to June 2010

## 1.2 Project Overview

This project, dealing with the management of mercury and mercury-containing waste (hereinafter called “*mercury waste management (MWM) project*”), will contribute to the UNEP priority area on *harmful substances and hazardous waste* under its *Medium Term Strategy* with the ultimate goal of minimizing the impact of harmful substances and hazardous waste to the environment and human beings. Specifically, the project supports the UNEP medium term strategy objective by reducing releases of mercury into the environment and reducing the exposure of workers and communities to mercury and mercury-containing waste.

This project was supported fund by Government of Norway through UNEP Chemicals Branch and participating countries have been known as Burkina Faso, Cambodia, Chile, Pakistan and the Philippines. This project was approval and signed on Memorandum of Understanding by Department of Environmental Pollution Control, Ministry of Environment of Cambodia as participated country with UNEP Chemical Branch in early year 2009. The starting of implementation project began April 2009 and finished in June 2010. This project was implemented by Project team of Department of Environmental Pollution Control, Ministry of Environment of the Kingdom of Cambodia.

The objectives of the project are;

1. To increase the technical capacity of participated countries and other stakeholders in assessing, managing and reducing the risks to human health and the environment posed by mercury and mercury-containing waste, and
2. Develop National Action Plan and Technical Guideline on Environmental Sound Management (ESM) of Mercury and Mercury-Containing Waste in Cambodia

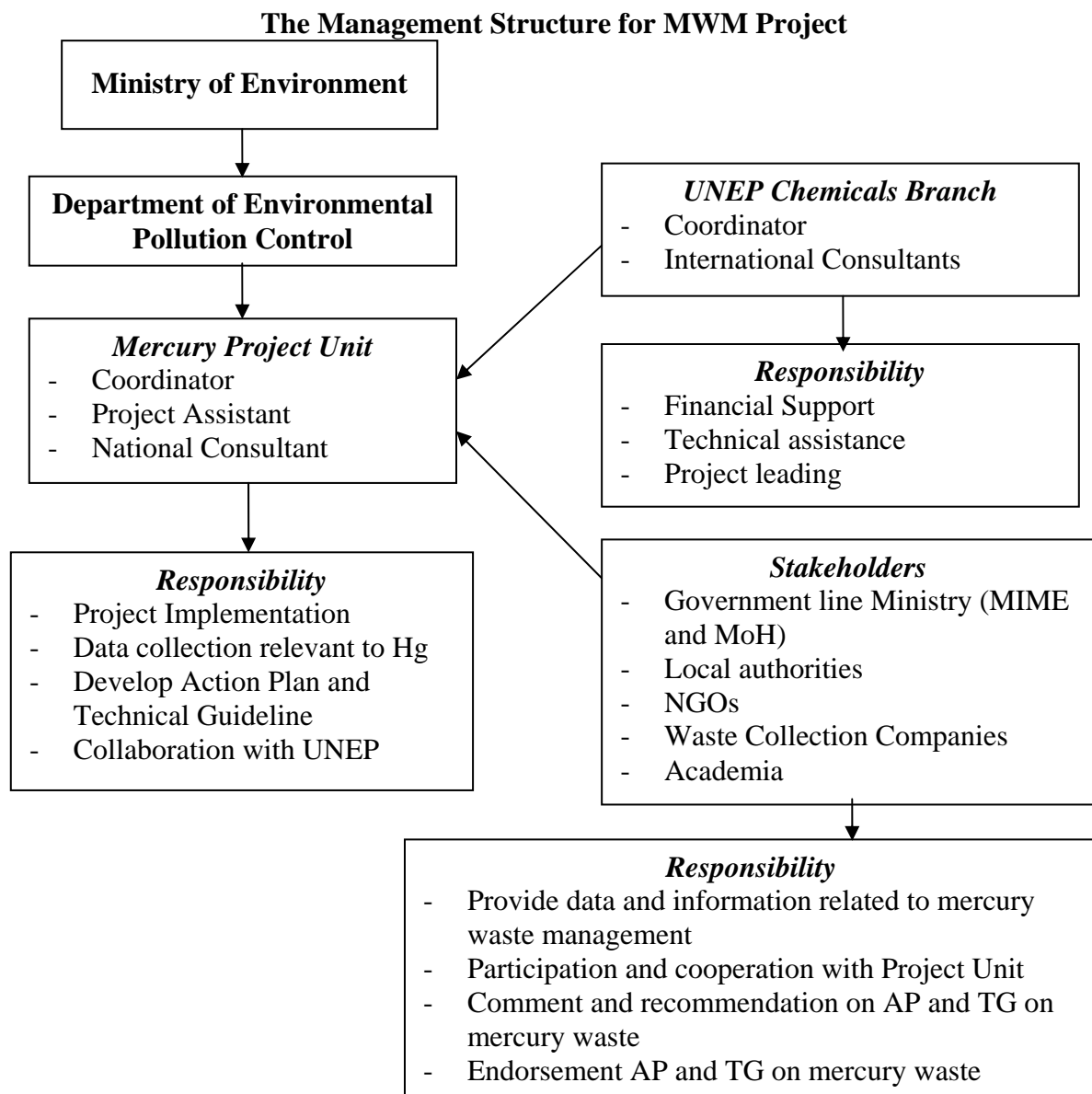
This project is comprised of the following components:

