



**Report**

**of**

**Inception Workshop of National Stakeholders**

**on**

***“Management of Mercury and Mercury Containing  
Waste in Pakistan”***

**30<sup>th</sup> July, 2009, Avari Hotel, Lahore, Pakistan**

This workshop was held as a national activity under the agreement between UNEP and the Government of Pakistan and financed by the Norwegian Partnership Agreement 2008/2009, NF/4030-08-05, through Component 9 “Mercury Waste Management”

## Foreword

Mercury is highly toxic, especially to the developing nervous system. Some populations are especially susceptible, most notably the fetus and young children. Yet, mercury continues to be used in many products and processes all over the world, including in small-scale gold mining; manometers and thermometers; electrical switches; fluorescent lamps; dental amalgams, batteries and VCM (vinyl-chloride-monomer) production and some pharmaceuticals. The most significant mercury releases to the environment are emissions to air, but mercury is also released from sources directly to water and land. Important emissions sources include coal-fired power generation, waste incineration, cement, steel and chlor-alkali production, gold and other metals mining, cremation, landfills and other sources such as secondary smelting operations and industrial inorganic chemical production.

2. Once released, mercury persists in the environment where it circulates between air, water, soils and biota in various forms. Once deposited, the form can change (by microbes) to methyl-mercury, a particularly hazardous form that concentrates up food chains, especially the aquatic food chain. Most people are primarily exposed to methyl-mercury through the diet, especially fish, and to elemental mercury due to dental amalgams and occupations (such as small-scale mining). Other sources of exposure include skin-lightening creams, mercury used for ritualistic purposes and in traditional medicines, and mercury spills at home. Fish are a valuable, nutritious component of the human diet; however, mercury is a major threat to this important food supply. Elevated mercury levels have been measured in numerous fish species throughout the world. The highest levels are found in large predatory fish. Humans who consume significant amounts of contaminated fish may be at risk. Also, wildlife that rely on fish as a large part of their diet, such as otters, eagles, seals and some whales, often have elevated mercury levels.

3. Mercury is also a commodity and major consumers of mercury in Pakistan are chlor-alkali industries (Ittehad Chemicals), dental hospitals (Punjab Dental Hospital), research laboratories (Pakistan Council for Scientific and Industrial Research), medicines (pharmaceutical Industries) and imported thermometers etc. Chief chemical species in use of these industries include elemental mercury (Hg), mercurous chloride (mercury(II) chloride,  $\text{Hg}_2\text{Cl}_2$ ), mercuric chloride (mercury(I)chloride,  $\text{HgCl}_2$ ) and mercuric sulfate (mercury(II) sulphide, cinnabar,  $\text{HgS}$ ).

4. Major sources of mercury risk exposure to population of Pakistan are mining and extraction of copper, gold, coal, cement crude steel and iron. Hospitals also serve as a potential source for mercury risk to population. In Pakistan, around 250,000 tons of medical waste is produced annually from all health care facilities, imparting a bad impact on the environment by contaminating land, air, and water.

5. Mercury, its compounds and substances containing mercury are disposed off either in wastewater or sent to landfills. There is no environmentally sound management of mercury regarding its use and disposal. An extensive research work is needed to assess the status and reduce the exposure risk of mercury in Pakistan.

6. UNEP Governing Council decisions 23/9 and 24/3 calls for work to be facilitated on the promotion and development of inventories of mercury uses and releases. UNEP has taken initiatives to mitigate this problem. In this regard, UNEP had initially selected six countries including Pakistan in the Asia Pacific region to identify and quantify the mercury releases in Pakistan. On the basis of the mercury inventory project, UNEP has ultimately selected three countries in this region including Pakistan for the mercury waste project.

7. It may be recalled here that the 1<sup>st</sup> Workshop on National Consultation on Mercury was held at Islamabad in 2008 to prepare an inventory on the Mercury sources and releases in Pakistan. After the successful preparation of inventory of this project, UNEP has now recommended Pakistan along with two other regional countries to develop a Mercury Waste Management Plan.

### **Proceedings of the Workshop**

8. A National Awareness and Information exchange Workshop on Mercury Waste Management in Pakistan was organized by the International Cooperation Wing, Ministry of Environment in collaboration with United Nations Environment Programme (UNEP), Chemicals Branch on 30<sup>th</sup> July, 2009 at Avari Hotel, Lahore. The objective of the workshop was to bring together all key players to discuss the management of Mercury Waste in Pakistan while protecting the interests and welfare of people suffering from Mercury. The agenda and concept note of the workshop are attached at Annex-I and II respectively.

9. The Honorable Federal Minister for Environment, Mr. Hameed Ullah Jan Afridi, graced the opening ceremony of the workshop as chief guest. The government officials, doctors, academia, Research Institutes, representatives of Mercury using Industries, media representatives and members of civil society were present on the occasion. A total of 168 participants attended the workshop. The list of workshop participants is attached at Annex-III.

