

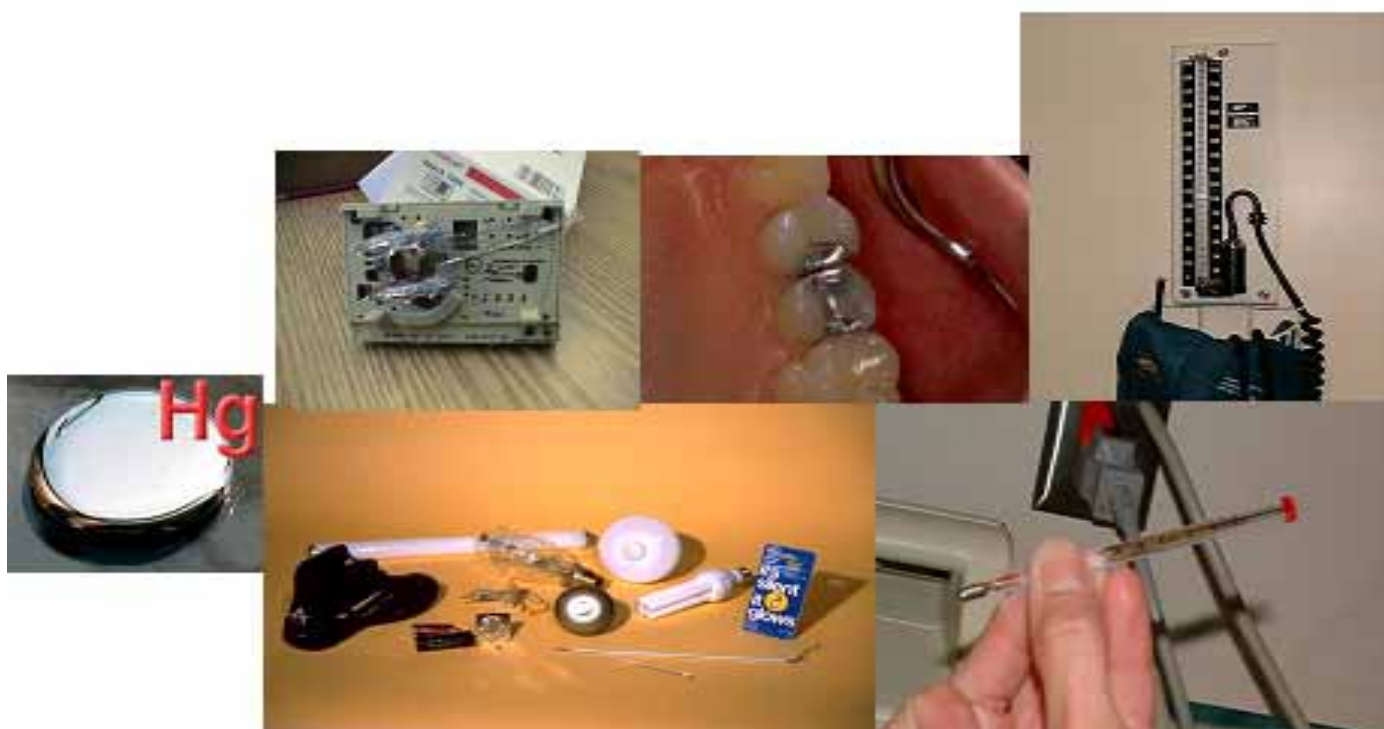


UNITED NATIONS
ENVIRONMENT PROGRAMME
DTIE - CHEMICALS BRANCH



**WORKSHOP TO REDUCE USE AND RELEASE OF MERCURY
IN PRODUCTS FOR THE ASIA PACIFIC**

**BANGKOK, THAILAND
17-19 MAY 2007**



IOMC



INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS
A cooperative agreement among UNEP, ILO, FAO, WHO, UNIDO, UNITAR and OECD



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GENEVA

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WORKSHOP OVERVIEW

EXECUTIVE SUMMARY

Introduction

The workshop was in response to the call of the United Nations Environment Program (UNEP) Governing Council (GC) 24th session, for increased efforts to address the global challenges to reduce risks from releases of mercury by reducing the global mercury demand related to use in products and production processes.

The workshop was conducted by UNEP Chemicals in coordination with the Thailand Ministry Pollution Control Department- Ministry of Environment and Natural Resources (PCD-MNRE) and with support from the United States Environmental Protection Agency (USEPA), last 17-19 May 2007 in Bangkok, Thailand. It was attended by

- 24 Governments -national focal points and representatives of the Strategic Approach to International Chemicals Management (SAICM) ; representatives from the environment , pollution control, science and technology, industry and trade, and health Ministries in the Asia Pacific (Bangladesh, Bhutan, Cambodia, China, Iran, Iraq, Japan, Kiribati, Kuwait, Laos, Malaysia, Mongolia, Myanmar, Nauru, Nepal, Oman, Palestine, Pakistan, Philippines, Qatar, Singapore, Thailand, Tuvalu) ; Canada
- 6 Non Governmental Organizations dealing with sound management of chemicals -Environmental Health Fund (EHF), Toxics Link, Basel Action Network(BAN), Sustainable Development Policy Institute (SDPI), Institute for Global Environment Strategies (IGES), Asian Institute of Technology (AIT)
- 2 Intergovernmental Organizations- World Health Organization (WHO) and the United Nations Institute for Training and Research (UNITAR); 1 from the Secretariat of the Basel Convention (SBC)
- 2 Industry organizations- National Electrical Manufacturers Association (NEMA) and the International Council of Mining and Metals (ICCM)
- Resource speakers representing other organizations- the USEPA, Mercury Policy Project (MPP), the Health Care without Harm (HCWH), the Concorde East West SPRL, the Pacific Basin Consortium for Environment Health Science , Sweden KEMI

Objectives of the workshop were to:

1. Strengthen awareness on mercury toxicology, exposure pathways, use and release in products and processes
2. Gain an understanding of mercury flow in trade as well as on mercury inventories and databases
3. Promote the exchange of information on mercury product substitution and best Management practices to reduce mercury from products
4. Present UNEP mercury programme and its current activities including partnership activities on mercury
5. Develop national and sub regional action plans aimed at reducing mercury use and release from products

Session 1: Opening of the Workshop

The workshop was opened by Mingquan Wichayarangsaridh, Deputy Director-General of Thailand PCD-MNRE at 9.30 in the morning of 17 May 2007. She welcomed participants and underscored the fact that the Government of Thailand is very supportive of UNEP work on the sound management of chemicals, including work to reduce pollution brought about by the use and release of mercury in products.

Participants were also officially welcomed by Atul Bagai, on behalf of the UNEP Regional Director for the Asia Pacific and Desiree Narvaez of UNEP Chemicals Mercury Programme. UNEP's opening remarks centered on the need for substitutes for mercury in products, considering mercury toxicity and its capacity to cycle globally. It emphasized that in considering the best way to protect human health and the environment, GC 24 had looked at two main ways forward. One approach to the global management of mercury is through partnerships, with an important partnership area being products. Partnerships are voluntary structures which provide a framework to work towards agreed objectives to reduce mercury releases to the environment. The other approach to manage mercury is a consideration of the need for a legally binding instrument. A meeting will be held later this year to start to discuss

the options for enhanced voluntary measures and new or existing legally binding instruments. UNEP requested Governments to explore the national management of mercury, and come up with national action plans focused on mercury in products, as part of workshop output.

The workshop overview and organization of activities was presented by Desiree Narvaez, and participants were asked to introduce themselves.

The opening session was moderated by Pattanan Tarin of the Thailand PCD-MNRE.

Session 2: Mercury: Toxicology, Exposure Pathways, Uses and Releases

Synthesis of presentation and highlights of discussion

The session was moderated by Hisashi Ogawa of WHO-WPR.

“Mercury Toxicology and Exposure Pathways” was presented by Irma Makalinao, Board member of the Pacific Basin Consortium for Environment and Health Sciences. The presentation covered the sources, routes of exposure, toxicity on target organs and systems of elemental, inorganic and organic mercury. The sources include mercury containing products, mining and industrial activities, waste incineration and volcanoes. Methylmercury that is bio-accumulated in fish and shellfish is a main concern in both industrialized and developing countries. Small gold/silver mining operations are also a major source in some developing countries. Mercury used in health care and the unintentional release of mercury from waste incineration poses a threat to public health. Children are particularly vulnerable to the exposure to mercury as it can affect adversely their neurodevelopment.

“Mercury Use and Releases” was presented by Michael Bender, Director of the US-based Mercury Policy Project. He stated that mercury emissions were decreasing in North America and Europe, but they are increasing in Asia. Major sources include coal combustion and waste incineration, and main users of mercury are small-scale gold mining, vinyl chloride monomer production, chlor-alkali mercury –cell plants, batteries and measuring devices. He stressed that the intentional use of mercury in products and processes is avoidable in most cases, except for lamps. The challenge for alternatives would be the costs involved. He concluded that the use of mercury could be phased out, as is being done by more industrialized countries, and that partnerships with measurable reduction goals is a good step forward, though his view is that an international agreement might be needed ultimately.

Discussions after these presentations raised the issue of the monitoring of, and trade in, mercury contaminated fish and shellfish. Capacity in developing countries needs to be developed to assess and monitor mercury contamination of fish. Regional partner organizations (UNEP Regional Office for the Asia Pacific, WHO Western Pacific Region, WHO Southeast Asia Region, Regional Food and Agriculture Organization (FAO) may support the effort of monitoring and assessment of fish contaminated with methylmercury, by building capacities of countries in the Asia Pacific Region. A proposal was made by the representative from the Sustainable Development Policy Institute (SDPI) to involve the SAARC (South Asian Association for Regional Cooperation), a regional body in South Asia, which besides South Asian Countries (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) as members also has other neighboring countries as observers. Rather than constituting a new regional body for planning/executing/supervising mercury reduction projects in the concerned South Asian countries, SAARC, established in 1985 with a well established Secretariat and Council of Ministers could be tapped to monitor such projects involving chemicals such as mercury.

Session 3: Mercury Flow in Trade and Releases from Products

Synthesis of presentation and highlights of discussion

The session was moderated by Eisaku Toda of the Japan Ministry of Environment

The **“2006 Report on Mercury Supply, Trade and Demand”** was presented by Peter Maxson, Director of the Concorde East West SPRL. The report revealed that primary mining, mercury from decommissioned chlor alkali cells, as well as by-product mercury remain significant sources of mercury supply. In terms of demand or gross consumption, the following are the highest in descending order: artisanal and small scale gold mining, vinyl chloride monomer production, chlor alkali production, batteries, dental amalgams, measuring and control devices, lighting and others. Among the regions in the world, highest demand is in East and Southeast Asia, followed by South Asia, and the EU (25 countries).

“Mercury Release from Products and Processes” was presented by Michael Bender. He reiterated the common sources of mercury release from products such as dental amalgams, measuring devices, batteries, lamps, electrical switches and relays. He underscored the fact that while mercury release is common from processes such as chlor alkali production, VCM and artisanal gold mining, mismanaged mercury waste disposal is also a significant source of mercury release.

In response to a question on US manufacturers' commitment to phase out mercury use in batteries, NEMA explained the technical challenges to achieve the commitment, but was confident that it would achieve it by 2011.

The presenters' views on the priority areas for reducing mercury use were also queried.. Peter Maxson listed a number of areas including the chlor-alkali industry, vinyl chloride monomer production and batteries. Michael Bender mentioned the health care sector as a priority area.

In response to a question about the importance of mercury use in lamps in the global mercury demand, and properties for reducing this particular use, Michael Bender observed that many countries, including European countries, USA and Australia seemed to be shifting towards fluorescent lamps for energy efficiency considerations, and that 90% of compact fluorescent lamps consumed in USA are manufactured outside the country. NEMA pointed out that life cycle consideration showed that total mercury emissions from fluorescent lamps are less than that from conventional lamps if the emission from power plant is considered, and that the further challenge would be to reduce the mercury content in lamps.

Session 4A: Mercury Inventories and Databases Synthesis of Presentations and Discussion

The session was moderated by Hanili Ghazali of the Malaysia Department of Environment.

The **“UNEP Mercury Inventory Toolkit”** was presented by Kaj Madsen from UNEP Chemicals. He highlighted the need to provide guidelines and tools to enable assessment of mercury: hence the development of the UNEP Mercury Inventory Toolkit. He informed about the importance of preparing a mercury inventory. The presentation outlined the structure of the Mercury Inventory Toolkit which provides step-wise guidance on mercury inventory development. It also presented the Mercury Inventory Pilot Project that was launched in April 2007 in Asia with five participating pilot countries in the region. The results of the pilot studies will provide useful knowledge, experience and information that could be shared with other countries and that will enable the toolkit to be reviewed and, if appropriate, improved.

“Pilot Projects on Strengthening Inventory Development and Risk Management-Decision Making for Mercury: A contribution to the Global Mercury Partnership” was presented by Brandon Turner of UNITAR. He informed about international concerns over mercury, including the UNEP Governing Council Decisions that provide strong impetus and global process for the mercury project. The Pollutant Release Transfer Registry (PRTR) was highlighted as a tool for the sound management of chemicals with three pilot projects being carried out in Chile, Ecuador and Panama. Having a mercury component in PRTRs includes development of a Hg emissions inventory report, preparatory capacity building workshop for developing a risk management assessment plan and to institutionalize mercury inventory within a national PRTR.

“Mercury Containing Products and Alternatives Databases” was presented by Maria Doa, Director, National Program Chemicals Division, Office of Pollution Prevention and Toxics, USEPA. She gave an overview of the current situation regarding mercury containing products in the US, as well as the major US processes that use them. She also informed about the drivers to achieve reductions in use of mercury in products and in process, including laws, regulatory actions, voluntary programs, consumer demands and availability of substitutes. The presentation highlighted the U.S. and Global Product and Process Demand comparison which identified reductions in the use of mercury for most of the products and process, with some exceptions in electrical lighting. It provided insight into the US experience in developing the mercury containing products and alternatives database, and emphasized the importance of countries doing something similar. Two advantages cited in the development of mercury products database are: 1) to enable evaluation of mercury in products reduction efforts and 2) to provide an outreach about mercury containing products and alternatives. This mercury product database is comprehensive in scope, covering all states and product sectors, and already incorporates the Interstate Mercury Education and Reduction Clearinghouse (IMERC) database, which is largely manufacturer's data. This US database on mercury in products will be available by end of 2007.

The representative from Cambodia noted that the UNEP toolkit did not include the estimate of mercury releases from the open burning of human corpses as a ritual burial cemetery in the case of Cambodia, where 85% are Buddhist. UNEP assured that since Cambodia is one of the pilot countries to use the UNEP toolkit, whatever experiences and learning that Cambodia will have in this regard will be incorporated into the final toolkit, which is essentially a methodology for inventory development.

A question was raised on the processes available to enable the UNEP toolkit to be updated as more data and information become available. UNEP responded pointing out that the UNEP toolkit is currently being pilot tested in 5 selected countries. Results of the pilot testing by end of 2007 will be the basis for updating the toolkit by early 2008. Further toolkit revisions will be considered in the light of experience and feedback.

The representative from Japan expressed that their experience has shown that some difficulties were encountered in estimating mercury emissions based on PRTRs because mercury releases are from impurities in coal. Japan verified if this was true for other countries present. There was no discussion that followed on PRTRs.

There was concern at reports of mercury releasing plants from the US being brought to developing countries. A query was made on a US legislation that prohibits such plants to be set up in developing countries. The US representative affirmed about the existence of such legislation but did not elaborate on the issue.

A question was made on UNEP consideration to doing the inventories on a regional basis because small countries have limited capability to do one nationally. It was emphasized by UNEP that the pilot test of the usability of the toolkit is being done at national level and the regional approach will be considered based on needs expressed at national level. Nevertheless, Governing Council 24 mandated UNEP to prepare best available emissions data to include at the regional level for presentation to GC25.

A comment was made on the capability of NGOs to help in generating data and information on mercury, in addition to their role of awareness and training activities. This was affirmed by UNEP and encouraged all stakeholders to make available data and information on mercury.

Session 4B: UNEP Mercury Programme Activities **Synthesis of presentations and highlights of discussion**

The session was moderated by John Atherton of the ICCM

The **“UNEP Mercury Programme”** was presented by Desiree Narvaez of UNEP Chemicals. The presentation provided an overview of the development of the UNEP programme which was established in 2003 in response to the Global Assessment of Mercury. The programme is aimed at assisting countries to understand and address mercury problems, including the activities that have been undertaken as a result. The programme was strengthened in 2005 and has facilitated supporting country efforts to reduce mercury pollution through its small grants programme. A further decision at the 24th Session of the UNEP Governing Council calls for further support of national and regional action plans and identified a number of priority areas for technical assistance and capacity building. GC 24/3 IV decision also calls for the development of an overarching policy framework for the UNEP Global Mercury Partnership. GC 24/3 decided further, to establish an ad hoc open-ended working group (OEWG) of Governments, regional economic integration organizations and stakeholder representatives to review and assess options for enhanced voluntary measures and new or existing international legal instruments

Participants expressed interest in the programme and requested technical and financial assistance to help address some of the priority areas. Participants acknowledged the need to update the Global Mercury Assessment in advance of the 25th UNEP Governing Council meeting.