1. Review of quantitative and qualitative data from the national inventory for mercury sources;
2. Prioritization of mercury sources and the corresponding sectors;
3. Development of a national mercury waste management plan;
4. Environmentally sound management (ESM) application in selected sources and sectors;
5. Sampling and mercury analysis of environmental and human samples; and
6. Final national reports and final project report (including evaluation and lessons learned).

## 2 PROJECT MANAGEMENT STRUCTURE

The Ministry of Environment (MOE) is the lead agency for implementation of the MWM Project, where H.E. Heng Nareth, Advisor to the Ministry of Environment and the Director of the Department of Environmental Pollution Control (DEPC), is a Project Director. To undertake administrative and technical management of the project, the MOE/DEPC has assigned the Office of Solid Waste and Hazardous Substance Management (SWHSM Office) to work on as a Project Coordination Unit (PCU) to carry out day-to-day basis work.

There is a UNEP Consultant acts as a consultative body to the PCU and plays an important role in review technical papers (action plan and guideline) developed by the PCU. Beside the UNEP Consultant, there are numbers of key professional stakeholders (governmental institutions), academia, civil society organization and private sectors are participating in reviewing and adaptation of such technical papers prior submission to decision makers for approval. The management structure of the mercury waste project is shown below;



Daily works, i.e. administrative and technical, of the MWM Project is executing by the Project Coordination Unit (PCU), headed by a National Project Coordinator with the supports from a Technical Assistant, an Administrator, and a National Consultant (*See appendix 1 for person working at PCU*).

To carry out the technical work on the development of a national mercury waste management plan and a technical guideline on environmentally sound management of mercury waste, a national consultant has been engaged to perform such works. An international consultant from UNEP was also involved in providing technical assistant to PCU and national consultant to undertake this work effectively.

### 3 PROJECT ACTIVITIES HIGHLIGHTED

During the MWM project implementation period, the PCU had been done its main achieved activities including the development of a national mercury waste management plan; a technical guideline on environmentally sound management of mercury waste; collected biota and environmental samples and analysis for mercury; organized workshops and meetings, etc. In total, PCU had organized and held 02 workshops, which were attended by 80 participants invited from about 32 institutions/agencies throughout the country, mostly from the governmental institutions. Beside this, PCU members had been attended some meeting and workshops organized abroad. Nature of such meetings, trainings, and workshops are shown in the below table.

| No | Description  | Number of Participants | Number of Institutions                |
|----|--|------------------------|---------------------------------------|
| 1. | Organized an regional inception workshop on Mercury Waste Management Project, held from 04 to 06 March 2010, in Siem Reap Province, Cambodia   | 18                     | 05 Countries and UNEP Chemical Branch |
| 2. | Organized a National Workshop on “the Management of Mercury and Mercury-Containing Wastes”, held from 30 <sup>th</sup> June to 01 <sup>st</sup> July 2009, at Juliana Hotel, Phnom Penh, Cambodia  | 40                     | 30                                    |
| 3. | Attended the UNEP Global Mercury Partnership (2nd Waste Management Partnership Area) Meeting, held in Toyo, Japan, 9-10 March 2010   | 01                     | Ministry of Environment               |
| 4. | Conducted field sampling (biota and environmental samples) in North-East part of Cambodia  | 05                     | M0E and DoE, police                   |
| 5. | Conducted environmental sampling (sludge) in Phnom Penh’s main sewer systems, from to  | 07                     | M0E and Labors                        |
| 6. | Organized a Consultation Workshop to review drafts of a National Mercury Waste Management Plan and a Technical Guideline on Environmentally Sound Management of Mercury Wastes, held from 10 <sup>th</sup> -11 <sup>th</sup> June 2010, at a Meeting Room of Tonle Bassac Restaurant, Phnom Penh | 40                     | 32                                    |

| No | Description   | Number of Participants | Number of Institutions |
|----|---|------------------------|------------------------|
| 7. | Attended the UNEP Mercury Waste Project Final Workshop, held from 21 to 23 June 2010, at Aberdeen, Scotland, UK | 02                     | MoE                    |

Major activities executed within the implementation year of 2009 and 2010 are highlighted below.