10. Ms. Yumna Sadaf, Lecturer, College of Earth and Environmental Sciences, Punjab University, Lahore, performed as anchor person at the workshop. The workshop commenced with the recitation from the Holy Quran by Mr. Rauf Ahmad, Section Officer (IC), Ministry of Environment.

11. In his welcome address, Mr. Abid Ali, Joint Secretary (International Cooperation)/ SAICM National Focal Point welcomed the chief guest and all the participants including foreign delegate. He informed the participants that Mercury was a highly toxic chemical being used all over the world including Pakistan in many products and processes such as thermometers, electrical switches, lamps, dental amalgams, batteries, chlor-alkali plants and some pharmaceuticals. He said that the United Nations Environment Programme, (UNEP) had taken initiatives to mitigate the problem. In this regard, UNEP, Chemicals Branch had initially selected six countries including Pakistan in the Asia Pacific region. He said that Inception Workshop would prove a milestone in achieving the objectives for the implementation of Mercury waste project in Pakistan. He thanked to the distinguished foreign guest, Dr. Mario Yarto, Expert, Chemicals Branch,

UNEP, Geneva who specially came to Pakistan from Mexico to share his knowledge and expertise with the national stakeholders to evolve a viable and effective strategy on the Mercury Waste Project in Pakistan (Annex-IV).

12. Dr. Mario Yarto, International Consultant, UNEP Chemicals Branch was glad to mention that he had the wonderful experience of traveling to Pakistan for the first time which also provided him an opportunity to share his knowledge and expertise with national stakeholders on the mercury issue. He provided participants with an overview of the mercury programme and related activities, highlighting the recent decision by UNEP's Governing Council (GC25) to launch negotiations on an international mercury treaty to deal with world-wide emissions and discharges of mercury; and further recommendations to accelerate actions under a voluntary Global Mercury Partnership. He noted that the GC requested the Executive Director of UNEP to convene an intergovernmental negotiating committee with the mandate to prepare a global legally binding instrument on mercury, commencing its work in 2010 with the goal of completing it prior to the twenty seventh regular session of the Governing Council/Global Ministerial Environment Forum in 2013 (Annex-V).

13. Mr. Zaigham Abbas, Technical Officer (Chemicals)/ National Project Coordinator, gave an overview of Mercury Waste Management Project. While describing the detail of the workshop, he said that Mercury was one of the serious global environmental issues. In this regard, UNEP's Governing Council had decided to assess mercury globally in 2002 and Pakistan was a part of that assessment. He further expressed that the assessment had revealed that Mercury being a toxic chemical was a potential threat to human life all over the globe. Keeping in view the gravity of the situation, UNEP's Governing Council recognized the issue and decided to make Mercury's pilot inventory projects. In this view, the 1<sup>st</sup> Workshop on National Consultation on Mercury was held at Islamabad in 2008 to prepare an inventory on the Mercury sources and releases in Pakistan. After the successful preparation of inventory of this project, UNEP, Chemicals Branch has now recommended Pakistan along with two other regional countries to develop Mercury Waste Management Plan (Annex-VI).

14. Dr Uzma Ali, Skin Specialist made the pictorial presentation and explained the mercury releases and its links with food chain (Annex-VII).

15. Dr. Rubina Mumtaz, Dental Surgeon gave presentation on the preparation of mercury use in dental amalgam and its impacts (Annex-VIII).

16. Mr. Muhmmad Masood, Chemical Engineer, Sitara Chemicals Industries described the successful story of phasing out mercury cell technology to Membrane cell technology. He also shared the experiences and explained the advantages of membrane cell technology.

17. Honourable Federal Minister for Environment, Mr. Hameed Ullah Jan Afridi, in his address as Chief Guest said that Government of Pakistan was fully committed to contribute towards the global efforts for the conservation of environment to ensure sustained life on the Earth Planet for our existing and future generations. He further said that Pakistan was a signatory to a number of international Conventions and protocols on

various environmental issues especially hazardous chemicals which included Basel Convention, Rotterdam Convention, Stockholm Convention, Vienna Convention and Montreal Protocol. He expressed that the Government of Pakistan had declared 2009 as the National Year of Environment with a view to creating awareness among all stakeholders especially the members of the civil society at grass root level and that's why for the first time in the environmental history of Pakistan, the Ministry of Environment had taken initiative with the support of the UNEP's Chemical Branch, Geneva to address the challenge of mitigation of Mercury. He urged expert from UNEP to provide technical support and guidance to address this gigantic challenge. He emphasized the need to hold a series of awareness workshops and publish awareness material to sensitize the people on the hazards of mercury. He urged the funding agencies to explore feasibility of the allocation of maximum funds for mass awareness on this toxic chemical (Annex-IX).