A presentation on **“Partnerships towards Mercury Reduction on Products”** was likewise made by Desiree Narvaez of UNEP Chemicals. The presentation examined the current status of the UNEP Mercury Partnership Programme and the next steps arising from the Governing Council Decision 24/3. The Decision calls for an overarching framework for collaborative actions and the existing partnerships in artisan and small scale mining, coal combustion, the chlor-alkali sector, mercury containing products and air transport and fate research. Activities relating to mercury containing products include awareness raising, capacity building and technical assistance to countries with focus on the health care sector, schools and consumer products.

Participants noted the goal to formalise an overarching partnership framework and requested that UNEP provide information on contacts within UNEP relating to the various aspects of the Mercury Programme.

A presentation **“Mercury Waste: Synergies with the Basel Convention”** was done by Ibrahim Shaffi of the Secretariat of the Basel Convention. He gave a short introduction to the goals of the Basel Convention and the classification of mercury under this instrument. The Conference of the Parties recently mandated a new Strategic Plan Focus Area on Mercury and agreed to work in collaboration with UNEP to develop partnerships around the theme of environmentally sound management (ESM) of mercury wastes. Possible components of this plan include the development of both generic and product specific guidelines on ESM and pilot projects in selected countries looking at awareness raising and technical assistance.

Participants expressed support for the development of ESM guidelines for mercury wastes and requested the Basel Secretariat to ensure stakeholders were informed of the process and subsequent progress.

Session 5: Strategies and Approaches to Mercury Reduction in Products

Synthesis of presentations and highlights of discussion

The introductory session to the concurrent sessions was moderated by Abhay Kumar of Toxics Link India.

An **“Overview of Technology Conversions or Change Over (mercury to non-mercury containing products)”** was presented by Peter Maxson. The presentation covered the availability, feasibility and reliability of mercury free technologies in various sectors and affirmed that on all these counts, mercury free alternatives are better than the conventional ones. In contrast to what some users claim as the issue of higher costs for alternatives, Maxson said that certain factors like insufficient awareness of mercury problems and the alternatives, lack of local suppliers and general inertia in converting to newer technologies are the barriers to any change to mercury free alternatives. Costs of conversion however remain a challenge for the chlor alkali industry. Data of major global mercury uses by year 2005 was also presented highlighting the small-scale/artisan gold mining as the major user of mercury followed by vinyl chloride monomer production and then chlor-alkali production. This is followed by mercury use in batteries, dental use, measuring and control devices and lighting industries.

“Mercury Reductions Resources and Initiatives: Interstate Mercury Education and Reduction Clearinghouse (IMERC)” was presented by Maria Doa of the USEPA. The measures that US is undertaking to reduce mercury in products was highlighted, including three areas where the State initiatives were crucial in reducing mercury in products

- First, laws passed by States that require or encourage reduction of mercury in products
- Second, an innovative State-run database with a wealth of information on mercury products
- And third, some of the resources States provide to make it easier for other States and communities, and even individuals, to reduce the use of mercury in products.

Examples were cited such as laws preventing discarded mercury products from being buried in landfills or burned in waste incinerators. Laws and other regulatory measures generally pertain to labeling, bans, phase-outs, reporting by manufacturers and sellers. For example, some products in which mercury is added during manufacturing (eg fever thermometers; thermostats and measuring devices) have been banned by some states. Another law requires manufacturers and distributors to report the mercury in products, and data are centralized in the “Interstate Mercury Education and Reduction Clearinghouse” (IMERC) database.

The discussion focused on the challenges to technology change. One proposed measure is an economic incentive such as tax credits. The EU has also preferred loans for conversion to mercury free alternatives in industries.

Concurrent sessions:

Two parallel discussions were held, with the participants choosing between participating in the session dealing with strategies to reduce mercury use and release in the health as well as school sectors and the other session dealing with strategies to reduce mercury use and release in consumer products.

After the respective presentations, participants responded to the Guide Questions:

GENERAL QUESTION: What can Governments, NGOs/civil society, industry/private sector do to contribute to a reduction in mercury use and release?

- In mercury containing products in the health care and school sectors
- In mercury containing consumer products

SPECIFIC QUESTIONS:

1. Which types of policy measures (regulations, legislation, administrative issuances, guidelines, etc.) do you have in your country for regulation and control of mercury containing products, including its waste management, storage and disposal?
2. Which are the main gaps or the missing regulatory measures needed to reduce demand of mercury containing products?
3. What economic measures or incentives are needed to promote substitutes or alternatives to mercury containing products?
4. What institutional arrangements and capacities must be in place to promote substitutes or alternatives to mercury containing products?
5. What other voluntary measures and activities can be done to reduce use of mercury containing products and its associated release?

Session 5 A: Mercury Reduction in the Health Care and School Sectors
Synthesis of presentations and highlights of discussion

Group discussion was facilitated by Josh Karliner from the HCWH and Tenzin Khorlo from Bhutan.

“The World Health Organization Policy Paper on Mercury in Health Care” was presented by Hisashi Ogawa, Regional Adviser on Healthy settings and Environment, WHO Western Pacific Region. WHO supports a long term ban for use of mercury containing devices and effectively promote the use of safe alternatives. The ideal management of mercury waste in the health care setting, centered on the life cycle approach, including mercury clean up and waste handling and storage procedures was likewise presented.

“Strategies to Reduce Mercury in Health Care” were presented by Josh Karliner, Coordinator of the Health Care without Harm. Strategies include proper policy measures such as regulation to support the use of mercury containing products alternatives, shifting markets and increasing demand as well as training and education in the health care sector.

“The Swedish Experience of Eliminating Mercury in the Health and Dental Sectors” was given by Eva Sandberg of Sweden KEMI. This includes bans on the manufacture, use and trade of mercury in products. Policies on taxation of mercury containing products as well as insurance coverage for non mercury containing products also prove to be effective.

A **“Policy Paper on the Use of Mercury Containing Products in Schools”** was presented by Maria Doa of the USEPA. The tool that USEPA has recently developed on the “Chemical Management Resource Guide for School Administrators” to include the safe handling of mercury in schools was presented. The tool covers proper chemical management, such as purchasing, identification, inventorying, labeling, use, storage, security, and disposal designed to reduce the health and safety risks to students, teachers and school personnel, as well as to the environment.

“The Interagency Committee Approach to Mercury Spill in a School” was presented by Irma Makalinao. She underscored the fact that success of the spill management in a school in the Philippines was largely due to interagency effort among all Government agencies involved.

The group identified the following strategies to reduce mercury contained in products in the health care and school sectors:

Mercury in the health sector:

- Philippines: Medical Societies should be encouraged to lead in the promotion of mercury free health care
- Lao PDR: Convince policy makers on the reduction of use of mercury
- Thailand : Raise awareness of the medical professionals, educate policy makers, ban use of pesticides use in households than contain mercury ; mercury containing medical devices that are sourced out from overseas should be regulated
- Kuwait: Professional awareness and public awareness, government can subsidize for its nationals (mercury thermometer exchange)
- Iran: For the government – partial or sectoral ban of mercury; work with country office of WHO for raising awareness; for industry sectors-awareness raising, and legislation
- Pakistan: NGO can be very good in strengthening knowledge

Mercury in schools:

- Toxics Link: Awareness raising on the hazards of chemicals like mercury
- Qatar: Information on mercury handling, hazards, general action plan
- Palestine: Awareness on the use of mercury and its harmful effects
- USEPA: Chemical industries to adopt schools and train school personnel

Other Policy and Economic Measures: In addition, the participants identified other broad strategies to address mercury in products, namely:

- Technology transfer and infrastructure for disposal of mercury waste
- Need to be more selective about donated equipments that may already breakdown and therefore end up as waste
- On supply and demand- The mercury alternatives must not be expensive ;it will be good if the substitute price will come down
- Industries to set aside some funds for research on mercury free products
- Research on mercury alternatives should be funded
- Mercury containing devices exchange programs should be encouraged
- Policy makers- must balance environment and health
- Creation of national advisory committee on mercury or interagency committee will facilitate action at national and local levels

Session 5B: Mercury Reductions in Consumer Products

Synthesis of presentations and highlights of discussion

Group discussion was moderated by Joe Digangi of the Environmental Health Fund and Brandon turner of UNITAR.

“Mercury Reductions in the Electrical Product Industry” was presented by Mark Kohorst of the National Electrical Manufacturers Association (NEMA). NEMA is an umbrella organization of electrical product manufacturers, dealing with advocacy, data collection and analysis, and technical support. The presentation emphasized that non mercury containing **electrical switches and relays**, used for industrial automation and medical imaging are available in the market, and that some manufacturers intend to phase out current mercury containing products.

Mercury is still used in a variety of lamps, such as in fluorescent and high intensity discharge **lamps**. Currently, there are no available alternatives to mercury containing lamps, but there are industry initiatives to reduce mercury content in lamps. Compact fluorescent lamps are energy efficient and mercury contributes to the

efficient operation of fluorescent lamps. There is greater overall mercury reduction from lamps due to energy efficiency compared to mercury emission from coal combustion. Mercury in an enclosed lamp is harmless, but becomes a problem when the lamp breaks and the waste is mismanaged. One manufacturer is set to make available non mercury containing lamps by 2010. Eisaku Toda, of the Japan Ministry of Environment presented Japan's program on fluorescent lamp recycling. Japan's fluorescent lamp recycling services is open to other countries in the Asia Pacific Region.

"Shifting to Mercury Free Pressure Gauges" was presented by Peter Maxson. Examples of pressure gauges include barometers, manometers, and sphygmomanometers. Strategies to reduce mercury in these products include banning its sales of products containing mercury, offering subsidies for replacement devices, as well as advocacy for its non use among medical institutions.

"Mercury Reduction in Thermostats" was presented by Michael Bender. Studies including that of the University of Lowell showed that non mercury thermostats are accurate and reliable. To foster conversion, demand can be created for nonmercury thermostats, which will foster competitive pricing and eventually lower its cost. Incentives must also be provided for the sound management of waste from mercury containing thermostats. Activities of the US based thermostat recycling corporation were presented by NEMA.

"Mercury Reduction in Batteries" was presented by Mark Kohorst. In the US, the only batteries still containing mercury are the "button cell batteries". Button cell batteries are used in hearing aids, digital thermometers, insulin pumps, other medical devices, watches, toys, calculators. The National Electrical Manufacturers Association in the US has committed to phase out production of mercury containing button cell batteries in 2011.

"Mercury Use in Cosmetics for Skin Whitening" was presented by Michael Bender. The presentation highlighted the increasing popularity and unmonitored availability of mercury containing skin cream in most Asian countries. Studies documented the hazardous effects of mercury containing skin creams in some Asian countries. Some countries have banned mercury in skin products, while others have required proper labeling of products. Mr. Bender said that the 2003 EU export ban must have caused the manufacture of these mercury containing creams outside of the EU such as in Asia. Some strategies identified to address mercury containing cosmetics are: public awareness and monitoring; ban manufacture, export, import of these types of cosmetics; stringent customs rules; proper labeling of cosmetic products for the public's informed choice.

"Traditional and Ritual Uses of Mercury" was presented by Peter Maxson. The existence of mercury use in certain cultures, traditions, and rituals was highlighted. While these mercury containing products may not be a major consumer of mercury, potentially they cause health problems and can result in mercury emissions to air, wastewater, and solid waste. Some barriers to change noted are the secretive nature of activities, and the fact that often practices involving mercury are obliged by religious leaders. Strategies to reduce these products are awareness raising, working with religious leaders for them to understand the hazardous nature of the products, and the proper waste management and disposal of the products.

The group identified common capacity gaps for mercury containing products in many countries such as:

- Lack of data, knowledge, and awareness on mercury containing products as well as the importance of certain activities such as source separation and proper disposal
- Lack of capacity regarding data collection, analysis, and laboratory sampling
- Lack of infrastructure in place regarding legislation, waste management, consumer information
- For many countries the issue is management of mercury containing products and its waste rather than production or manufacture of products

The group likewise identified approaches that could be explored by countries to address to mercury containing consumer products:

- Capacity building: data collection, analysis, laboratory sampling
- Legislation and enforcement
- Green procurement, producer responsibility schemes
- Identifying primary manufacturers and reducing supply of mercury containing products
- Awareness raising and education

- Monitoring and reporting
- Waste management: source separation, identifying mercury recycling facilities
- Clearinghouse mechanism on Hg containing products and Hg free alternatives
- Establishing a regional partnership on mercury products, sharing lessons learned, recognizing synergies
- A need to share lessons learned and experiences to address this transboundary issue; current workshop is a contribution to this effort

Session 6: Sub regional Action Planning

The definition and steps to action planning was presented by Desiree Narvaez of UNEP Chemicals. An action plan describes the steps to be carried out and the implementation strategies for responding to a priority or delivering a program. An action plan should be formulated in the context of a country's political, economic and cultural situation. An action plan focused on mercury in products aims to define and put in place the necessary tools for implementation of national decisions as well as to facilitate mobilization of resources necessary to implement the plan. The following steps are the suggested steps in action planning : a) establish the context and analysis of the issue which includes a situation, gap, and stakeholder analysis b) formulate objectives c) identify relevant management options which could be legal, operational or voluntary measures d) establish the criteria for evaluation and prioritization which could include efficiency, affordability, and practicability e) evaluate and select management options to be applied f) develop the action plan implementation strategy. The implementation strategy may include proposed activities, outputs, responsibilities, performance indicators as well as resource needs. Examples to the activities in an action plan focused on mercury in products would be: inventory and reporting, public information, awareness raising and education, policy development and legislation, technological and engineering improvement, institutional arrangements and monitoring as well as proper waste management to include mercury storage and disposal.

Participants were grouped by countries and sub regions.

The following are the highlights of the sub regional group action plans:

Group 1: Laos, Cambodia, Thailand

Laos and Cambodia identify policy development or the drafting of regulations and legislation relevant to mercury in products as their priority activity. Thailand has the relevant legislation and regulatory measures in place, but it lacks the enforcement and monitoring capacity. All 3 countries identify as their priorities the following: awareness raising, doing mercury inventories, green procurement and green labeling so as to promote non mercury containing products, strengthening cooperation among relevant Government agencies, as well as the need for mercury waste management guidelines.

Group 2: Southwest Asia (Bangladesh, Bhutan, Nepal, Pakistan, Iran)

For Bangladesh and Pakistan, their priority is on the overall chemical infrastructure within their Ministries of Environment. Both countries propose a separate chemical section under the MOE with the appropriate technical staff. Bhutan and Nepal identify the need for awareness raising as well as doing mercury inventories. Iran sees the need to coordinate closely with its Ministry of Health to ban mercury containing dental amalgams as well as to reduce its total mercury imports. All countries propose technology transfer as a major strategy, capacity building of staff and personnel, as well as enhanced interagency collaboration.

Group 3: Northeast Asia (China, Japan, Mongolia)

Japan's priority activities include: improving the inventory of mercury use in products including those exported from Japan, improving the PRTR release inventory, introducing labeling for other mercury containing products such as lamps and medical devices, reviewing and updating its procurement guidelines, phasing out manufacture of mercury button cell batteries by 2011, and continuing its human and environmental monitoring. As part of international cooperation, Japan intends to extend its battery and lamp recycling activities in East Asia, establish an expert group on best available technology development and disseminate guidelines on the sound management of mercury waste, and it offers to coordinate the mercury use and release inventory. Mongolia's priorities are: to develop trade regulations, especially a possible ban on imports of mercury for use

in its booming gold industry, environmental monitoring especially as regard gold mining, strengthening of national capacities, developing voluntary agreement between Government and industry. China proposed to have regulatory controls over its vinyl chloride monomer manufacturing as well as on its lamps and button cell batteries industries, raise awareness, as well as do mercury inventories.

Group 4: Southeast Asia (Myanmar, Philippines, Singapore, Malaysia)

Myanmar's priority is drafting of regulatory measures as well as designating and training appropriate staff to handle the mercury program in the Ministry of Environment. For Malaysia and the Philippines, there is a need for regulation of imported second hand electronics containing mercury that ultimately ends up as waste that is difficult to manage. The 3 countries propose to have a stronger participation of developing countries at the World Customs Organization for a more precise classification of harmonized systems code for used products especially those containing mercury. All 3 countries also propose for a financing mechanism similar to the GEF, to enable funding relative to the mercury program. Singapore, Malaysia, Philippines, Myanmar also propose a gradual phase out of mercury containing products and promote substitutes through green procurement, providing economic incentives through tax measures, as well as enhanced information dissemination.

Group 5: West Asia (Kuwait, Qatar, Palestine, Iraq, Oman)

All 5 countries identify the need for chemical management infrastructure with identified and trained staff as their priority. They all need to identify a specific unit in the concerned Ministries that will deal specifically with chemicals such as mercury. The need for awareness raising is still strong, much more on doing mercury inventories, as well as regulatory measures such as having the appropriate labels in products.

Group 6: Pacific Islands (Tuvalu, Kiribati, Nauru)

These Pacific Islands, with limited land mass and being recipients of imported products, identify management of mercury containing waste, especially its disposal, as their top priority. Their identified common capacity gaps are in the areas of awareness and knowledge (health and environmental impact), data on mercury, regulatory measures to address mercury importation, as well as the need to amend the existing environmental law to include specific mercury management options. All three countries (Tuvalu, Kiribati, and Nauru) plan to submit project proposals aimed at reducing risks from mercury pollution in their respective countries.