## **4 ORGANIZED REGIONAL NATIONAL INCEPTION WORKSHOP**

### **4.1 Organized National Workshop on the Management of Mercury and Mercury-Containing Waste**

The Workshop on the Management of Mercury and Mercury-Containing Waste was held from 30<sup>th</sup> June to 01<sup>st</sup> July 2009 at Juliana Hotel, Phnom Penh. This workshop was participated 35 persons coming from various concerned stakeholders as the following:

- 16 people are coming from governmental line ministries including Ministry of Environment; Ministry of Agriculture, Forestry and Fisheries; Ministry of Industry, Mines and Energy; Ministry of Commerce; General Directorate of Customs; and Royal University of Phnom Penh (Department of Environmental Science) and Waste Collection Company.
- 15 people are coming from Provincial Departments and private waste collection companies such as Departments of Environment; Health; Industry, and Mine and Energy; that come from 08 provinces and 01 city, namely Municipality of Phnom Penh, Kompong Thom province, Kompong Cham province, Kandal province, Battambang province, Mondolkiri province, Oddar Meanchey province, Ratanakiri province, and Kratie province
- 02 people are coming from NGOs namely SCARO Organization and COMPED Organization, and
- 02 people are coming from private waste collection companies namely Sarom Trading Co., Ltd and Cintri Cambodia Limited.

*(See Appendix 1 and 2 regarding list of participants and workshop illustration)*

The main purposes of the national workshop on the management of mercury and mercury containing waste are the following:

- To promote institutions' awareness related to management and risk reduction on human health and environment, which are causing from mercury and its wastes,
- To encourage related institutions to participate and support in order to implement the project successfully,
- To collect information, comments and recommendation from various agencies related to the management of mercury and waste containing mercury,
- To identify potential of waste sources that containing mercury in Cambodia,
- To identify the main options of Environmentally Sound Management of waste containing mercury,
- To identify samples to analyze for mercury.

Topics were presented in the National Workshop as the following:

- Project background and purpose of the workshop,
- Background and general aspects of the project Management of Mercury and Mercury Containing Waste at the Global Level,
- Inventory Report on Mercury widespread in Cambodia,
- Summary of the Basel Convention on the Draft Technical Guidelines for Environmentally Sound Management of Mercury Wastes,
- Legislations and Implementation on Environmental Management,
- Mercury utilization and Waste Containing Mercury Management,
- The management and exploitation of natural resource,
- Situation of anarchy mining by people in O Paav, Snang Orn and Rolous areas,
- Main components for developing Action Plan and Technical Guideline on Management of Mercury and Mercury Containing Waste,

During the national workshop on the Management of Mercury and Mercury-Containing Waste, participants were divided into four groups to discuss the same topics for developing action plan and guideline for sound management of mercury and mercury-containing waste. After discussion, each group selected their representatives to present the outcomes of discussion. The outcome from each group were presented for general floor discussion in order to clarify, elaborate, and recommended for sound management of mercury and wastes containing mercury related issues. The outcomes of group discussion are summarized below.

In conclusion, feedbacks and information obtained from this workshop were used to develop Action Plan and technical guideline on Environmentally Sound Management of mercury and mercury containing waste in Cambodia.

## **4.2 Development of a National Mercury Waste Management Plan**

The Draft National Mercury Waste Management Plan was developed based on comments and results of the group discussions obtaining from the national workshop that was held in Phnom Penh (June 2009). The first draft of this action plan was developed in English version to submit to UNEP consultant for comments and the second draft was also developed by elaborating comments and feedbacks from UNEP consultants. After the second draft was elaborated, then the National Mercury Waste Management Plan was translated into Khmer version in order to send to national stakeholders for final reviewing. Then, a Consultation Workshop to review drafts of a National Mercury Waste Management Plan was organized to review and elaborate this action plan (June 2010). There are 40 participants from governmental line ministries, civil society organization, academia, and private sectors, were taken participated in this consultation workshop.

The main purpose of the National Mercury Waste Management Plan (NMWMP) is to provide the Governments of Cambodia with a way forward in her efforts to reduce the exposure of Cambodia ecosystems, fish and wildlife, and especially humans, to mercury through the prevention and reduction of anthropogenic releases of mercury to the Cambodia environment.

The ultimate goal of the NMWMP is to achieve a reduction in the anthropogenic releases of mercury wastes to the Cambodian environment, through appropriate national and provincial initiatives, to amounts that can be attributed to naturally occurring levels and fluxes. The action plan also addressed that the respected ministries intend to attain this goal by seeking to (1) Reduce mercury wastes from human activities includes the reductions of mercury wastes

from operations, products and waste streams; (2) Establish an equitable implementation and compliance regulation; and (3) Promote continued appropriate and responsible mercury management initiatives.

The National Mercury Waste Management Plan have set five main component to achieve the overall objectives of this action plan including: (1) Component 1: Mercury management in processes, operations and products; (2) Component 2: Mercury waste management approaches; (3) Component 3: Research, monitoring, modeling, assessment and inventories; (4) Component 4: Communication activities; and (5) Component 5: Implementation and compliance.