18. At the end of opening session, Federal Minister for Environment gave souvenir to Dr. Mario and Mr. Abid Ali, Joint Secretary (IC) to the Federal Minister for Environment. The inaugural session was also graced with photo session of the workshop participants along with Chief Guest.

19. After the opening ceremony, the first technical session of the workshop was held. Participants from different departments and institutions gave their presentations. Mr. Zaigham Abbas, Technical Officer (Chemical)/ National Project Coordinator, Ministry of Environment made a presentation on the "Current status of Mercury in Pakistan". He gave an overview of the situation in the country (Annex-X).

20. Dr. S.S. Tahir, Director General, Pakistan Council for Scientific and Industrial Research (PCSIR), Islamabad made a presentation on the "Alternatives/Substitutes of Mercury". He said that Mercury Alternatives /Substitutes should be encouraged (Annex-XI).

21. Dr. Ejaz Ahmad Khan, Instructor, Health Services Academy, Islamabad made a presentation on "Health Impacts of Mercury". He stressed to create awareness regarding the impacts of mercury on health (Annex-XII).

22. Ms. Sidra Karim, Lecturer, Environment Department, National College of Business Administration and Environment, Gulberg, Lahore, delivered a presentation on "Ground Water Contamination by Mercury and its Environmental Impacts". She identified different areas of contaminated water by mercury (Annex-XIII).

23. Engineer Colonel (Retired) Mumtaz Hussain, Editor, Monthly, The Environ Monitor Magazine, made a presentation on "Management of Mercury and Mercury containing Wastes in Pakistan". He informed about the mercury standards and waste management status of mercury in the country (Annex-XIV).

24. Dr. Mario Yarto, International Consultant, UNEP's Chemicals Branch, made a presentation on "Technical Guidelines on Environmental Sound Management (ESM) of Mercury Waste and Mercury Waste Management Project". He explained the Basel Convention guidelines and the activities of Mercury Waste Project by UNEP, Chemicals Branch (Annex-XV).

25. After presentations, questions/answers session was held, which was chaired/facilitated by Dr. Bashir Ahmad Khan, Director General (EPA, N.W.F.P), Mr. Shuja-Uddin Siddiqui, Project Director (Cleaner Production Center (CPC), Sailkot, and Dr. Aamir Ijaz, Director, Institute of Total Quality Management, University of the Pujab, Lahore. The participants of the workshop showed keen interest in that session and asked questions from the UNEP's Chemical Expert as well as from the other experts. Several participants of the workshop recommended the need to develop specific technical guidelines, such as sector specific management guidelines. Several stakeholders expressed their concern on the complexity and application of the Basel Guidelines in developing countries.

26. The second technical session of the workshop was held after the lunch break. The participants were divided into three working groups to hold discussion and formulate recommendations. The topics of discussion of the working groups were as follows:

Group I: Criteria for prioritization

Group II: Drafting of a national mercury waste management plan

Group III: Sector specific and awareness raising activities on the Technical Guidelines (TG) application

27. In those brain-storming sessions, the participants made valuable suggestions and recommendations. Based on discussions and deliberations by the working groups, Dr. S. S. Tahir, Director General, PCSIR, Islamabad, Eng. Col(R). Mumtaz Hussain, Editor, Monthly, The Environ Monitor Magazine, Ms. Farzana Altaf Shah, Director (Labs/NEQS), Pak-EPA Islamabad, delivered short presentations highlighting the suggestions made by their respective groups I,II & III respectively.

28. Pictorial glimpses of the workshop are at Annex-XVI. The event was also extensively covered in the print media. The scanned copies of the news clippings from Daily The Dawn, Daily The News and National Languages Newspapers are at Annex-XVII. The questionnaire regarding mercury awareness was distributed to the workshop participants. The responses of these questionnaires are attached at Annex-XVIII.

## **Recommendations**

**Group I: Criteria for prioritization**

### **Policies**

- Phase-out programme in existing appliances, Equipment and Industries
- Best Technical options for setting up industries /Import of new products
- Capacity building for utilization of local R&D potential.

### **Rules and regulations on Hg Import**

- Handling, Transportation, Labeling, Storage and safe disposal
- National data base for Hg -Inventory with releases on
  - Air
  - Water
  - Soil
- Monitoring of existing potential Hg sources

### **Group II: Drafting of a national mercury waste management plan**

- Identification and categorization of mercury waste
- Segregation of mercury waste at source
- Specific legislative guidelines for safe handling, storage transportation and disposal of mercury waste including fresh and existing legislations (Including Basel Convention and National instruments)
- Reuse , recycle and recovery of mercury waste
- Only certified and skilled personnel should handle the mercury waste
- Technical training of consumers of mercury products should be undertaken
- Academia and regulating bodies should include the subject “Hazardous Waste Management” in their curricula
- Capacity building of governmental and nongovernmental organizations/departments
- Rigorous implementation through EPAs/Ministry of Environment
- Monitoring and evaluation by independent monitoring agencies
- Encourage development of alternative equipment and materials
- Establish R&D centers at provincial level
- Exchange of knowledge and expertise at international level
- Encouraging mercury free interventions at national level