WORKSHOP CONCLUSIONS:

The workshop provided a broad information base ranging from general aspects on the environment and health effects and trade in mercury to specific cases of mercury in products to bring the participants to an equal footing with regard to background information.

The workshop furthermore provided ample possibilities for networking between the mercury and SAICM focal points, and this provided possibilities for exchange of information from different countries, ministries, and NGOs; creation of synergies through the possibility to draw on a broader experience basis. This was particularly important for the drafting of national action plans where the SAICM focal points were able to provide useful information based on their experience with implementation of SAICM.

The discussions at the workshops pointed to a number of areas of importance for decreasing the use of mercury in products. These main areas were identified as follows. :

- ◆ Raising awareness of political decision makers and consumers/users of mercury
- ◆ Information exchange to include inventory development and cooperation at the regional and national level
- ◆ Capacity building to transfer and apply best management practices and new technologies on substitutes to mercury containing products
- ◆ Other identified strategies

A number of different issues were raised for the above areas:

1. **Awareness raising and advocacy**, in order to decrease demand of mercury containing products, must be targeted at
 - ◆ Political decision makers in relevant ministries in order to ensure funding of the necessary measures to decrease mercury use such as
 - the development of action plans that are targeted and costed, including action plans for disposal of waste containing mercury
 - development, implementation and enforcement of legislation such as phase-out/ban on sales and import; customs codes for products containing mercury; reporting by manufacturers and sellers
 - support the development and implementation of measures to decrease the use of mercury, such as green procurement and green labeling; producer responsibility schemes
 - identify primary manufacturers of mercury containing products and reduce the supply of mercury containing products by encouraging substitutes or alternatives
 - creation of a national advisory committee or interagency committee on mercury
 - ◆ Consumers/users of mercury in order to raise awareness on
 - the hazards and risks of mercury in products
 - alternatives to mercury containing products that are cost efficient
 - the need for proper waste management, including proper segregation, storage and waste disposal
2. **Information exchange to include inventory development** and cooperation at the regional and national level
 - ◆ Establishment of a clearing house mechanism (could be the role of UNEP) to include information on alternatives/ substitutes to mercury containing products
 - ◆ Exchange of information between countries in the region on the development of inventories on mercury use and release
 - ◆ E-forums for networking
 - ◆ Create regional cooperation based on existing structures
3. **Capacity building** to transfer and apply best management practices and new technologies on substitutes to mercury containing products
 - Technological awareness to promote substitutes to mercury containing products
 - Establishment of expert groups on Best Available Techniques
 - Application of BAT/BEP to reduce mercury emissions
 - Manpower and laboratory upgrading, especially for environmental monitoring
 - Education and training of personnel (such as school and health personnel) dealing with mercury containing products
 - Encourage research on alternatives to mercury use
4. **Other identified strategies**
 - ◆ Funding, including through UNEPs small grant programme, to support country activities on mercury;
 - ◆ Expansion of the mercury partnerships in products;
 - ◆ Economic incentives, such as tax cuts for non mercury containing products, and incentives for sound management of mercury containing waste products
 - ◆ Loans from financial institutions for conversion to mercury free alternatives in industries

Closing of the Workshop:

The workshop was officially closed at 6 in the evening of 19 May 2007 by Kaj Madsen of UNEP Chemicals. In closing, he outlined the workshop conclusions and thanked the USEPA and the host Government, Thailand for the logistical support that contributed to the success of the workshop.

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CONCEPT NOTE : MERCURY IN PRODUCTS, BANGKOK, THAILAND

I. Background and Rationale:

Partnerships

Governing Council decision 23/9 IV urges Governments, intergovernmental and non-governmental organizations and the private sector to develop and implement partnerships, in a clear, transparent and accountable manner, as one approach to reducing the risks to human health and the environment from the release of mercury and its compounds to the environment.

Partnerships, as embodied in the Rio Declaration on Environment and Development and Agenda 21 and as further developed in the Bahia Declaration on Chemical Safety, are also included among the main principles and approaches that will guide the implementation of the Strategic Approach to International Chemicals Management (SAICM), including implementation of the Global Plan of Action. Furthermore, promoting reduction of risks from mercury and other chemicals of global concern is one work area identified in the SAICM Global Plan of Action.

This workshop will focus on developing and implementing the partnerships on mercury in products.

Mercury in Products Partnerships

The UNEP Governing Council in its 24th session called for increased efforts to address the global challenges to reduce risks from releases of mercury by reducing the global mercury demand related to use in products and production processes

Objective of the products partnership is to reduce or eliminate mercury in products where effective and cost-efficient substitutes exist as well as to reduce releases during manufacturing, industrial processes and disposal. Work under this partnership includes efforts to reduce or eliminate mercury in products through exchanging information and expertise, transferring and applying best management practices, developing and improving mercury use and emission inventories, providing technical assistance in implementing mercury product substitution and reduction programs, and raising public awareness.

This workshop will build on the success of the “mercury in products” workshop conducted by the North American Commission for Environment Cooperation (CEC) for the United States Environment Protection Agency (USEPA) in Mexico, last 21-23 February 2006, with UNEP participation. That workshop brought together participants from Latin American countries and resulted in national action plans aimed at reducing mercury in products.

It also builds on the UNEP Chemicals initial work on mercury in the Asia Pacific in particular, the awareness raising workshop for the Asia Pacific Region last 26-29 April 2004 in Bangkok, Thailand that brought together 40 participants from 17 Governments and 3 NGOs, as well as the inception workshop on the mercury inventory toolkit conducted by UNEP in 10-12 April 2007 for five selected Asian countries.

In addition, this workshop also aims to promote a “buy in” of key players in the mercury in products partnership and will result in a formal organization with clearly defined objectives, strategies, and work plan.

II. Objectives:

The workshop aims to

6. Strengthen awareness on mercury toxicology, exposure pathways, use and release in products and processes
7. Gain an understanding of mercury flow in trade and on mercury inventories and databases
8. Promote the exchange of information on mercury product substitution and best management practices to reduce mercury from products
9. Promote the global partnership on mercury, particularly on products
10. Develop action plans aimed at reducing mercury use and release from products

III. Structure:

The workshop is organized with an overview of partnerships on mercury and a number of thematic sessions covering relevant issues relating to mercury in products. Generally, the sessions consist of plenary presentations followed by questions and panel discussions. Towards the end, the participants will be divided into sub regional groups and countries will have the opportunity to develop national action plans.

The aim and desired outcome for each session is as follows:

Session 1: Open the workshop; get to know the workshop participants; present the resource persons, secretariat and other organizational details; expectations of the workshop; GIVE THE participants an understanding of the policy context within which the workshop is taking place

Session 2: Present an overview of mercury toxicology and its exposure pathways

Session 3: Present an overview of the global mercury flow in trade and the main sources of mercury releases from products to the global environment

Session 4: Present methods and approaches for assessing mercury use and release in products such as mercury inventories and databases

Session 5: Present possible strategies and approaches on mercury product substitution and best management practices to reduce mercury in products

Session 6: Give participants an opportunity to discuss and review/develop action plans to address mercury pollution from products; identifying specific technical and financial needs and specific activities to address the needs

IV. Expected Output:

Knowledge and understanding of

1. UNEP Mercury Programme Governing Council mandates and its decisions relevant to mercury and the UNEP Mercury Programme
2. Mercury toxicology and exposure pathways
3. Mercury trade, supply and demand
4. Mercury inventory toolkit and other instruments for mercury release assessment
5. Strategies and approaches on mercury product substitution and best management practices to reduce mercury pollution from products
6. Global Mercury Partnership with focus on mercury in products

Developed action plans of countries addressing mercury pollution from products

V. Operating Details:

Date and venue:

This three day workshop will be conducted on 17-19 May 2007 and will be held immediately before the SAICM Asia Pacific Regional meeting scheduled on 21-23 May 2007 in Bangkok, Thailand

Target participants:

1. SAICM focal points/representatives from the 52 countries in the region, 10 NGOs
2. plus one Mercury focal point/Government representative from each of the 21 Asia mainland countries (Southeast Asia, Northeast Asia, South Asia); letters of invitation will be sent to UNEP Official Contact Points in the respective countries. **NOTE: DEADLINE FOR PRE-REGISTRATION IS 20 APRIL 2007**
3. NGOs and industry - one each from the Health and Dental Care associations, Dry cell batteries manufacturing sector, lamp manufacturing sector, Electrical switches and relay sector, Automotive vehicle and equipment manufacturing sector, thermostats manufacturing sector
4. IGOs- WHO, UNITAR

5. Other Governments- USA, Canada, Sweden

Resource speakers:

Local and international speakers to address specific issues will be tapped-Health Care without Harm (HCWH), Mercury Policy Project (MPP), Pacific Basin Consortium for Environmental Health Sciences, National Electrical Manufacturers Association (NEMA), and United States Environment Protection Agency (USEPA), Concorde East West Sprl

Funding to support participants:

Funding would be available to support participants from developing countries and countries with economies in transition. Major funding is being provided by the USEPA

Workshop Proceedings:

Proceedings, containing a report on plenary presentations and discussions, as well as national action plans will be published and made available to participants and others after the workshop has taken place. In addition, information on the global partnership of mercury in products will be made available in the UNEP Mercury Programme website.

For more information on the workshop, please contact Desiree M. Narvaez, Programme Officer, Mercury and other Metals Programme, UNEP Chemicals, Geneva, Switzerland at telephone no. +41 22 917 8865 OR Email: dnarvaez@chemicals.unep.ch

PROGRAMME OF THE WORKSHOP

Thursday 17 May 2007

08:00 – 9:30	Registration of participants	All participants
Session 1	Opening of the Workshop	<i>Moderator: Pattanan Tarin, Thailand MNRE</i>
9:30 – 9:50	Opening statements by hosts	
	Ministry of Natural Resources and Environment (MONRE), Kingdom of Thailand	Mingquan Wichayarangsaridh Deputy Director-General of Pollution Control Department MNRE, Thailand
	United Nations Environment Programme (UNEP) and Governing Council Mandates	Atul Bagai, UNEP ROAP
9:50 – 10:10	Welcome remarks and overview of the agenda	Desiree Narvaez UNEP Chemicals
10:10 – 10:30	Introduction of participants, resource persons and secretariat	All participants
10:30 – 10:50	BREAK	
Session 2	Mercury: Toxicology, Exposure Pathways, Uses and Releases	<i>Moderator: Hisashi Ogawa, WHO-WPRO</i>
10:50 – 11:10	Mercury Toxicology and Exposure Pathways	Irma Makalinao, Pacific Basin Consortium for Environmental Health Sciences
11:10 – 11:30	Mercury Uses and Releases	Michael Bender Mercury Policy Project
11:30 – 12:00	Questions and plenary discussion	
Session 3	Mercury Flow in Trade and Releases from Products	<i>Moderator: Eisaku Toda, Japan MOE</i>
12:00- 12:20	Mercury Demand, Trade, and Supply	Peter Maxson Concorde East/West

Sprl

12:20- 12:40	Mercury Releases from Products and Processes	Michael Bender Mercury Policy Project
12:40- 13:10	Questions and plenary discussion	
Session 4 A	Mercury Inventories and Databases	<i>Moderator: Hanili Ghazali, Malaysia DOE</i>
15:00-15:20	UNEP Mercury Inventory Toolkit	Kaj Madsen, UNEP Chemicals
15:20-15:40	Tracking Mercury Products and Processes: Mercury-Containing Products and Alternatives Database	Maria Doa, United States Environment Protection Agency (U.S. EPA)
15:40-16:00	Pilot Projects on Strengthening Inventory Development and Risk Management-Decision Making for Mercury : A Contribution to the Global Mercury Partnership	Brandon Turner United Nations Institute for Training and Research (UNITAR)
16:00- 16:30	Questions and plenary discussion	
16:30-16:50	BREAK	
Session 4 B	UNEP Mercury Programme Activities	<i>Moderator: John Atherton, ICCM</i>
16:50-17:10	UNEP Mercury Programme	Desiree Narvaez UNEP Chemicals
17:10-17:30	Partnerships towards Mercury Reduction in Products	Desiree Narvaez UNEP Chemicals
17:30-17:50	Synergies with the Basel Convention	Ibrahim Shafii Secretariat of the Basel Convention
17:50-18:10	Questions and plenary discussion	
18:10- 18:30	Day 1 Conclusions and Synthesis Briefing on group discussions for day 2	Kaj Madsen, UNEP Chemicals

Friday 18 May 2007

Session 5	Strategies and Approaches to Mercury Reduction in Products	<i>Moderator: Abhay Kumar, Toxics Link</i>
9:00- 9:30	Overview: Technology Conversion to Mercury-Free Alternatives	Peter Maxson Concorde East/West
9:30-10:00	Initiatives by U.S. States to Reduce Use of Mercury in Products	Maria Doa, U.S. EPA
BREAK OUT Concurrent Sessions 10:00- 16:30¹		
16:30-16:50	BREAK	
16:50- 17:10	Presentation of Discussions– Health Care and School Sectors	<i>Rapporteur: Amel Arashdan, Kuwait CAL</i>
17:10- 17:30	Presentation of Discussions- Consumer Products	<i>Rapporteur: Joseph Digangi, EHF</i>
17:30- 18:00	Plenary Discussions	Rapporteur
18:00-18:30	Day 2 Conclusions and Synthesis Briefing on group discussions for day 3	Desiree Narvaez UNEP Chemicals
Saturday 19 May 2007		
Session 6	Sub regional Group Discussions	
	Group Discussions ² on	
9:30-13:00	- country priorities relative to mercury reduction in products - next steps/action plans/concrete measures to address priorities	
13:00-15:00	LUNCH BREAK	
15:00- 17:00	Plenary presentation of group output	Group Rapporteurs
17:00-17:30	Workshop Conclusions	
17.30-18:00	Closing of Workshop	Kaj Madsen, UNEP Chemicals

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¹Please see separate sheet

² Groupings were by countries in South Asia, Southeast Asia, East Asia, Northeast Asia, West Asia, Southwest Asia, Pacific Islands

CONCURRENT SESSIONS

Session 5 A	Mercury Reduction in the Health Care and School Sectors	
10:00-10:20	Mercury in Health Care :WHO Policy Paper	Hisashi Ogawa World Health Organization (WHO)- Western Pacific Regional Office
10:20-10:40	Management of Mercury in Health Care Waste	Hisashi Ogawa World Health Organization (WHO)- Western Pacific Regional Office
10:40-11:00	Strategies to Promote Mercury Free Health Care	Josh Karliner Health Care Without Harm (HCWH)
11:00-11:20	Break	
11:20-11:40	Mercury Reductions in the Dental Sector in Sweden	Eva Sandberg Swedish Chemical Agency Sweden
11:40-12:00	Mercury Reductions in the Health Care Sector – The Swedish Experience	Eva Sandberg, Swedish Chemical Agency Sweden
12:00- 13:00	Group Discussions (regulatory, economic, educational measures)	<i>Facilitators: Tenzin Khorlo, Bhutan, Josh Karliner, HCWH</i>
13:00-14:30	Lunch Break	
14.30-14:50	Mercury Reduction in Schools: Policy Paper Initiatives in the School Sector (laboratory chemicals and equipments)	Maria Doa U.S. EPA
14.50-15:10	Mercury Spill in a School- Country experience	Irma Makalinao Philippines
15:10-16:30	Continuation of Group Discussions (regulatory, economic, educational measures)	<i>Facilitators: Tenzin Khorlo, Bhutan, Josh Karliner, HCWH</i>

Session 5 B	Mercury Reductions in Consumer Products	
10:00-10:20	Mercury Reduction in the Electrical Product Industry	Mark Kohorst National Electrical Manufacturer's Association (NEMA)
10:20-10:40	Mercury Recycling in Lamps- Country Experience	Eisaku Toda Ministry of the Environment Japan
10:40-11:00	SHIFTING TO MERCURY-FREE PRESSURE GAUGES	Peter Maxson Concorde East/West Sprl
11:00-11:20	Break	
11:20-11:40	Mercury Reduction in Thermostats	Michael Bender Mercury Policy Project
11:40-12:00	Mercury (compound) Reduction in Battery(button cell, dry cell)	Mark Kohorst National Electrical manufacturer's Association (NEMA)
12:00- 13:00	Group Discussions (regulatory, economic, educational measures)	<i>Facilitators: Sourash Mobadderi, Iran MOE Joseph DiGangi, EHF</i>
13:00-14:30	Lunch Break	
14:30-14:50	Mercury in Cosmetics	Michael Bender Mercury Policy Project
14:50- 15:10	Traditional & Ritual Uses of Mercury	Peter Maxson Concorde East/West Sprl
15:10-16:30	Continuation of Group Discussions (regulatory, economic, educational measures)	<i>Facilitators: Sourash Mobadderi, Iran MOE Joseph DiGangi, EHF</i>

OPENING STATEMENT (MNRE)



*By Mrs. Mingquan Wichayarangsaridh,
Deputy Director General of the Pollution Control Department
Ministry of Natural Resources and Environment, Thailand*

Mr. Atul Bagai, Chemicals Focal Point, UNEP Regional Office for Asia and the Pacific
Distinguished delegates, Ladies and gentlemen

It is a great pleasure for me to welcome you on behalf of the Thai government to “the Workshop to Reduce Mercury Use and Release in Products for the Asia and the Pacific” in Thailand.