The action plan is also projected resources for the implementation of the *National Mercury Waste Management Plan (NMWMP)* which is requiring approximately **US\$2925000.00** for five year period commencing from 2011 to 2015. The action plan also mentioned about stakeholders who are involving in this action plan implementation as well as indicating governmental commitment to share her limited resources up to 20% of requirement resources need as an in kind contribution.

### **4.3 Development of a Technical Guideline on Environmental Sound Management (ESM) of Mercury Wastes**

Similar fate to the draft National Mercury Waste Management Plan, the draft of Technical Guideline on Environmentally Sound Management of Mercury Wastes was developed based on comments and results of the group discussions obtaining from the national workshop that was held in Phnom Penh (June 2009). The first draft of this technical guideline was developed in English version by a national consultant and submitted to UNEP consultant for comments, while the second draft of technical guideline was also developed by elaborating comments and feedbacks from the UNEP consultants. After the second draft was elaborated, then this technical guideline was translated into Khmer version in order to send to national stakeholders for final reviewing. A Consultation Workshop to review the final drafts of a Technical Guideline on ESM of Mercury Waste was organized to review and elaborate this technical guideline (June 2010). There are 40 participants from governmental line ministries, civil society organization, academia, and private sectors, were taken participated in this consultation workshop.

The main purpose of this technical guideline is to focusing on ESM of mercury containing products, i.e. thermometers, dental amalgam filling, and fluorescent light bulbs, using in health care facilities, households, manufacturing establishment, streets, etc. There are five main areas of consideration for ESM of mercury and mercury contaminated wastes that the technical guideline has been addressed including: (1) Guideline on the management of lamps wastes; (2) Guideline on the management of mercury wastes from dental clinics; (3) Guideline on the management of small spill of mercury; (4) Guideline on mercury waste prevention and minimization; and (5) Guideline on monitoring of mercury waste disposal sites. This technical guideline was also providing procedures to be followed by various groups including users, cleaners, waste generators, waste collectors, waste handling facilities, etc.

### **4.4 Environmental Sampling and Analysis**

In or order to get known of mercury exposure to the environment and human, the project team and lab officer has taken environmental samples from sewage system in the capital city



(Phnom Penh) and environmental and biota samples from another two provinces (Ratanakiri and Kratie Provinces). Sampling activities were taking place from January to March 2010. There are 60 samples were collected and sent for analyses in Aberdeen, Scotland. Within these 60 samples, there are 37 sludge samples were collected from artisanal and small scale gold mining (ASGM) sites, hospital and public drainage and 23 samples of human hair and nail were collected from workers at ASGM sites. Drying sludge samples (using cold-drying method) were taken place nearly two months in the laboratory of Ministry of Environment before packaging and sending to Aberdeen Lab for analyses.

#### **4.5 Consultation Workshop to review drafts of a National Mercury Waste Management Plan and a Technical Guideline on Environmentally Sound Management of Mercury Wastes**

A Consultation Workshop to review drafts of a National Mercury Waste Management Plan and a Technical Guideline on Environmentally Sound Management of Mercury Wastes, was held from 10<sup>th</sup>-11<sup>th</sup> June 2010, at a Meeting Room of Tonle Bassac Restaurant, Phnom Penh. This consultation workshop was regarded as national closure workshop for the project and it was convened by 40 persons from concerned stakeholders of relevant institutions/agencies as following:

- There were 15 persons coming from governmental line ministries such Ministry of Environment; Ministry of Agriculture, Forestry and Fisheries; Ministry of Industry, Mines and Energy; Ministry of Commerce; General Directorate of Customs; and Royal University of Phnom Penh (Department of Environment) and Waste collection Company
- There were 14 persons from Provincial Departments (Department of Environment; Health; Industry, Mines, and Energy; coming from a capital city and 08 provinces namely Phnom Penh Municipality, and Kompong Thom, Kompong Cham, Kandal, Battambang, Mondolkiri, Oddar Meanchey, Ratanakiri, and Kratie Provinces) and private waste collection companies
- There were 03 persons from NGO namely SCARO, CARDI, and Mlup Baitong Organization
- There was 01 from private waste collection company namely SAROM TRADIN Co., Ltd, and
- There was 01 academy from University of Phnom Penh

The main purposes of the Consultation Workshop to review drafts of a National Mercury Waste Management Plan and a Technical Guideline on Environmentally Sound Management of Mercury Wastes are:

- To introduce the outputs of the project in the development of a national mercury waste management plan and a technical guideline on ESM of mercury wastes,
- To request to all stakeholders to express their reflects to and comment on this two frameworks for further elaboration before submission this action plan and technical guideline to decision makers for final approval,
- To take this opportunities to disseminate these two frameworks to all stakeholders for further participating in the management of mercury and mercury containing wastes with ESM, and
- To get support from stakeholders to endorse these papers.