### **Group III: Sector specific and awareness raising activities on the Technical Guidelines (TG) application**

#### **Vision Statement**

- Awareness leads to personal protection, personal protection leads to community safety, community safety leads to proper and effective implementation of the National Mercury Waste Management Plan

#### **Goal and Objective**

- Development of a national mercury waste management plan
- Incorporation of the Basel Convention
- Use multiple points if necessary



## **Main Sectors**

- Chlor-Alkali Plants
- Health Care and Dentistry
- Landfill (municipal waste)
- Ship Breaking
- Secondary ferrous and non-ferrous metal production
- Energy sources
- Waste burning(industrial, medical)
- Cell batteries
- Lime production

## **Key Players per Sector**

- HEALTH CARE
  - Doctors
  - Nurses
  - Orderlies
  - Medical students
  - Paramedical staff
  - Hospital administrative staff
  - Sanitary workers
- INDUSTRY
  - Ministry of Industries
  - Chambers of commerce and industry
  - Labor department
  - Customs department
  - Small and Medium Enterprises Development Authority (SMEDA)
  - Local governments
  - Ministry of Environment
  - Industrial and Manufacturing units heads
  - Labor Union
- LANDFILL (Municipal Waste)
  - Project Director Solid Waste Management
  - Chief Corporation Officer Municipal Corporation – Local Governments
  - Solid Waste Management Office
  - EPAs and EPDs
  - Sanitary Workers
  - Garbage Collectors
  - NGOs

## **Possible Awareness Activities and Practices**

- PRACTICES
  - Waste minimization
  - Segregation at source
  - Handling
  - Collection
  - Storage
  - Transportation
  - Disposal

### **Awareness Tools**

- Campaigns
- Leaflets
- Brochures
- Workshops
- Banners

### **Coordination Mechanism**

- National coordination committee
- Development of sectoral specific guidelines
- Legislative and Regulatory Guidelines
- Ground level stakeholders
- Monitoring and evaluation

## **RECOMMENDATION**

- Remediation of sites contaminated with mercury
- Introduce programs for public awareness and participation
- Involvement of civil society

## **CONCLUSION**

29. At the end of the workshop, the certificates/souvenirs were distributed to the workshop participants. The workshop was formally closed with a vote of thanks by Mr. Abid Ali, Joint Secretary(IC), Ministry of Environment. He thanked all national and international stakeholders on behalf of the Ministry of Environment (IC Wing) for their active participation in the workshop which made it a useful event.

30. In nutshell, the participants of the workshop emphasized on the phase out programme in existing appliances, equipment and industries, explore best technical options for setting up industries /import of new products and enhance capacity for utilization of local research and development potential. Furthermore, the participants recommended making rules and regulation on Mercury import with special focus on handling, transportation, labeling, storage and safe disposal. It was also suggested to set

up of national data base for Mercury inventory on, air, water or soil and evolve a monitoring mechanism of existing potential Mercury sources. Several participants of the workshop recommended the need to develop specific technical guidelines, such as sector specific management guidelines. Several stakeholders expressed their concern on the complexity and application of the Basel Guidelines in developing countries.

31. In order to draft a national mercury waste management plan, it was emphasized on identification and categorization of mercury waste, segregation of mercury waste at source, formulation of specific legislative guidelines for safe handling, storage, transportation and disposal of mercury waste including fresh and existing legislations and reuse, recycle and recovery of mercury waste. The management should encourage the certified and skilled personnel to address the mercury waste issue in a befitting manner. Moreover, academia and regulating bodies should be included in the subject of “Hazardous Waste Management” in their curricula. The capacity building of governmental and nongovernmental organizations/departments will facilitate to implement the strategy in letter and spirit. The government should encourage to develop alternate equipment and materials of Mercury and support the initiative on mercury free products at national level.

32. Apart from the administrative and regulatory measures, the awareness plays pivotal role to sensitize all key players and the members of civil society to implementation National Mercury Waste Management Plan in a real sense. The possible awareness activities and practices should focus on waste minimization, segregation at source, handling, collection, storage, transportation and disposal. The main awareness campaign should be through leaflets, brochures, workshops and banners etc.

33. A questionnaire was developed and circulated among all the participants of the workshop to make an assessment on the degree of their know how on the Mercury issue. The feedback received from the participants divulged that almost all of them possessed adequate knowledge on the subject. However majority of participants had least knowledge on two issues i.e. sharing of data/experience of use of mercury in different units and best safe storage alternatives for mercury in Pakistan.