Ladies and gentlemen, we all know that mercury is a serious global pollutant. It is a bioaccumulative and persistent neurotoxin that can remain active in the environment for more than ten thousands years. Mercury has caused adverse effects to the environment, wildlife as well as human. Exposure to mercury can cause irreversible damage to the brain, nerve, heart and immune system with young children being particularly vulnerable and at risk. The health effects of mercury are threatening human development at the core.

Despite of its adverse effects, mercury still has its use in a variety of application in household, medical and electrical devices and in industries. The use of mercury and other hazardous chemicals has been perceived as necessary for economic development and prosperity. However, if we can measure the economic loss and all hidden cost caused by mercury pollution such as healthcare cost, legal and compensation cost, cost of environmental remediation as well as loss of intelligence, in a long run, the sum of all these costs would many times exceed the economic benefit of using such hazardous chemical. It is beyond what we can estimate and put a number for. To give an example, it has been more than half a century since the Minamata case was recognized, the impact of that mercury poisoning incident is still continuing till today.

Ladies and gentlemen, the impact of mercury pollution is not limited to only the environment and public health issues but also extending to a wider economic and social development issue. This places the mercury pollution at high priority and absolute necessity for us as government to deal with. And because mercury can travel across boundaries, cooperation at regional, sub-regional and global level is needed.

Reducing and eliminating mercury use and release in products is one of the best and apparent approaches to control the mercury pollution at the source, so this workshop will be particularly valuable to us. Through information exchange and fruitful discussion in this workshop, I hope that we will be able to develop effective strategies and action plans to reduce and eliminate mercury use and release. And I look forward to working together as a region and cooperating with other global partners in tackling this issue.

On behalf of the Thai Government, I wish to take this opportunity to express our appreciation to the UNEP Chemicals and US. EPA. for providing support for this workshop. I would also like to thank all participants for the time and commitment to be here. And may I dedicate this contribution to his majesty King Bhumibol Adulyadej on the auspicious occasion of his 80th birthday anniversary on 5th December this year.

Finally, I wish this workshop to be successful and reach its intended outcome. I hope you continue enjoying your stay in Thailand.

Thank you.

OPENING STATEMENT (UNEP)



By Atul Bagai, UNEP Regional Office for Asia Pacific

Welcome to all

I'd like to thank all the participants who have taken the time to join us here. We look forward to a busy few days, with a lot of active discussion, as well as many interesting presentations.

I'd also like to extend thanks to the Thai government for graciously hosting us, and assisting with our practical arrangements.

Also, I'd like to thank the US EPA, whose financial support has allowed this meeting to go ahead. I would also like to extend apologies from John Whitelaw, the Deputy Head of UNEP Chemicals. He had planned to attend this workshop, but due to some last minute issues which came up, is unable to be here with us.

We are here for these few days to talk about one important chemical and its uses. Many of you will also be participating in the regional meeting on SAICM, where you will consider more general issues of chemicals management. Many chemicals are recognised as being of concern, with some in particular, like mercury, posing particular concern.

So why do we focus on mercury? Mercury has been recognised as a chemical of concern, with recommendations for global action since 2003. A prime concern about mercury is that it moves in the environment. Like persistent organic pollutants, mercury released in one location has the potential to move to remote locations. It also accumulates in the environment, and biomagnifies in the food chain. This causes problems for those at the top of the food chain, particular for people and animals who have a large amount of fish in their diet. Mercury can also move in the environment through the air, particularly with releases from coal burning power plants, and through water, which is often seen after the use of mercury in gold mining.

Of course, mercury also moves through means other than environmental transport. This week we address one such means namely mercury in products. Products containing mercury are used in a variety of products, and this workshop will provide information on the uses of mercury. The movement of these products in commerce is another important mechanism for mercury moving around the globe. One of the reasons to have a focussed workshop on mercury in products in the Asia-Pacific region is that this is the region showing the most growth currently, with innovation in design and development of products, and is therefore a key area to explore how to reduce or eliminate mercury use in these products.

So where is mercury used, and what products contain mercury – these are some of the questions we will try to answer this week. One question to ask yourself throughout this week is how we can stop using mercury in products. Do we really need the product? Does the product really need to contain mercury, or are there suitable alternatives mercury-free alternatives, which might use another chemical in place of the mercury, or might use a non-chemical means. Is the mercury only there to support a feature which is not necessary – like flashing lights in children's shoes, which are frequently powered by button-cell mercury containing batteries. If we decide for some products that the mercury is really necessary, then how to manage, use and dispose of the mercury without polluting the environment is an important issue to decide.

This was of considering how reduce mercury use by initially exploring alternatives, and considering safe management of the mercury where no alternatives can be identified is also a sound management structure for other chemicals of concern. Over the next week, there will be more opportunities to discuss the sound management of chemicals, with the overall goal that by 2020 chemicals will be managed so that there are not adverse effects to human health or the environment.

This doesn't mean we stop using chemicals, but that we consider the need for chemicals, possible chemical and non-chemical alternatives, and also consider how we use chemicals to avoid pollution or adverse health effects.

The optimal way to control mercury globally has also been discussed at the last four meetings of the Governing Council. In considering the best way to protect human health and the environment, the last meeting of the Governing Council looked at two main ways forward. One approach to the global management of mercury is through partnerships, with an important partnership area being products. Partnerships are voluntary structures which provide a framework to work towards agreed objectives to reduce mercury releases to the environment. The other approach to manage mercury consideration of the need for a legally binding instrument. A meeting will be held later this year to start to discuss the options for enhanced voluntary measures and new or existing legally binding instruments

In considering how we may decide to manage mercury globally, it will be important for governments to consider how to manage mercury nationally. The mechanisms for global management of mercury will necessarily be built on national management of mercury – whether that be via legislation, voluntary controls, or a combination of both. We will explore the national management of mercury, with a particular focus on mercury in products towards the end of the workshop, where, after having participated in the discussions on where mercury is used, what alternatives exist and how to manage mercury safely, each of you will be invited to start to prepare an action plan for managing mercury in products in your country. In this you can consider where mercury is needed, where alternatives could be substituted, and how to deal with waste mercury. I hope that developing a focussed action plan like this will also assist in preparing action plans for other chemicals, and for chemicals management in general. I also hope that the discussions we have on this topic this week will help you in developing further your sound management of chemicals.

I look forward to a productive few days, with many interesting discussions.

WELCOME REMARKS AND OVERVIEW OF THE AGENDA

By Desiree Narvaez, UNEP DTIE Chemicals Branch

Slide 1

Mercury in Products

Workshop to Reduce Mercury Use and Release in Products for the Asia Pacific

17-19 May 2007
Bangkok, Thailand

Slide 2

Mercury Pollution a Concern in Asia

- Mercury is a global issue with specific concerns in different regions
- Many Asian countries have a high reliance on coal - a significant source of mercury.
- Use of mercury in small scale gold mining a potential problem in the region
- Concern for growing manufacturers of mercury containing products in Asia
- Transboundary and long range transport mercury is a global and regional concern

Slide 3

Background

- Rio Declaration on Environment and Sustainable Development (Agenda 21)
- Bahia Declaration on Chemical Safety,
- Strategic Approach to International Chemicals Management (SAICM), including implementation of the GPA-Promoting reduction of risks from mercury and other chemicals of global concern.
- UNEP GC decision 23/9 IV: Partnerships- approach to reduce risks of mercury release

Slide 4

Mercury in Products

- The UNEP GC24/3 IV (February 2007) :called for increased efforts to address the global challenges to reduce risks from releases of mercury by **reducing the global mercury demand related to use in products and production processes.**
- Mercury in products partnerships
General objective:
To reduce or eliminate mercury in products where effective and cost-efficient substitutes exist as well as to reduce releases during manufacturing, industrial processes and disposal.

Slide 5

Mercury in Products Partnerships

- exchange of information and expertise
- transfer and application of best management practices
- developing and improving mercury use and emission inventories
- providing technical assistance in implementing mercury product substitution and reduction programs
- increasing awareness

Slide 6

WORKSHOP BUILDS UPON

- North American Commission for Environment Cooperation (CEC) in Mexico, last 21-23 February 2006
- UNEP Chemicals awareness raising workshop for the Asia Pacific Region last 26-29 April 2004, Bangkok, Thailand
40 participants from 17 Governments and 3 NGOs
- Inception workshop on the mercury inventory toolkit conducted by UNEP last 10-12 April 2007

Slide 7

Objectives and Expected Output

Knowledge and understanding of

- UNEP Mercury Programme Governing Council mandates, its decisions relevant to mercury and current activities
- Mercury toxicology and exposure pathways, use and release
- Mercury supply, trade and demand
- Mercury inventory toolkit and other instruments for mercury release assessment
- Strategies and approaches on mercury product substitution and best management practices to reduce mercury pollution from products
- National action plans addressing mercury in products

PRESENTATIONS AT THE WORKSHOP

MERCURY TOXICOLOGY AND EXPOSURE PATHWAYS

By Irma Makalinao, Pacific Basin Consortium for Environmental Health Sciences

United Nations Environmental Programme
Bangkok, Thailand
May 17-19, 2007

**MERCURY Toxicology and
Exposure Pathways**

Professor Irma R. Makalinao, MD FPPS FPSCOT
Pacific Basin Consortium for Environment and Health Sciences



Children's Health and the Environment
WHO Training Package for the Health Sector
World Health Organization
www.who.int/ceh

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Mercury and Children's Environmental Health

OVERVIEW

- ❖ Environmental origin, transport and fate
- ❖ Routes of exposure
- ❖ Toxicokinetics
- ❖ Toxicodynamics
- ❖ Target organs/systems
- ❖ Treatment
- ❖ Prevention

9/10/2007

2

Mercury and Children's Environmental Health

ORIGIN

- ❖ One element
- ❖ 3 species
 - Elemental
 - Inorganic
 - Organic
- ❖ Different toxicity profiles!

Los Alamos National Laboratory Chemistry Division

Periodic Table of the Elements

Los Alamos CHEMISTRY

element names in blue are liquids at room temperature
element names in red are gases at room temperature
element names in black are solids at room temperature

9/10/2007

pearl1.lanl.gov/periodic/default.htm

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Mercury and Children's Environmental Health

ENVIRONMENTAL SOURCES OF EXPOSURE

- ❖ Chloralkali production
- ❖ Artisanal gold and silver mining
- ❖ Mercury mining, smelting and use
- ❖ Burning fossil fuels
- ❖ Waste incinerators
- ❖ Volcanoes



Goldman, Pediatrics (2001) 108:197

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9/10/2007

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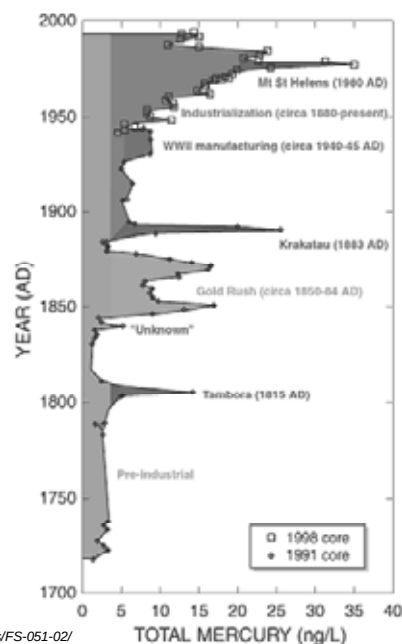
Mercury and Children's Environmental Health

A man made problem

Major atmospheric releases detected in the ice core

- Natural background
- Volcanic
- Gold rush
- World War II
- Industrialization

Hg released in the last 100 years: 70% man made



9/10/2007

<http://toxics.usgs.gov/pubs/FS-051-02/>

Mercury and Children's Environmental Health

A LARGE ENVIRONMENTAL PROBLEM

- ❖ In small scale gold mining areas Hg is used to extract gold from ore (amalgamation process)
- ❖ 1 to 2 kg of Hg are used to process 1 kg of gold
- ❖ Most Hg is released into the environment (soil, air, water)
- ❖ More than 50% workers have high levels
- ❖ ...and their children?



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Mercury and Children's Environmental Health

Continent	Stationary Combustion	Pig iron & steel production	Cement production	Waste disposal	Non-ferrous metal production	Artisanal gold mining	Sum quantified sources
Europe	186	10	26	12	15		250
Africa	197	0.5	5.2		7.9		210
Asia	860	12	82	33	87		1075
North America	105	4.6	13	66	25		210
South America	27	1.4	5.5		25		60
Australia & Oceania	100	0.3	0.8	0.1	4.4		105
Sum, quantified sources 1995	1470	30	130	110	170		~1900
Worldwide						300-100	

Drasch, Wiley VHC, Verlag, 2004, all data in metric tons

9/10/2007

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Mercury and Children's Environmental Health

TRANSPORT: GLOBAL CYCLE OF MERCURY



Hg is emitted into the atmosphere and circulated globally

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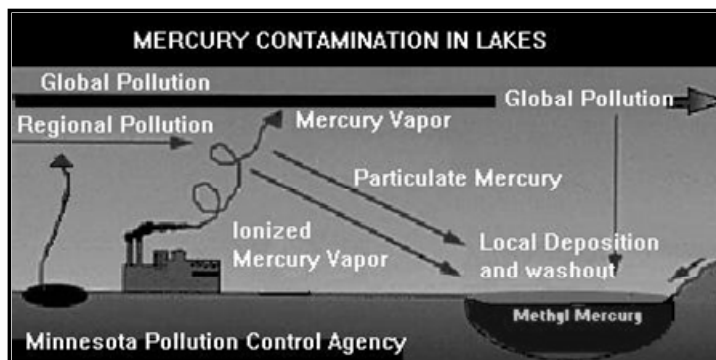
EPA

EPA

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TRANSPORT: GLOBAL CYCLE OF MERCURY



Ultimately enters water bodies and deposits

- ❖ Close to source
- ❖ Long distance from source → global pollution

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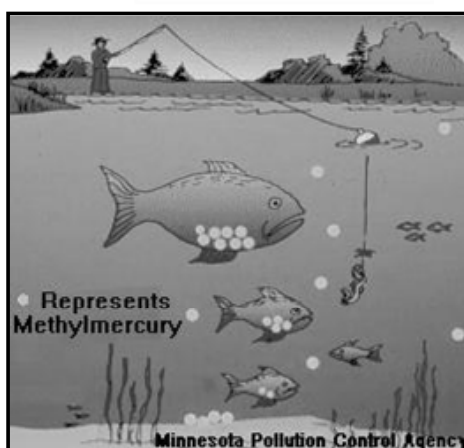
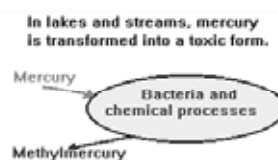
9

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FATE

Metabolic conversion and bio-accumulation through "food-chain"

- ❖ Hg in sediments converts into methyl-mercury (MeHg)
- ❖ MeHg enters the aquatic food chain: fish, marine and freshwater
- ❖ MeHg uptake by humans through fish consumption



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ELEMENTAL (METALLIC) MERCURY – "QUICKSILVER"

Sources of exposure

❖ Environmental:

- Volcanic explosions, rock weathering, degassing

❖ Anthropogenic inadvertent:

- Combustion: fossil fuels (coal), waste incineration
- Industrial: gold/silver mining, chloralkali plants, batteries, switches, fluorescent lights, thermometers, sphyngomanometers

❖ Anthropogenic intentional:

- Dental amalgams
- Ritual and folk-medicine use

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ELEMENTAL MERCURY - QUICKSILVER

Routes of exposure

- ❖ Inhalation (volatile at room temp): 75-85% absorption
- ❖ Ingestion and skin: almost no absorption

Elimination

- ❖ Urine and Feces

Toxicity

- ❖ Lungs, eyes, gingival, skin
- ❖ Also: Central nervous system, kidneys, immune system

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INORGANIC MERCURY

Sources of Exposure

❖ **Environmental**

- None

❖ **Industrial products**

- Vapor lamps, embalming,
- Photography
- Latex paint (pre 1990s)
- Disinfectants, antimicrobials
- Alternative medicines, cosmetics

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INORGANIC MERCURY

Routes of Exposure

- ❖ Ingestion - 10% absorbed
- ❖ Skin - can be high and deadly

Elimination

- ❖ Renal

Toxicity

- ❖ Primary: kidneys, gastrointestinal tract
- ❖ Secondary: Central nervous system

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ORGANIC MERCURY

Sources of Exposure

- ❖ Environmental conversion:
 - Fish and shellfish (methyl-mercury)
- ❖ Industrial production:
 - Fungicides, bactericides (phenylmercury)
 - Vaccine preservatives (thimerosal)

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ORGANIC MERCURY

Routes of Exposure

- ❖ Gastrointestinal - rapid & complete absorption
- ❖ Parenteral - 100% absorbed
- ❖ Transplacental – Bioconcentrated

Elimination

- ❖ Feces- $T_{1/2}$ 45 to 70 days in adults

Toxicity

- ❖ Primary: Central nervous system
- ❖ Secondary: Cardiovascular

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Mercury	Sources	Routes of exposure	Elimination	Toxicity
Elemental (metallic)	Volcanoes Combustion Waste incineration Thermometers Amalgams Folk remedies	Inhalation	Urine and faeces	CNS Kidney Lungs Skin (Acrodynia in children)
Inorganic (mercuric chloride)	Lamps Photography Disinfectants Cosmetics Folk medicine	Ingestion Dermal	Urine	CNS Kidney GI tract Skin (Acrodynia in children)
Organic (methyl; ethyl)	Fish Fungicides Preservatives	Ingestion Parenteral Transplacental	Faeces	CNS Cardiovascular

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MERCURY: ACRODYNIA

Uncommon syndrome "Pink disease":

- ❖ Pain in the extremities
- ❖ Pinkish discoloration and desquamation
- ❖ Hypertension
- ❖ Sweating
- ❖ Insomnia, irritability, apathy

Considered as idiosyncratic reaction.