The outcomes from the Consultation Workshop to review drafts of a National Mercury Waste

Management Plan and a Technical Guideline on Environmentally Sound Management of Mercury Wastes were then elaborated in these two frameworks before submission to decision makers for approval. It is observed that these two papers will be got approval from the decision makers no later than quarter 3 of 2010.

## **5 LESSON LEARNED AND RECOMMENDATION**

### **5.1 Lesson learned**

There are numbers of lesson learned gained from the implementation of mercury waste project, as described below:

- Information and data retrieved from the Inventory Report on Mercury release in Cambodia have been used as references for the development of action plan and technical guideline. However, some data seem to be inappropriate for Cambodia context, because of some input factors does not reflect to national context and situation.
- There is inadequate national data and information for use to further development of action plan and other frameworks, except inventory report on mercury release,
- Capacities of project team as well as national consultant have limited regarded to mercury issues, action plan development, technical guideline development, and may be extended to further implementation of such frameworks,
- The understandings on mercury issues of participants were limited, which is resulting in limitation to their contribution information, data and comment for the formulation of technical and legal frameworks, i.e. action plan and technical guideline development,
- Language is another term of barrier for the development of any frameworks both legal technical papers, which is English and Khmer Languages shall be translated to facilitate communication at national contest and international context. It is also affecting project implementation due to limited budget provided by development partners could not cover translation fees,
- Supported fund also is limited, because other activities shall be taken including additional technical meetings, workshops, site visits to collect or gather base line information, samplings, translation, etc.

### **5.2 Recommendation**

For further effectively implementation of ESM of mercury and mercury contaminated wastes, there are number of activities shall be taken as the following:

- Full inventory on mercury release shall be taken in accompany with lab analyses which regarded as based lines data for the country,
- Capacity building on ESM of mercury and mercury-contaminated wastes shall be undertaken, especially among professional officers,
- Public awareness raising on mercury issues shall be broadly undertaken through formal and non-formal education systems and mass media,
- Least developing country like Cambodia shall be exempted from GEF policy regarding country contributions (50-50 policy). The government of Cambodia can contribute up to 20% of requirement budget for any protect implementation as an in kind contribution,

- There is a need to implement some pilot or demonstration projects reflecting to national mercury waste management plan such as retirement of mercury-based thermometers, collection of used fluorescent light bulbs, good practicing of mercury wastes in dental clinic, installment of mercury waste collection depots, awareness raising program, etc.

## 6 APPENDICES

### 6.1 *Appendix 1: Person working at PCU*

After approval and signing on MoU of the Management of Mercury and Mercury-Containing Waste, project team members had been identified and recruited to perform the following tasks:

1. Mr. Sarun Sambo, Project Coordinator,
2. Mr. Chin Sothun Project Administrator
3. Mr. Sreng Sophal Project Assistant,
4. Mr. Roath Sith Project Consultant

Communication address

Office of Solid Waste and Hazardous Substance Management

Department of Environmental Pollution Control

Ministry of Environment

#48, Street Samdech Preah Sihanouk, Tonle Bassac, Chamkarmon, Phnom Penh, Cambodia

Tel: +855 23 210 492, Fax: +855 23 987880

### 6.2 **Appendix 2: List of Participants attended National Inception Workshop, 30<sup>th</sup> June to 01<sup>st</sup> July 2009**

| No. | Name               | Position             | Institution   |
|-----|--------------------|----------------------|---|
| 1   | Mr. Phin Rady      | Chief of Office      | Department of Environmental Pollution Control, Ministry of Environment (MoE)  |
| 2   | Mr. Ly Hout        | Chief of Office      | Department of Planning and Legal Affair, (MoE)                                |
| 3   | Mr. Ou Vitou       | Vice Chief of Office | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 4   | Mr. Chin Chamroeun | Vice Chief of Office | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 5   | Mr. Nget Bol       | Official             | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 6   | Mr. Chhun Cheata   | Official             | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 7   | Mr. Khmao Mara     | Official             | Department of Environmental Data Management, (MoE)                            |
| 8   | Mr. Chhun Sophal   | Chief of Office      | Department of Environmental Impact Assessment, (MoE)                          |
| 9   | Mr. Sok Vuthea     | Vice Chief of Office | Department of Environmental Education   |
| 10  | Mr. Sieng Sotham   | Director             | Ministry of Industry, Mine and Energy   |
| 11  | Mr. Phan Oun       | Deputy Director      | Ministry of Commerce  |