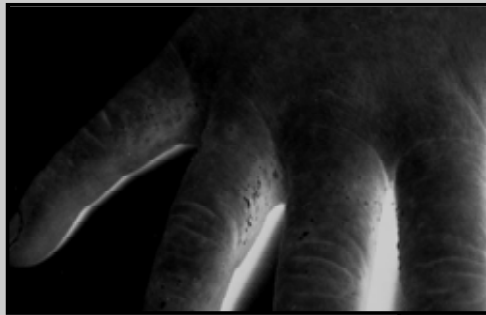
Schwarz,



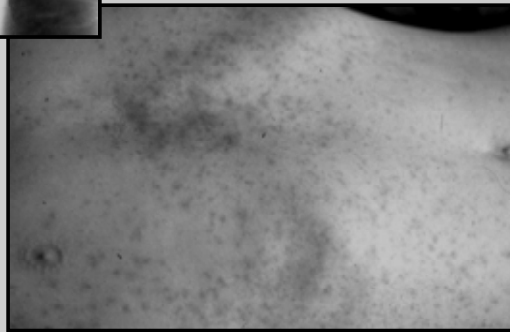
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v. Muhlendahl

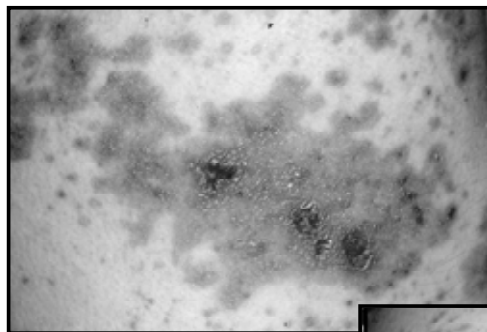


v. Muhlendahl

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Muhlendahl



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CHILD EXPOSURE IN INDUSTRIALIZED COUNTRIES

❖ Methylmercury

- Consumption of contaminated fish & shellfish
- Emitted to atmosphere by electric generation
- Transplacental
- Breast milk

❖ Ethylmercury

- Thimerosal

❖ Elemental - vapors

- Ritual and folk-medicine use
- Amalgam (minor source)

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CHILD EXPOSURE IN DEVELOPING COUNTRIES

❖ “Occupational” exposures from gold/silver mining

❖ Regional cultural uses

❖ Eating contaminated fish

High exposure may cause overt symptoms



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MERCURY: TOXIC EFFECTS

- ❖ **Neurotoxicity**
- ❖ **Nephrotoxicity**
- ❖ **Teratogenicity:** MeHg is a teratogen (Minamata disease)
- ❖ **CVS:** elevated risk of heart attack, hypertension
- ❖ **Carcinogenicity:** MeHg is a possible human carcinogen
- ❖ **Mutagenesis:** Hg seems not to be mutagen
- ❖ **Reproduction:** no clear evidence of effect
- ❖ **Immunotoxicity:** under scientific discussion

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PEDIATRIC EXPOSURE - FISH

- ❖ **Major source of mercury burden for children in most countries**
- ❖ **Fish may contain methyl-mercury**
- ❖ **Children exposed**
 - By eating fish
 - Transplacentally
 - Via breast milk



Rice field in the Philippines, irrigated with tailing sediments containing mercury

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METHYLMERCURY LEVELS IN FISH

Ocean Fish with high levels of mercury

Species	Mercury concentration (PPM)				N° of samples
	Mean	Median	Min	Max	
Mackerel King	0.73	NA	0.23	1.67	213
Shark	0.99	0.83	ND	4.54	351
Swordfish	0.97	0.86	0.10	3.22	605
Tilefish	1.45	NA	0.65	3.73	60

www.cfsan.fda.gov/~frf/sea-mehg.html

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METHYLMERCURY LEVELS IN FISH

Typical average mercury concentration in marine fish

Species	mg Hg/kg	Species	mg Hg/kg
Herring	0.013	Sea Bass	0.145
Salmon	0.035	Tuna	0.206
Mackerel	0.081	Halibut	0.250
Perch	0.116	Snapper	0.250
Cod	0.121	Shark	1.327

Drasch., Wiley VHC Verlag, 2004; Adapted from US EPA (1997)

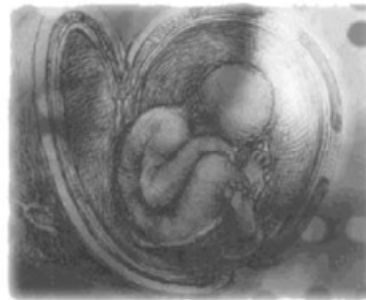
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METHYLMERCURY: POWERFUL NEURODEVELOPMENTAL TOXICANT

- ❖ **Impedes nerve cell division and migration**
- ❖ **Binds with microtubules required for neuronal development**
- ❖ **Binds to and distorts DNA & RNA**



EHP

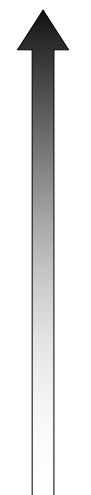
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EFFECTS OF PRENATAL EXPOSURE

- ❖ **Mental retardation**
- ❖ **Ataxia & cerebral palsy**
- ❖ **Seizures**
- ❖ **Vision & hearing loss**
- ❖ **Delayed developmental milestones**
- ❖ **Language disorders**
- ❖ **Deficits in fine motor function**
- ❖ **Visual spatial disabilities**
- ❖ **Memory problems**
- ❖ **High blood pressure low cardiac rate variability**



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CONGENITAL MINAMATA DISEASE: METHYLMERCURY EXPOSURE IN PREGNANCY

- ❖ Mothers often asymptomatic!
- ❖ Microcephaly
- ❖ Cerebral palsy/spasticity
- ❖ Mental deficits
- ❖ Malformation of ears, heart, skeleton, eyes



Minamata Bay, Japan

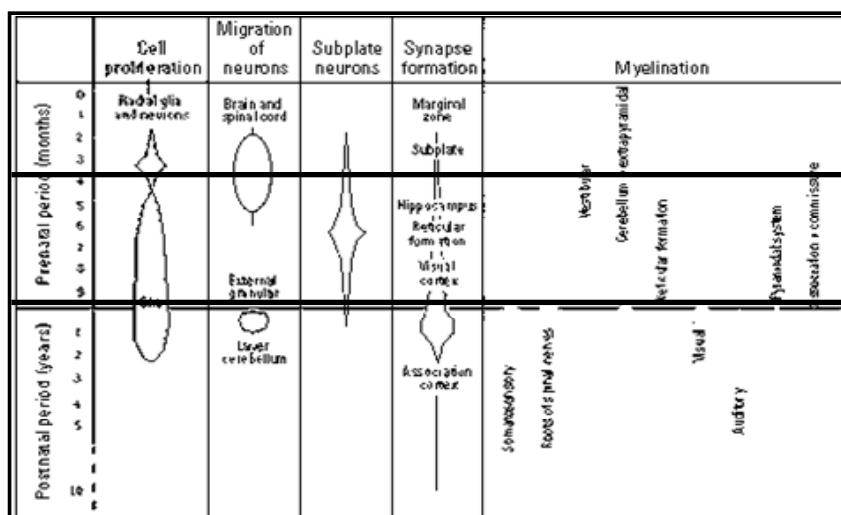
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NEURODEVELOPMENT



Rice, EHP, 2000 108 (3): 511

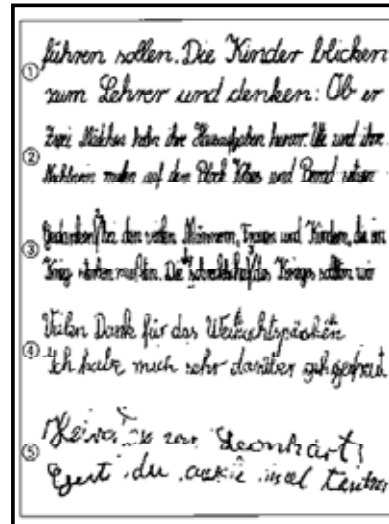
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EXAMPLE OF "TREMOR MERCURIALIS"

Hand-writing of
a 9 year old girl in
monthly intervals after
an accidental intake of
mercury containing
seed preservatives



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Boese, Paediatr Prax (1993) 45: 183

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SUBCLINICAL EFFECTS

- ❖ Susceptibility of the fetal brain is very high
- ❖ Altered neuro-psychological tests postpartum, if prenatal Hg-burden was raised by whale fish consumption (*Faroe Islands study*)
- ❖ No effects found in a similar study (*Seychelles study*)

Recommendations

- ❖ EPA recommendation: 0,1 µg of methyl Hg/kg body weight/day
- ❖ WHO recommendation: 1.6 µg/kg body weight/week

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ANOTHER ORGANIC MERCURY: THIMEROSAL

❖ A mercury preservative used in

- Eye drops, antiseptics, other pharmaceuticals
- Multidose vaccinations

❖ It is metabolized to ethyl-mercury

- $T_{1/2}$ ~7 days in babies
- Crosses blood brain barrier
- Neurotoxic in high doses,
- "Safe dose" unknown

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PEDIATRIC EXPOSURE TO THIMEROSAL IN IMMUNIZATIONS

❖ Vaccine practices in the 1990s raised the body burden of mercury for small and preterm babies*

❖ Thimerosal free vaccinations for neonates **

- In the US, all infant vaccinations are thimerosal free since March 2001, except some influenza
- Still used to prevent microbial contamination of multidose vials in some countries

❖ No harmful effect of thimerosal proven in infants ***

** Stajich, 2000, ** Ball, 2001, 2001, *** Heron, 2004*

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MERCURY

- ❖ **Is persistent and cycles globally**
- ❖ **Continues to be widely used**
- ❖ **Exposure has serious effects**
- ❖ **Has an impact on global fishing**
- ❖ **May generate bigger problems in less-developed regions**
- ❖ **Interventions can be successful**

UNEP. Global Mercury Assessment, December 2002: www.chem.unep.ch/mercury/default.htm

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Thank you

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GLOBAL MERCURY USES AND RELEASES

By Michael Bender, Mercury Policy Project



Global Mercury Uses and Releases

*Presented by Michael Bender
Mercury Policy Project
www.mercurypolicy.org
UNEP Mercury Products Meeting
Bangkok, Thailand
17 May 2007*



**Mercury
Policy Project**

Background on the Mercury Policy Project & Zero Mercury Working Group

- The Mercury Policy Project was formed in 1998 to reduce mercury pollution, use, export and exposure to mercury
- The Zero Mercury Working Group is a coalition of 48 public interest NGOs from around the world formed in 2005 to reduce global supply, demand and emissions of mercury.



**Mercury
Policy Project**

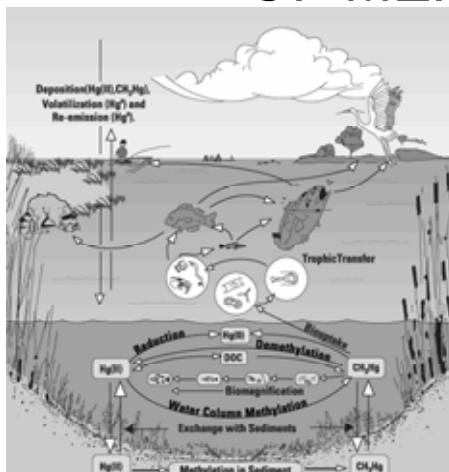
Summary of Presentation

- Overview: Global Mercury Cycle, Transport and Fate
- Types of Mercury Emissions
- Major Mercury Sources and Uses
- Conclusion



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Policy Project**

TRANSPORT: GLOBAL CYCLE OF MERCURY



From various sources, mercury is emitted into the atmosphere and circulated globally



US EPA

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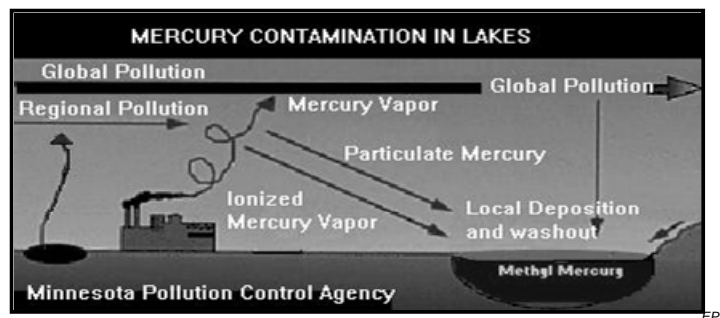
Categories of Mercury Release

- Natural (i.e. volcanoes)
- Human-caused
 - Related to mercury use
 - Related to processing of materials with trace amounts of mercury occurring naturally
- Re-emissions of mercury already in environment
- Releases to land, water, air



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TRANSPORT: GLOBAL CYCLE OF MERCURY



Ultimately enters water bodies and deposits

❖ Close to source

❖ Long distance from source

global pollution

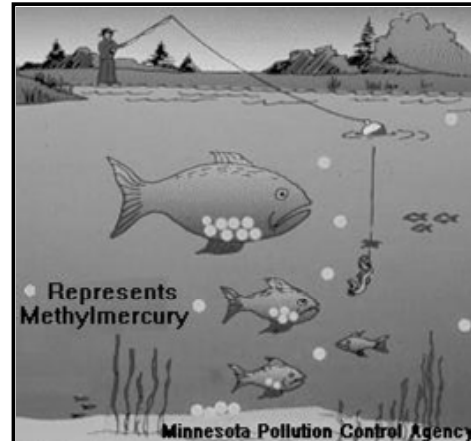
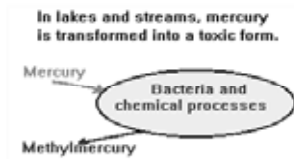


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FATE

Metabolic conversion and bio-accumulation through "food-chain"

- ❖ MeHg enters the aquatic food chain: fish, marine and freshwater
- ❖ Hg in sediments converts into methyl-mercury (MeHg)
- ❖ MeHg uptake by humans through fish consumption



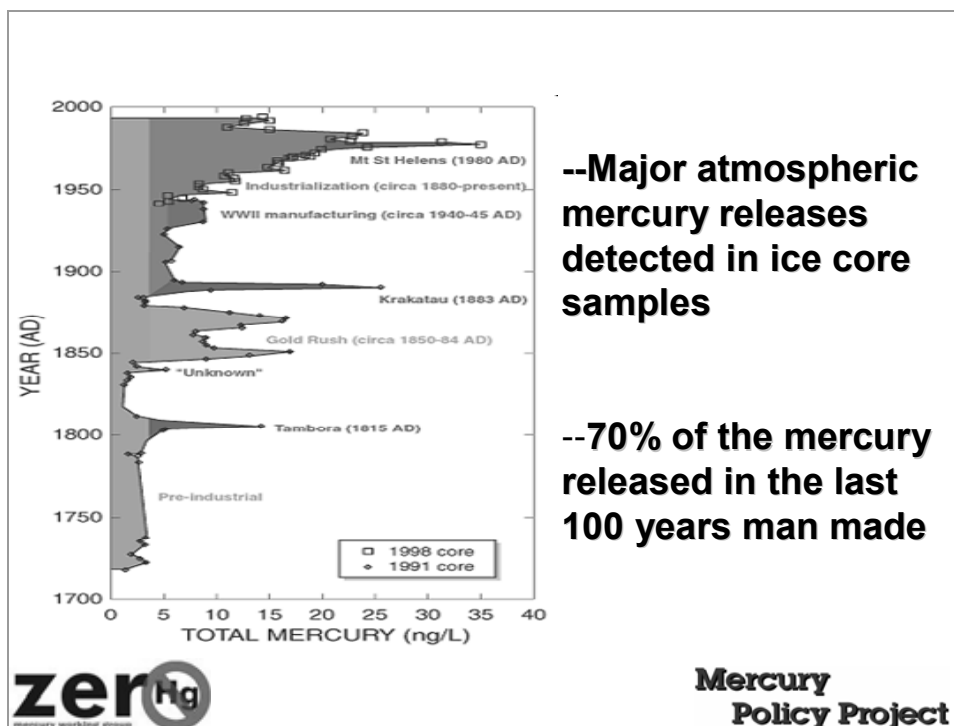
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Global mercury deposition has increased three-fold since the Industrial Revolution

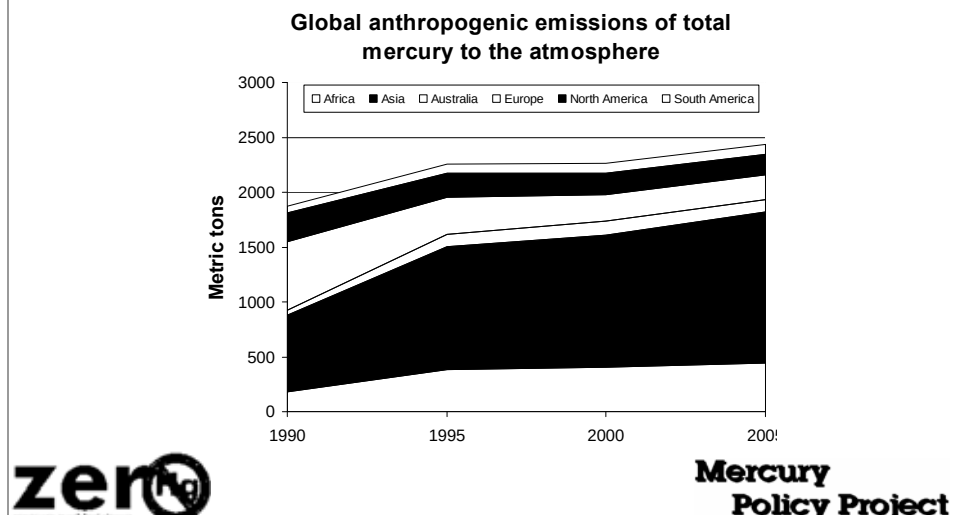
- Natural emissions (i.e. volcanoes, etc.) estimated at 2000 tons per year
- Atmospheric emissions from human activities are in the range of 2000 to 2400 tons per year
- Quantities from the re-emission of previously deposited anthropogenic mercury releases are thought to be 2000 tons per year.
- Total deposition from all sources: over 6,000 tons per year



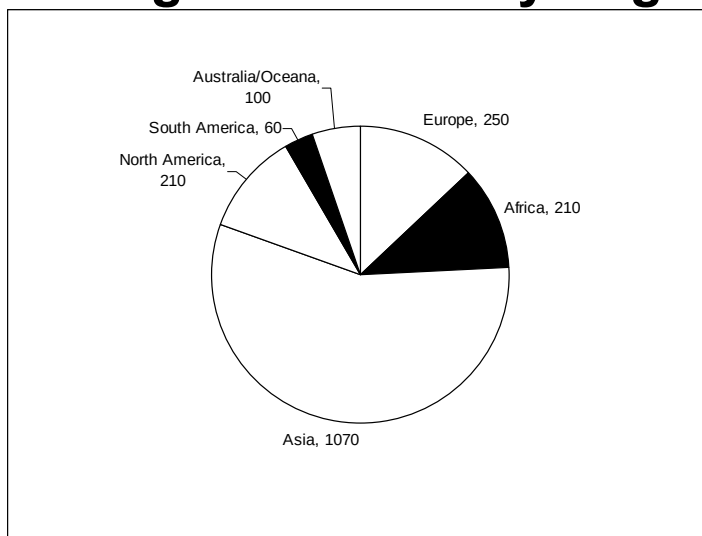
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While mercury emissions are decreasing in North America and Europe, they are increasing in Asia and Africa



2004 Hg Emissions By Region

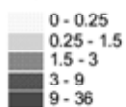


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1995 Global Anthropogenic Mercury Emissions



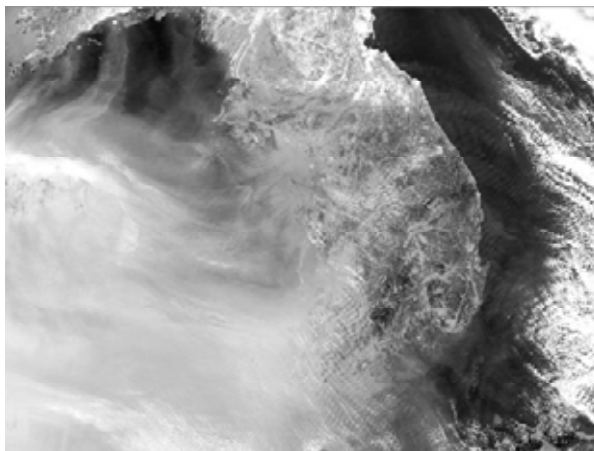
Hg emission(ton yr⁻¹), total



Source: Pacyna, et al., presentation to Global Transport Workshop, Ann Arbor, MI, 16-17 September, 2003



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China Contributes Half of Korea's Mercury Pollution

A NASA satellite photograph of smog including mercury pollution traveling on winds from China into the sky over the Korean Peninsula on Jan. 27, 2006. At the time, mercury concentration in Seoul's air was over 10 times higher than normal./Courtesy of visibleearth.nasa.gov



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Mercury Releases From Major Sources

70% comes from 2 sources:

- Coal combustion—estimated to be the largest global source of emissions
- Incineration of wastes containing mercury

Other significant sources:

- Cement production
- Smelting of ferrous and nonferrous ores.



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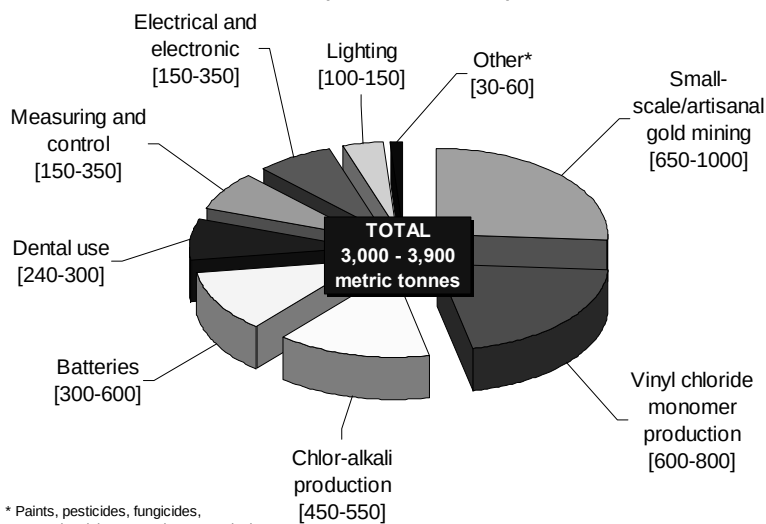
Largest Uses of Mercury

- Small-scale gold mining
 - A large problem, but our understanding of the sector, and ability to address it, is improving
- VCM-Vinyl chloride monomer (for polyvinyl chloride (PVC) production)
 - Large and growing user (China and a few plants in Russia)
- Chlor-alkali mercury-cell plants
 - Relatively small number (130 worldwide)
 - Larger number of polluting plants have received little attention
- Batteries
 - Most produced in China, Hg mainly used in button batteries
 - Also produced in Japan
- Measuring Devices
 - Thought to be produced mainly in China, but some from India



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**Global metallic mercury demand by application, 2005
(metric tonnes)**



November 2006



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This is a general view of a Spanish electrolysis plant that uses the mercury process and the cellroom of a mercury chlorine electrolysis plant. (Photo courtesy [Euro Chlor](#))



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Mercury in Artisanal & Small Scale Gold Mining

- Hg use estimated 900 tons consumed annually
- 10-15 million Artisanal miners worldwide, with 100 million people dependent on income
- This results in much human exposure to mercury and pollution in disadvantaged communities
- Demonstration projects show reduction, Hg alternatives



- Assistance programs should be available to miners to reduce use, release, exposure—with sensitivity to local community situation



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Conclusion:

- Intentional use of Hg in products and processes is avoidable in most all cases except fluorescents
- Alternatives exist for most uses; challenge is availability, cost, creating demand, and economies
- Phasing out use of mercury will reduce pollution & worldwide mercury demand
- Pollution control equipment is available to significantly reduce mercury emissions from major air sources, yet additional cost must be factored in
- Partnerships with measurable reduction goals and strategies are a good step forward
- Ultimately, binding Hg agreements will be needed



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Acknowledgements

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-David Lennett, NRDC
www.nrdc.org
-Peter Maxson, Concorde
East/West, Inc.
-Alexis Caine, US EPA
Region 5



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MERCURY SUPPLY, DEMAND AND TRADE

By Peter Maxson, Concorde East/West Sprl



Mercury Supply, Demand and Trade

Peter Maxson

Concorde East/West Sprl - Brussels

“Reducing Mercury Use and Release in Products”

Workshop organised and sponsored by:

UNEP Chemicals Branch - Division of Trade, Industry, and Economics

Ministry of Natural Resources and Environment of the Kingdom of Thailand

United States Environmental Protection Agency

Bangkok, 17-19 May 2007 – Siam City Hotel

Slide 2

Scope of presentation

Overview of global:

- Mercury sources
- Mercury uses
- Mercury trade
- Mercury prices
- Other issues

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Slide 3

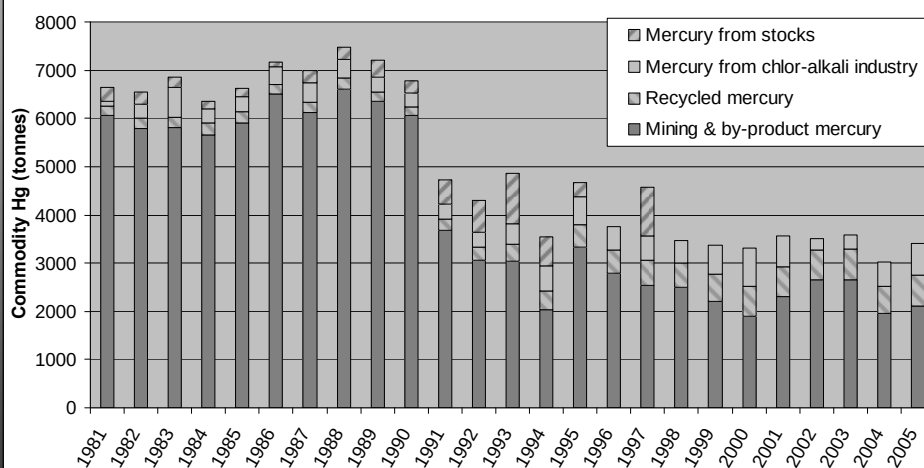
Sources of mercury supply (2005)	Mercury supply (metric tonnes)
Primary mercury mining	1350-1600
By-product mercury	450-600
Recycled mercury from chlor-alkali wastes ^{a)}	90-140
Recycled mercury - other ^{b)}	450-520
Mercury from chlor-alkali cells (decommissioning) ^{c)}	600-800
Stocks ^{d)}	0-200
Total	3000-3800

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Slide 4

Global mercury supply

Global mercury supply 1981-2005



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Mercury uses

Slide 5

Products containing Hg– p.1

- Anti-fouling agents
- Anti-tamper devices of pay-phones
- Barometers
- Batteries
- Bubblers/traps (mercury)
- Cathode-ray oscilloscopes
- Coulter Counters with manometers
- DC watt-hour meters
- Diffusion pumps
- Distillation salts
- Dropping Mercury Electrode (DME) technique for polarography and volt-ammeter
- Fan and air vent controls

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Products containing Hg– p.2

Slide 6

- Fire alarms
- Float switches (in bilge pumps, chemical feed pumps, septic tanks, and sump pumps)
- Fluorescent lights
- Furnaces and heating systems
- G-Sensor security systems use mercury in some applications
- Heating and ventilation equipment
- High intensity discharge (HID) lamps
- High voltage equipment
- Hot water heaters
- Household appliances

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Slide 7

Products containing Hg– p.3

- **Manometers**
- **Natural gas powered equipment**
- **Otosopes**
- **Pool alarms**
- **pH meters**
- **Plunger/displacement relays (see above chart)**
- **Products containing preservatives (see chemical sheet)**
- **Rubber flooring**
- **Security alarms (e.g. automotive, building and computer)**

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Slide 8

Products containing Hg– p.4

- **Sequential Multiple Analyzers**
- **Silent light switches**
- **Steam recorders in boiler panels**
- **Switching equipment for telecommunications**
- **Temperature control or environmental testing equipment**
- **Thermometers**
- **Thermostats**
- **Thermostat probes**
- **Tilt switches**

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Slide 9

Major global mercury uses – 2005

Global mercury demand (2005)	Metric tonnes
Small-scale/artisanal gold mining	650-1,000
Vinyl chloride monomer (VCM) production	600-800
Chlor-alkali production	450-550
Batteries	300-600
Dental use	240-300
Measuring and control devices	150-350
Lighting	100-150
Electrical and electronic devices	150-350
Other (paints, laboratory, pharmaceutical, cultural/traditional uses, etc.)	30-60
Total	3,000-3,900

Note: In each of these sectors some mercury recycling takes place, involving the recovery of mercury from products or wastes. Therefore, "net consumption" of mercury in any of these sectors may be significantly lower than "gross consumption."

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Slide 10

Regional mercury demand

Elemental mercury, 2005	Regional demand (metric tonnes)	Regional supply (metric tonnes)
East and Southeast Asia	1,600-1,900	900-1,300
South Asia	300-500	100-200
European Union (25 countries)	400-480	400-800
CIS and other European countries	150-230	800-1,200
Middle Eastern States	50-100	0-50
North Africa	30-50	0-50
Sub-Saharan Africa	50-120	0-50
North America	200-240	300-500
Central America and the Caribbean	40-80	20-100
South America	140-200	100-200
Australia, New Zealand and Oceania	20-40	0-50
TOTAL	3,000-3,900	3,000-3,800

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Concerns about the largest uses

- **Small-scale gold mining**
 - A large problem, but our understanding of the sector, and ability to address it, is improving
- **VCM (China & Russia)**
 - Large and growing user (China)
- **Chlor-alkali**
 - Relatively small number of exceptionally polluting plants
 - Larger number of plants that have received little attention
 - Industry (WCC) outreach, US partnerships, UNEP mercury program, etc.
- **Batteries**
 - Mostly East Asia and South Asia sources and uses, decreasing
 - Responding to international pressure, but regional use may persist

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Mercury trade summaries available on UNEP

<http://www.chem.unep.ch/mercury/COMTRADE-data-per-country.htm>

ALBANIA				Elemental mercury imports and exports						
Data source: UN DESA/ESD/UNSD - Comtrade statistics - downloaded 11Apr2006										
Tariff system: SITC rev.2										
Tariff code: 52216										
Filter: Trade value = \$US 0										
Comments:										
Period	Exporting partner countries			Albania				Importing partner countries		
		Reported exports to target country		Reported imports from partner country (on left)		Reported exports to partner country (on right)		Reported imports from target country		
Year	Country name	Kg mercury	Value (\$US)	Kg mercury	Value (\$US)	Kg mercury	Value (\$US)	Kg mercury	Value (\$US)	Country name
1995	Germany	97	2000							
1996	Czech Rep.	152	1068			6187	6396			TFYR of Macedonia
1996	Germany	97	1993							
1999	Belgium			41	955					
1999	Slovenia	207	817							
2000	Greece			34	916					
2000	Slovenia	265	2043							
2001	Italy			195	856					
2001	Slovenia	488	4405							
2002	Areas, nes			78	223					
2002	Czech Rep.	199	875	199	1809					
2002	Slovenia	250	1554							
2003	Czech Rep.			50	618					
2003	Slovenia	97	1817							
2004	Slovenia	167	3960							

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Slide 13

Trade summary data – observations

- **Comtrade data summaries may not be consistent with national database**
- **Many reasons**
 - commodity vs. waste,
 - weight or currency conversions,
 - import data (tariffs) more reliable than exports,
 - some countries report trade movements by country of consignment – others by origin
- **Need to study specific cases to fully understand discrepancies, and improve reporting**

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Slide 14

Value of summary trade data

- **Comtrade data are not intended to be the definitive trade statistics for each country**
- **But they are certainly adequate to suggest trends, general magnitudes, values, etc.**
- **Large or ongoing discrepancies with a trading partner should be investigated**
- **Good potential as a useful tool in support of policy initiatives**

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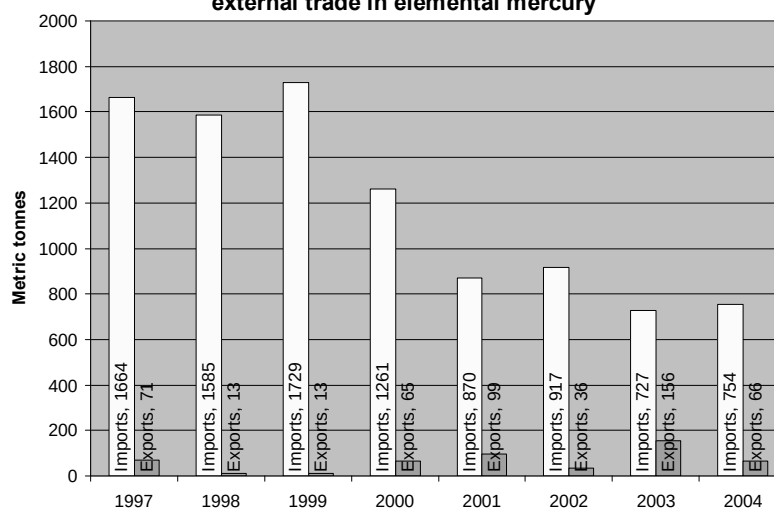
Regional trade flows

Purpose:

- to show global commercial mercury movements that are often not evident from country trade summaries