| No. | Name                | Position                                | Institution  |
|-----|---------------------|---|--|
| 12  | Mr. Teum Sokphan    | Vice Chief of Office                    | General Directorate of Customs                                     |
| 13  | Mr. Vong Siv ho     | Official                                | General Directorate of Customs                                     |
| 14  | Mr. Sean Sinn       | Official                                | Ministry of Agriculture, Fishery and Forestry                      |
| 15  | Mr. Khim Nora       | Official                                | Department of Environment, Phnom Penh                              |
| 16  | Mr. Pech Sovanthyda | Vice Chairman of Dump Site, Phnom Penh. | Phnom Penh Waste Management Authority                              |
| 17  | Mr. Nem Chantha     | Chief of Office                         | Department of Industry, Mine and Energy of Kompong Thom province   |
| 18  | Ong Bunthoeun       | Deputy Director                         | Department of Environment of Kompong Thom province                 |
| 19  | Mr. Kham Sou lot    | Chief of Office                         | Department of Environment of Rattanakiri province                  |
| 20  | Mr. Thoeun Chantha  | Official                                | Department of Environment of Kompong Cham province                 |
| 21  | Mr. Soun Dy         | Director                                | Department of Industry, Mine and Energy of Kompong Cham province   |
| 22  | Mr. Chheang Sena    | Deputy Director                         | Department of Health of Kompong Cham province                      |
| 23  | Mr. Ung Vanny       | Vice Chief of Office                    | Department of Environment of Kandal province                       |
| 24  | Mr. Keat Korn       | Chief of Office                         | Department of Environment of Battambang province                   |
| 25  | Mr. Um Saran        | Deputy Director                         | Department of Industry, Mine and Energy of Mondulakiri province    |
| 26  | Mr. Heng Kheng      | Chief of Office                         | Department of Environment of Mondulakiri province                  |
| 27  | Mr. Chhorn Khantha  | Director                                | Department of Industry, Mine and Energy of Oddar Meanchey province |
| 28  | Mr. Ngor Hour       | Director                                | Department of Environment of Oddar Meanchey province               |
| 29  | Mr. Chou Sophark    | Director                                | Department of Environment of Rattanakiri province                  |
| 30  | Mr. Hun Bunthan     | Deputy Director                         | Department of Industry, Mine and Energy of Rattanakiri province    |
| 31  | Mr. Khath Sovann    | Deputy Director                         | Department of Environment of Kratie province                       |
| 32  | Mr. Hour Sophal     | staff                                   | SCARO Organization   |
| 33  | Mr. Iv Sophal       | staff                                   | COMPED Organization  |
| 34  | Thon Sereitim       | Staff                                   | Sarom Trading Co., Ltd (waste collection company)                  |
| 35  | Heap Sakun          | staff                                   | CINTRI Company (waste collection company)                          |
| 36  | Mr. Sarun Sambo     | Project Coordinator                     | Ministry of Environment  |
| 37  | Mr. Roath Sith      | Project team                            | Ministry of Environment  |

| No. | Name             | Position     | Institution             |
|-----|------------------|--------------|-------------------------|
| 38  | Mr. Sreng Sophal | Project team | Ministry of Environment |
| 39  | Mr. Chin Sothun  | Project team | Ministry of Environment |
| 40  | Mr. Siv Kong     | Secretary    | Ministry of Environment |

### 6.3 Appendix 3: Illustration of National Inception Workshop Illustration



H.E Heng Nareth, Advisor to Ministry of Environment and Director delivered opening speech in workshop



Delegates took a group photo with participants during workshop on the management of mercury and waste containing mercury, 30 June 2009



Mr. Sarun Sambo, Project coordinator presented project background and purpose of the workshop



Dr. Mario Yarto, UNEP Consultant was delivering his presentations on the management of mercury and its wastes related issues



Mr. Roath Sith, Project team member presented the of Inventory Report on Mercury widespread in Cambodia



Mr. Phin Rady, Chief, Office of Water and Soil Quality Management, Ministry of Environment, presented legislations and Implementation on environmental management related issues



Mr. Seang Sotham, Director of the Department of Geology, Ministry of Industry Mine and Energy presented on Mercury utilization and Waste Containing Mercury Management



Mr. Nem Chantha, Chief office of Department of Mine and Energy presented on situation of anarchy mining in Kompong Thom Province



Overview of group discussion on action plan development and guideline formulation for sound management of mercury

Overview of discussion on action plan development and guideline formulation for sound management of mercury