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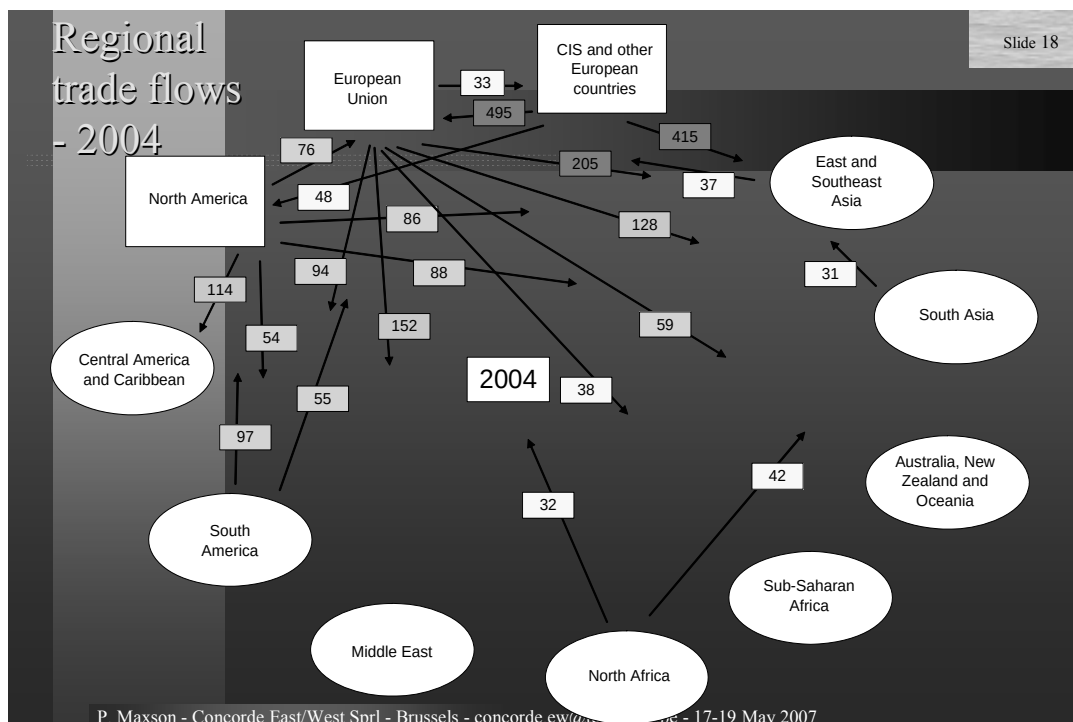
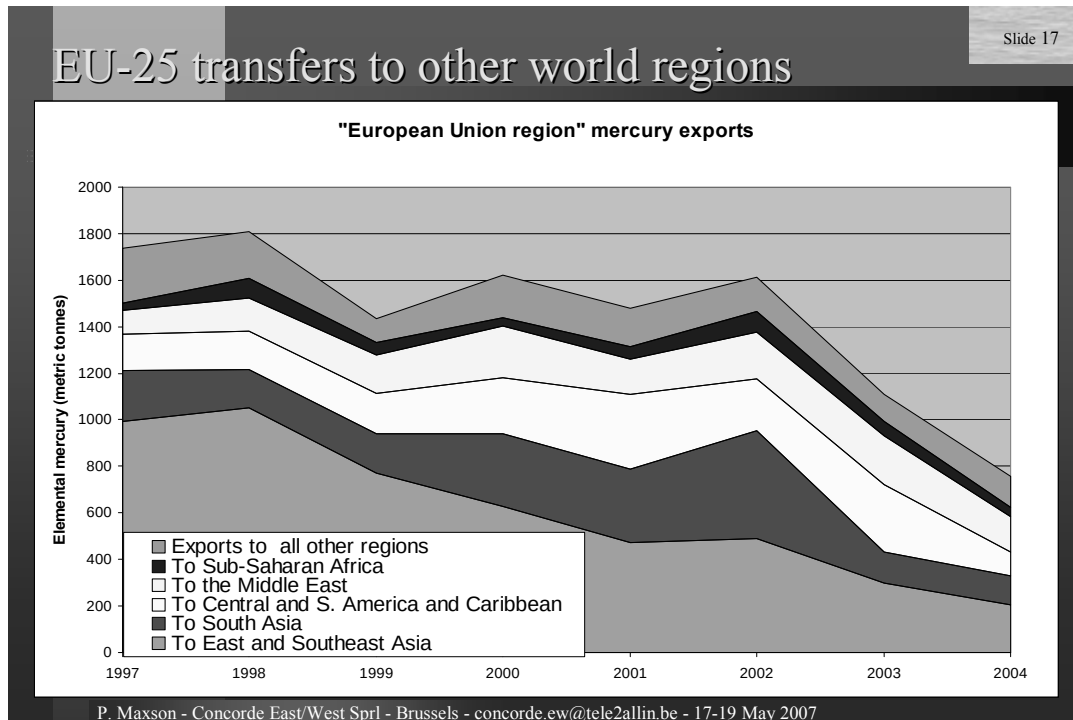
**"East and Southeast Asia" region
external trade in elemental mercury**

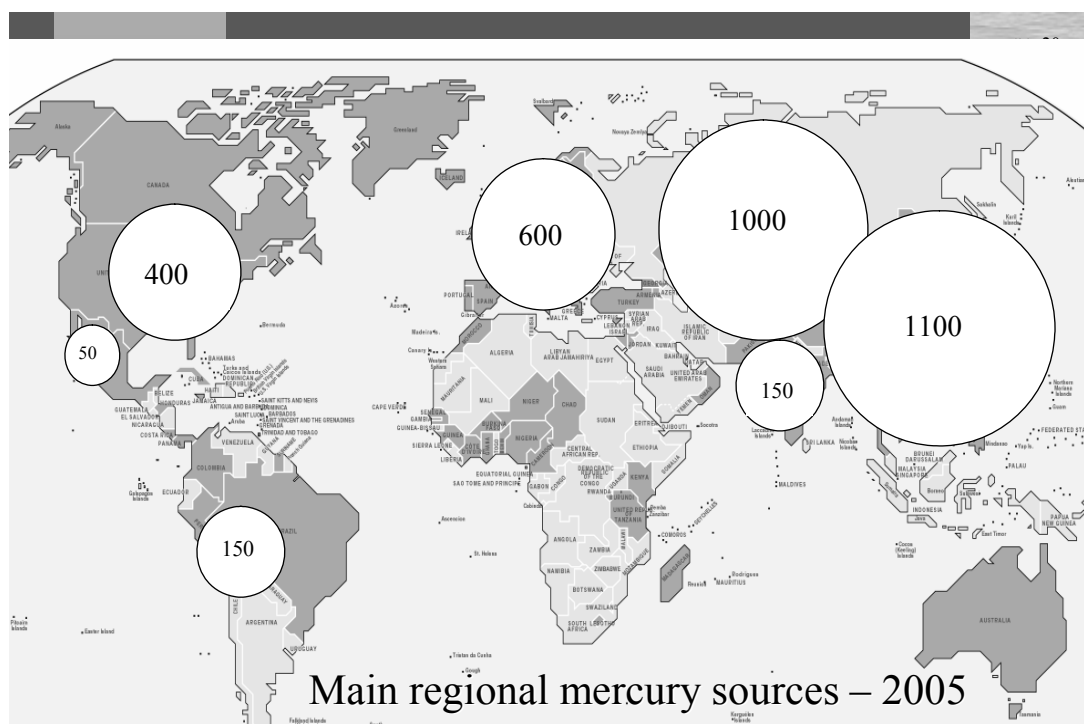
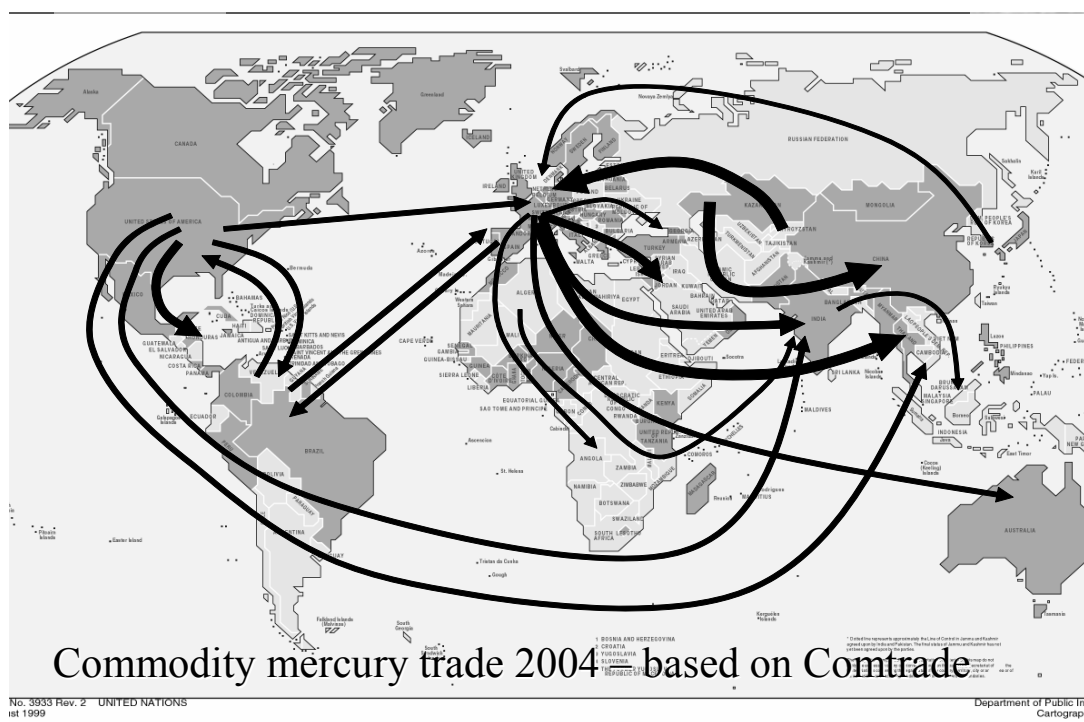


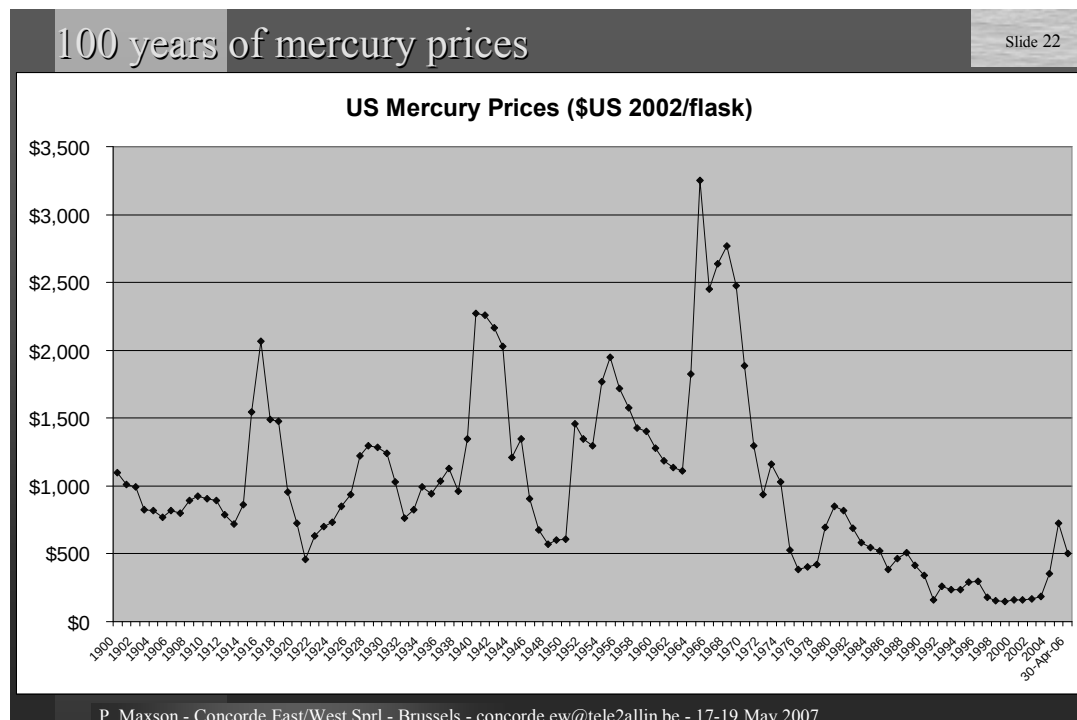
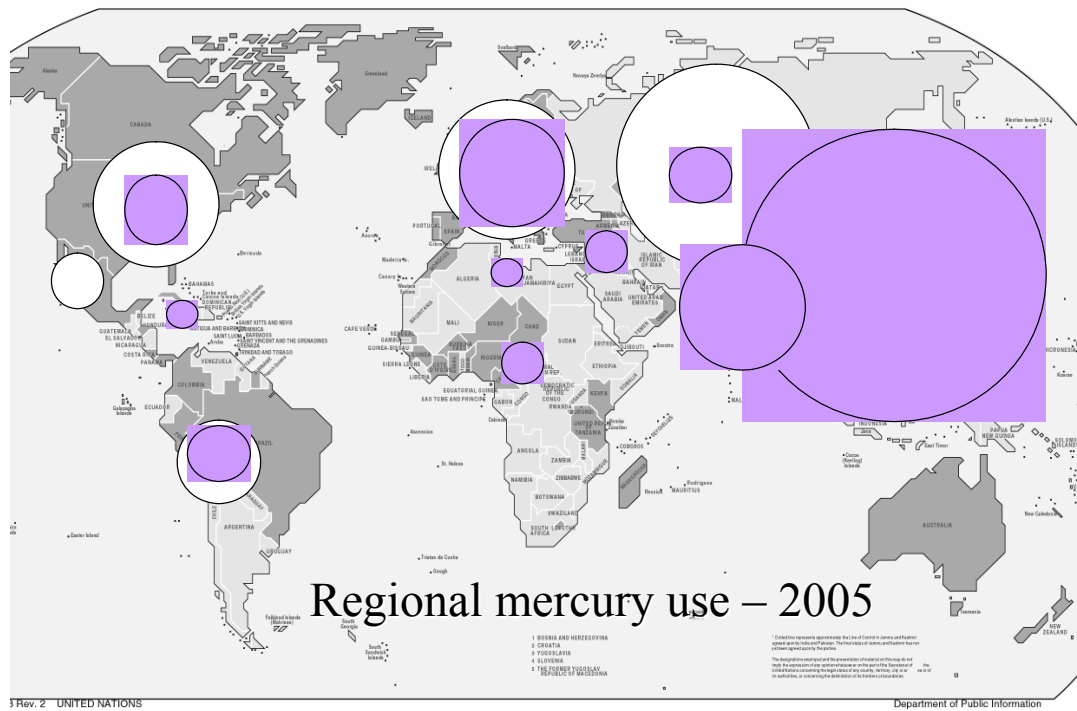
Note: It should be noted that this figure includes some trade flows recorded in the Comtrade database that the East and Southeast Asia region did not itself report. These and other discrepancies are discussed in the UNEP Trade Report, Section 4.1.

Source: UNSD Comtrade statistics, as of April 2006.