Presentation on the result of Group Discussion by each group

Presentation on the result of Group Discussion by each group

#### 6.4 Appendix 4: List of Participants attended Consultation Workshop, 10-11 June 2010

| No. | Name                 | Position                        | Institution   |
|-----|----------------------|---------------------------------|---|
| 1   | Mr. Phin Rady        | Chief Officer                   | Department of Environmental Pollution Control, Ministry of Environment (MoE)  |
| 2   | Mr. Ly Hout          | Chief Officer                   | Department of Planning and Legal Affair, (MoE)                                |
| 3   | Mr. Iv Sophol        | Officer                         | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 4   | Mr. Chap Yuthy       | Vice Chief Officer              | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 5   | Mr. Siv Kung         | Vice Chief Officer              | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 6   | Mr. Ben Bunnarin     | Chief Officer                   | Ministry of Industry, Mines and Energy  |
| 7   | Mr. Sok Vuthea       | Chief Officer                   | Ministry of Environment   |
| 8   | Mr. Pech Sathaserey  | Chief of Bureau                 | Ministry of Labor and Vocational Training                                     |
| 9   | Mr. Chea Sa vorn     | Chief Office                    | Ministry of Commerce  |
| 10  | Mr. Kong Pheach      | Department Deputy Director      | Ministry of Agriculture, Forestry and Fisheries                               |
| 11  | Mr. Heang Someth     | Officer                         | Ministry of Industry, Mines and Energy  |
| 12  | Mr. Srun Chantha     | Officer                         | Ministry of Environment   |
| 13  | Mr. Phay Chanthy     | Vice Chief Officer              | Ministry of Environment   |
| 14  | Mr. Sok Vuthea       | Vice Chief Officer              | Department of Environmental Education   |
| 15  | Mr. Chin Chamroeun   | Vice Chief Officer              | Department of Environmental Pollution Control, Ministry of Environment, (MoE) |
| 16  | Mr. Sam Phalla       | Manager                         | COMPED  |
| 17  | Mr. Thorn Sereything | Staff                           | Sarom Trading Company   |
| 18  | Mr. Seng Vang        | Department Director             | CARDI   |
| 19  | Mr. Sao Kun Chhon    | Director                        | Phnom Penh Waste Management Division  |
| 20  | Ms. Chea Eliyan      | Deputy head                     | Department of Environmental Science, Royal University of Phnom Penh           |
| 21  | Ms. Seang Soriya     | Trainer                         | Mlup Baitong Organization   |
| 22  | Mr. Tep Sinora       | Vice-Chief Officer              | Department of Environment of Preah Sihanouk province                          |
| 23  | Ms. Tout Sokhon      | Chief Officer of Administration | Provincial Health Department of Kampong Thom province                         |



| No. | Name                | Position            | Institution  |
|-----|---------------------|---------------------|--|
| 24  | Mr. Ong Bunthoeurn  | Deputy Director     | Department of Environment of Kampong Thom province             |
| 25  | Mr. Sao Soeun       | Director            | Provincial Health Department of Battambang                     |
| 26  | Mr. Choup Sarun     | Deputy Director     | Department of Environment of Battambang province               |
| 27  | Mr. Mam Rithy       | Chief Officer       | Department of Environment of Kampong Cham province             |
| 28  | Mr. Koy Sonin       | Deputy Director     | Department of Environment of Kampong Speu province             |
| 29  | Mr. Nget Yuthoeun   | Chief Officer       | Department of Environment of Bunteay Meanchey province         |
| 30  | Mr. Choung Sophal   | Officer             | Provincial Health Department of Kandal province                |
| 31  | Mr. Thor Sopheap    | Chief Officer       | Department of Environment of Kandal province                   |
| 32  | Mr. Mr. Nem Chantha | Chief Officer       | Department of Industry, Mine and Energy Kompong Thom Province  |
| 33  | Mr. Heng Kheng      | Chief Officer       | Department of Environment of Mondulkiri province               |
| 34  | Mr. Um Saran        | Deputy Director     | Department of Industry, Mine and Energy of Mondulkiri province |
| 35  | Mr. Thoeun Chantha  | Officer             | Department of Environment of Kompong Cham province             |
| 36  | Mr. Sarun Sambo     | Project Coordinator | Ministry of Environment  |
| 37  | Mr. Roath Sith      | Project Consultant  | Ministry of Environment  |
| 38  | Mr. Chin Sothun     | Secretary           | Ministry of Environment  |
| 39  | Mr. Sreng Sophal    | Secretary           | Ministry of Environment  |
| 40  | Mr. Nget Bol        | Master Ceremony     | Ministry of Environment  |

## 6.5 Appendix 5: Illustration of Consultation Workshop



H.E. EAM RA, Under Secretary of State to Ministry of Environment and Director delivered opening speech in workshop



Delegates took a group photo with participants during workshop on the management of mercury and waste containing mercury, 30 June 2009

## Mercury Waste Management Project



Mr. Roath Sith, Project team member presented the draft action plan and guideline on Mercury waste management to gather comment and revise from participants



Mr. Sarun Sambo, Project coordinator presented project background and purpose of the workshop



Activities of concerning participants provided comment and revise on the gap of draft technical guideline and national action plan on mercury management



Activities of concerning participants provided comment and revise on the gap of draft technical guideline and national action plan on mercury management



Activities of concerning participants provided comment and revise on the gap of draft technical guideline and national action plan on mercury management



Activities of concerning participants provided comment and revise on the gap of draft technical guideline and national action plan on mercury management



Activities of concerning participants provided comment and revise on the gap of draft technical guideline and national action plan on mercury management



Activities of concerning participants provided comment and revise on the gap of draft technical guideline and national action plan on mercury management

### 6.6 Appendix 6: List of Biota Samples at Gold mining area

| No. | Code Number |         | Location   | Collected Date | Sample Remark                             |
|-----|-------------|---------|------------|----------------|---|
|     | Hair        | Nail    |            |                |   |
| 1   | RMNS001     | RMNS001 | Ratanakiri | 4/1/2010       | Miner                                     |
| 2   | RMNS002     | RMNS002 | Ratanakiri | 4/2/2010       | Miner                                     |
| 3   | RMNS003     | RMNS003 | Ratanakiri | 4/3/2010       | Miner                                     |
| 4   | RPNS004     | RPNS004 | Ratanakiri | 4/1/2010       | Their family member who assist their work |
| 5   | RPHS005     | No      | Ratanakiri | 4/2/2010       | Their family member who assist their work |
| 6   | RPNS006     | RPNS006 | Ratanakiri | 4/3/2010       | Their family member who assist their work |
| 7   | KPNS007     | KPNS007 | Kratie     | 6/1/2010       | Their family member who assist their work |
| 8   | KPNS008     | KPNS008 | Kratie     | 6/1/2010       | Their family member who assist their work |
| 9   | KPNS009     | KPNS009 | Kratie     | 6/2/2010       | Their family member who assist their work |
| 10  | KMNS010     | KMNS010 | Kratie     | 6/1/2010       | Miner                                     |
| 11  | KMNS011     | KMNS011 | Kratie     | 6/1/2010       | Miner                                     |
| 12  | KMNS012     | KMNS012 | Kratie     | 6/2/2010       | Miner                                     |

### 6.7 Appendix 7: List of Soil Samples at Gold mining area

| No | Code Number | Type of Sample | Location   | Collected Date | Sample Remark  |
|----|-------------|----------------|------------|----------------|--|
| 1  | SSR001      | Soil           | Ratanakiri | 4/1/2010       | Ore  |
| 2  | SSR002      | Sludge         | Ratanakiri | 4/2/2010       | Sludge at tailing pond   |
| 3  | SSR003      | Sludge         | Ratanakiri | 4/3/2010       | Sludge at surrounding tailing pond with distance about 15 meters |
| 4  | SSK004      | Soil           | Kratie     | 6/1/2010       | Ore  |

|   |        |      |        |          |  |
|---|--------|------|--------|----------|--|
| 5 | SSK005 | Soil | Kratie | 6/1/2010 | Sludge at tailing pond   |
| 6 | SSK006 | Soil | Kratie | 6/2/2010 | Sludge at surrounding tailing pond with distance about 15 meters |

### 6.8 Appendix 8: List of Sludge Samples In Phnom Penh City

| No | Code Number | Type of Sample | Location   | Collected Date | Location of Sample    |
|----|-------------|----------------|------------|----------------|-----------------------|
| 1  | SSP007      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 2  | SSP008      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 3  | SSP009      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 4  | SSP010      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 5  | SSP011      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 6  | SSP012      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 7  | SSP013      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 8  | SSP014      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 9  | SSP015      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 10 | SSP016      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 11 | SSP017      | Sludge         | Phnom Penh | 12/1/2010      | Municipal Drainage    |
| 12 | SSP018      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 13 | SSP019      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 14 | SSP020      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 15 | SSP021      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 16 | SSP022      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 17 | SSP023      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 18 | SSP024      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 19 | SSP025      | Sludge         | Phnom Penh | 13/1/2010      | Municipal Drainage    |
| 20 | SSP026      | Sludge         | Phnom Penh | 13/1/2010      | Pachim Dental Clinic  |
| 21 | SSP027      | Sludge         | Phnom Penh | 13/1/2010      | Pachim Dental Clinic  |
| 22 | SSP028      | Sludge         | Phnom Penh | 13/1/2010      | Pachim Dental Clinic  |
| 23 | SSP029      | Sludge         | Phnom Penh | 13/1/2010      | Sokchea Dental Clinic |
| 24 | SSP030      | Sludge         | Phnom Penh | 13/1/2010      | Sokchea Dental Clinic |
| 25 | SSP031      | Sludge         | Phnom Penh | 13/1/2010      | Sokchea Dental Clinic |
| 26 | SSP032      | Sludge         | Phnom Penh | 14/1/2010      | New Landfill          |
| 27 | SSP033      | Sludge         | Phnom Penh | 14/1/2010      | New Landfill          |
| 28 | SSP034      | Soil           | Phnom Penh | 14/1/2010      | New Landfill          |
| 29 | SSP035      | Soil           | Phnom Penh | 14/1/2010      | New Landfill          |
| 30 | SSP036      | Sludge         | Phnom Penh | 14/1/2010      | Closed Dumping Site   |
| 31 | SSP037      | Soil           | Phnom Penh | 14/1/2010      | Closed Dumping Site   |