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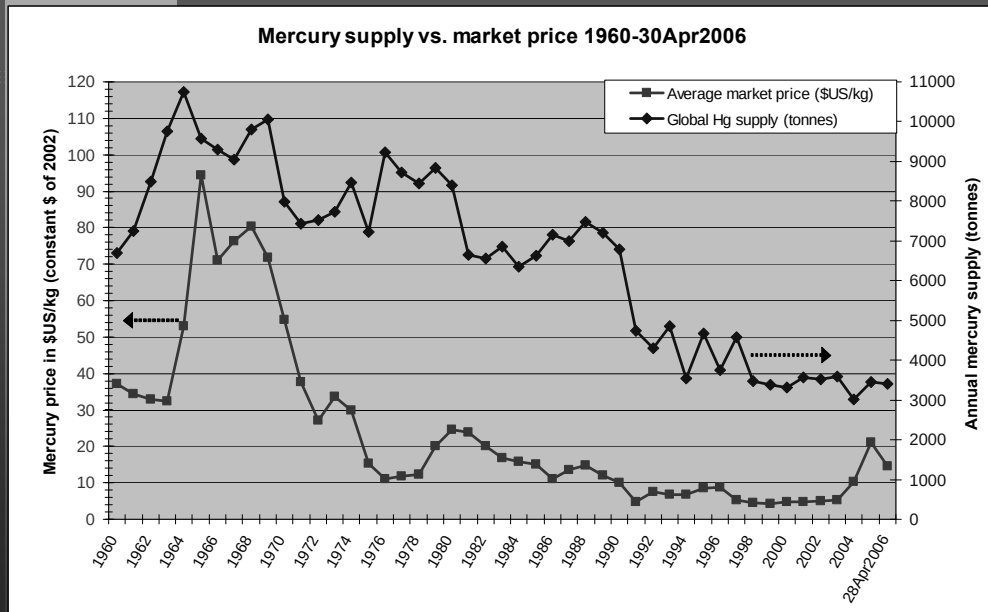






Upturn in the market price of mercury

Slide 23



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Acknowledgement and further info

Slide 24

Many thanks to UNSD Comtrade for full access to its database and assistance of support staff

For further information on trade issues, please consult:

- <http://www.chem.unep.ch/mercury/>
- **Revised UNEP trade report**

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

MERCURY RELEASES FROM PRODUCTS AND PROCESSES

By Michael Bender, Mercury Policy Project / Zero Mercury Working Group

Slide 1

Mercury Releases From Products and Processes

*Presented by Michael Bender
Mercury Policy Project/
Zero Mercury Working Group
www.mercurypolicy.org
www.zeromercury.org*

*UNEP Mercury Products Meeting
Bangkok, Thailand
17 May 2007*



Slide 2

Summary of Presentation

- Current Global Mercury Demand
- Mercury Releases from Products
- Mercury Releases from Processes
- Mercury-Free Alternatives



Slide 3

Global Mercury Demand—Best Estimates

Sector	Metric Tons
Batteries	400
Chlor-alkali	620 (535 net)
Measuring Devices	250
Switches/Relays	250
Lighting	120
Dental	270
Small-scale gold mining	800-1,000
PVC	700 (350 net)
Other	50
Total	3,460 to 3,660

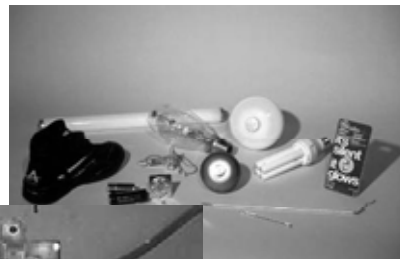


**Mercury
Policy Project**

Slide 4

Releases Caused by Mercury-Containing Products

- Device production
- Product Use
 - Accidental releases— breakage and spills
 - Release inherent in use: Pesticides, fungicides, dental amalgam
 - Laboratory chemicals and medicines
 - Other uses: folk medicine, cosmetics, religious rituals



**Mercury
Policy Project**

Slide 5

Mercury-Containing Product Disposal-- Incineration

- Incineration—without mercury controls, most mercury released to air
- Biggest source of mercury in some locations
- Medical waste can contain significant concentrations
- Household wastes



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Slide 6

Mercury Product Disposal

- Landfills—releases lower than incinerators, especially with liners, daily covering
- Solid waste collection system— generates releases when products break
- Scrap metal recycling— significant releases from switches in cars, appliances
- Cremation (from dental amalgam)



**Mercury
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Slide 7

Mercury is released from a wide range of industrial processes, including:

1. Industrial processes that produce chlorine (mercury cell chlor-alkali plants),
2. Vinyl chloride monomer (for polyvinyl chloride (PVC) production, used mainly in China.
3. Artisanal and small scale gold mining (ASM) where mercury is vaporized to extract the gold



**Mercury
Policy Project**

Slide 8

Major Product Categories Containing Mercury

- Batteries
- Measuring Devices, including thermometers
- Electrical Switches/Relays
- Dental Mercury Amalgam
- Fluorescent Light Bulbs



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Slide 9

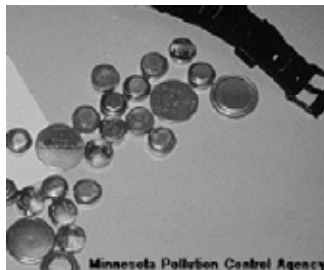
Batteries

Where is the mercury?

- Vast majority used to make button cells in China
- To lesser extent, Japan too

How to achieve global demand reduction?

- Commitment by USA manufacturers to produce mercury-free button cells by 2011
- Obtain similar commitment from EU, China, and Japan manufacturers and/or governments



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Slide 10

Toxics Link Case Study: 5 Delhi Hospitals

- Average thermometer breakage in a medium sized (300 – 500 bedded) hospital – 70/month
- Mercury disposed by one hospital per year- 840 gm only though breakage of thermometers
- In house calibration/refilling of sphygmomanometer in certain hospitals in poor condition
- Vapor levels in a typical calibration room dangerously high between 2 to 3 $\mu\text{g}/\text{m}^3$ in a ventilated room



**Mercury
Policy Project**

Slide 11

Mercury-Free Thermometers

- Challenge to make Hg-mercury alternatives cost competitive and available, including electronic/digital
- Advantages of non-mercury alternatives include reduced risks from exposure to glass/mercury upon breakage
- Hg thermometer sales prohibited in some countries (e.g. Sweden)
- Discontinued voluntarily elsewhere (most pharmacies in US agreed to stop sales)



**Mercury
Policy Project**

Slide 12

Developing Countries Switching To Mercury Free Thermometers, Health Care

- Philippines, Brazil, Cuba, Argentina, South Africa are all taking significant steps.
- Also activities in S. Korea, India, Mexico, Vietnam, China, and several other nations
- Model municipal, national policies are being developed, with hundreds of hospitals are taking action
- Demand for alternatives is growing
- UNEP & Health Care Without Harm are working in partnership, as you will hear tomorrow



**Mercury
Policy Project**

Slide 13

Other Measuring Devices

- Blood pressure cuffs
- Manometers
- Barometers
- Non-fever thermometers
- Other Medical Devices
- Various meters to measure moisture content, liquid density, etc.



**Mercury
Policy Project**

Slide 14

Mercury-Free Measuring Devices

- **In many countries, alternatives generally available at comparable price and comparable performance**
- **Resources on available alternatives:**
 - www.sustainablehospitals.org
 - www.mercuryfreehealthcare.org
 - www.noharm.org
 - www.maine.gov/dep/mercury/lcspfinal.pdf



**Mercury
Policy Project**

Slide 15

Electronic Products

- Where is the mercury?
 - In switches and relays primarily, which can be found in many products such as pumps, thermostats, RV ovens, etc.
- How to achieve global demand reduction?
 - Leverage EU RoHs Directive into global norm
 - States enacting switches/relays Hg phase-out legislation in USA
 - China and Japan developing similar laws



**Mercury
Policy Project**

Slide 16

Non-Electronic Measuring Devices

- Mercury mostly in fever thermometers and blood pressure cuffs, but also in manometers, hydrometers, barometers, etc.
- How to Achieve Global Demand Reduction
 - Extend EU Directive under development to include consumer and non-consumer products, and thus create global legal benchmark
 - Encourage international organizations, multilateral lending agencies, bilateral donors and private investors to provide financial incentives and resources and to otherwise encourage Asian manufacturers to embrace mercury-free transition and supply high-quality, low cost products.
 - Continue to spur demand for non-mercury measuring devices in the health care sector and elsewhere.

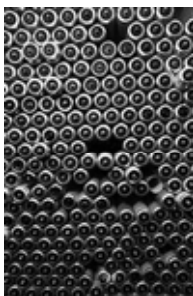


**Mercury
Policy Project**

Slide 17

Fluorescent Lamp Production

- Asia largest producer; much Hg wasted
- Use of mercury growing 10% annually
- Increasing use in production of compact fluorescent lamps
- Clean production: need to switch to Hg pellet technology



**Mercury
Policy Project**

Slide 18

NGO Global Demand Reduction Scenario

Sector	2005	2012	2017
Batteries	400	50	25
Chlor-alkali	620 (535 net)	300	0
Measuring Devices	250	75	50
Switches/Relays	250	50	50
Lighting	120	150	110
Dental	270	135	75
Small-scale gold mining	800-1,000	600	400
PVC	700 (350 net)	550	300
Other	50	25	10
Total	3,460 to 3,660	1,885	1,020



**Mercury
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Slide 19

Acknowledgements

Thanks to the following organizations and individuals
for sharing ideas and/or slides for this presentation:



- David Lennett, NRDC
www.nrdc.org
- Peter Maxson, Concorde
- Satish Sinha, Toxics Link
www.toxicslink.org
- Health Care Without Harm,
www.noharm.org



UNEP MERCURY INVENTORY TOOLKIT

By Kaj Madsen, UNEP DTIE Chemicals Branch



An introduction to UNEP Toolkit for identification and quantification of mercury releases

Asian Products Workshop
Bangkok, Thailand

United Nations Environment Program, Chemicals Branch

1

What is a mercury inventory?



Identifies the sources of mercury released to
air, water, land, wastes.

Quantifies sources and release pathways.

2

Why prepare a mercury inventory?



Understand sources and potential impacts of mercury.

Determine the significance of the issue and set priority actions.

Set goals and measure progress.

Communicate with stakeholders.

Identify at-risk populations.

3

What is 'The Mercury Inventory Toolkit'?

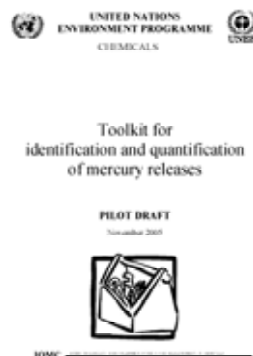


The toolkit is a 250 page document with associated Excel Spreadsheets.

Step-wise guidance on mercury inventory development.

Completed in Nov 2005 and translated into the UN languages.

www.chem.unep.ch/mercury/toolkit/default.htm



4

The mercury inventory toolkit is an important UNEP guidance document:



Intended to simplify inventory development and reduce workload at the country level:

- Guides inventory makers through 4 stages.
- Has a pre-prepared database developed for use.

Outcome can be supplemented as experience is gained:

- Start with evaluating existing data and information.
- Proceed with filling in the gaps and refining when needed.

Development of comparable data-sets assists in regional and global decision making.

Similar approach to the UNEP dioxin and furan toolkit.

5

Follows a 4-step methodology...



Screening to identify main source categories

Further classification of the source categories into sub-categories.

Development of a quantitative inventory – detailed information gathering.

Reporting of the standardized inventory.

6



Step 1: Identifying Main Source Categories

Extraction and use of fuels/energy sources
 Primary (virgin) metal production
 Production of other minerals and materials with mercury impurities
 Intentional use of mercury in industrial processes
 Consumer products with intentional use of mercury
 Other intentional products/process uses
 Production of recycled metals (secondary metal production)
 Waste incineration
 Waste deposition/landfilling and waste water treatment
 Crematoria and cemeteries
 Identification of potential hot-spots

Consideration of releases to air, water, land, waste etc.

7



Step 2: Further classification of the source categories into sub-categories.

Table 5-99 Consumer products with intentional use of mercury: sub-categories with primary pathways of releases of mercury and recommended inventory approach

Chapter	Sub-category	Air	Water	Land	Product	Waste/ residue	Main in- ventory approach
5.5.1	Thermometers with mercury	X	X	X	X	X	OW
5.5.2	Electrical and electronic switches, contacts and relays with mercury	X	x	X	X	X	OW
5.5.3	Light sources with mercury	X	x	X	X	X	OW
5.5.4	Batteries containing mercury	X	x	X	X	X	OW
5.5.5	Biocides and pesticides	X	X	X	X	X	OW
5.5.6	Paints	X	x	x	X	x	OW
5.5.7	Pharmaceuticals for human and veterinary uses	X	x	x	x	X	OW
5.5.8	Cosmetics and related products		X		X	x	OW

8



Step 3: Development of the quantitative inventory.

Based on a Mass Balance approach

- Input = output

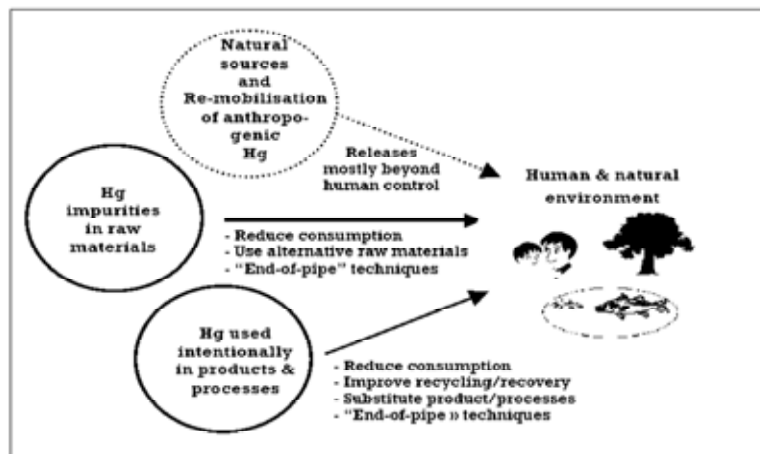
Inputs are estimated based on available data, and outputs are estimated for all media.

For each sub-category the toolkit contains:

- Outputs and release pathways
- Discussion of mercury input, information sources
- Data and examples of mercury input, releases and wastes/residues.
- Draft default input factors and output distribution factors.

9

Step 3: Development of quantitative inventory.



10

Step 4: Inventory Reporting



Inventory report is an important communication tool

Should include:

- ❑ Summary
- ❑ Country inventory
- ❑ Data/knowledge gaps
- ❑ Conclusion (priorities)
- ❑ Annexes with supporting data

11

Inventory development considerations



Start with a simple qualitative listing of sources.

Quantify using the best information available.

- ❑ Noting data/knowledge gaps.
- ❑ Indicating rate of uncertainty.
- ❑ Refinement as better data, more funding becomes available.

Data collection in national settings can be 'detective work'

- ❑ Diverse (from time to time, country to country)
- ❑ Learning process

Follow basic chemistry principles (e.g. Mass balance principle and for converting data)

12

Mercury Inventory Pilot Project was launched in April 2007 in Asia



Five participating pilot countries in the region.

Pilot project aims to:

- ❑ field tests the toolkit to ensure its usefulness.
- ❑ promote action, both immediate and long-term, at both national, regional levels to protect human health and environment.
- ❑ promote exchange of information on problems and solutions amongst project participants.

13

Further information:



<http://www.chem.unep.ch/mercury/>

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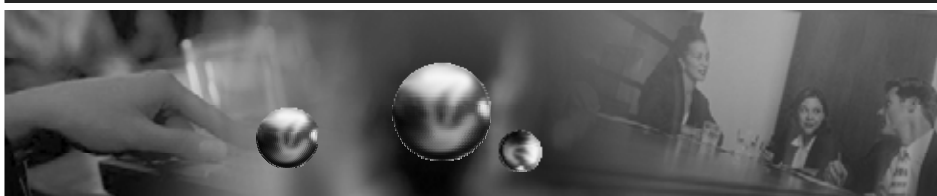
14

TRACKING MERCURY PRODUCTS AND PROCESSES: MERCURY-CONTAINING PRODUCTS AND ALTERNATIVES DATABASE

By Maria J. Doa, United States Environment Protection Agency (U.S. EPA)



Tracking Mercury Products and Processes: Mercury-Containing Products and Alternatives Database



United Nations Environment Program
Mercury Products Workshop
Bangkok, Thailand
May 17, 2007

Maria J. Doa, Ph.D.
Director, National Program Chemicals Division
U.S. Environmental Protection Agency



Overview

- Existing U.S. Product and Process Demand
- U.S. Demand Drivers
- U.S. and Global Product and Process Demand Comparison
- EPA's Mercury-Containing Products and Alternatives Database



Existing U.S. Product and Process Demand

- Major U.S. Products
 - Wiring devices and switches
 - Measuring and control devices
 - Electrical lighting
 - Button cell batteries
 - Dental amalgam
- Major U.S. Process
 - Mercury cell chlor-alkali production

3



Existing Global Product and Process Demand

- Major Global Products
 - Wiring devices and switches
 - Measuring and control devices
 - Dental amalgam
 - Electrical lighting
 - Batteries
- Major Global Processes
 - Vinyl chloride monomer (VCM) production
 - Artisanal/small-scale mining
 - Mercury-cell chlor-alkali production

4



U.S Demand Drivers

- Reductions in use of mercury in products
 - Federal laws
 - State laws
 - Regulatory action
 - Voluntary programs
 - Consumer demand
 - Available substitutes
- Reductions in use of mercury in processes
 - Regulatory action
 - Economics

5



U.S. and Global Product and Process Demand Comparison

- Wiring Devices and Switches
 - U.S.
 - Baseline (2001): 103 metric tons
 - Current: 88 metric tons
 - 15 percent reduction
 - Global
 - Baseline (2000): 154 metric tons
 - As of 2005: 140 metric tons
 - 9 percent reduction

6



U.S. and Global Product and Process Demand Comparison (cont'd)

- **Measuring and Control Devices**
 - U.S.
 - Baseline (2001): 69 metric tons
 - Current: 65 metric tons
 - 6 percent reduction
 - Global
 - Baseline (2000): 166 metric tons
 - As of 2005: 150 metric tons
 - 10 percent reduction

7



U.S. and Global Product and Process Demand Comparison (cont'd)

- **Electrical Lighting**
 - U.S.
 - Baseline (2001): 21 metric tons
 - Current: 5 metric tons
 - 74 percent reduction
 - Global
 - Baseline (2000): 91 metric tons
 - As of 2005: 120 metric tons
 - 32 percent increase

8



U.S. and Global Product and Process Demand Comparison (cont'd)

- **Button Cell Batteries**
 - U.S.
 - Baseline (2001): 17 metric tons
 - Current: 15 metric tons
 - 12 percent reduction
 - From 1980 to 2001, U.S. demand in all batteries reduced from 1,052 to <245 metric tons (77 percent reduction).
 - Global (All Batteries)
 - Baseline (2000): 1,081 metric tons
 - As of 2005: 400 metric tons
 - 63 percent reduction

9



U.S. and Global Product and Process Demand Comparison (cont'd)

- **Dental Amalgam**
 - U.S.
 - Baseline (2001): 34 metric tons
 - Global
 - Baseline (2000): 272 metric tons
 - As of 2005: 270 metric tons
 - <1 percent reduction

10



U.S. and Global Product and Process Demand Comparison (cont'd)

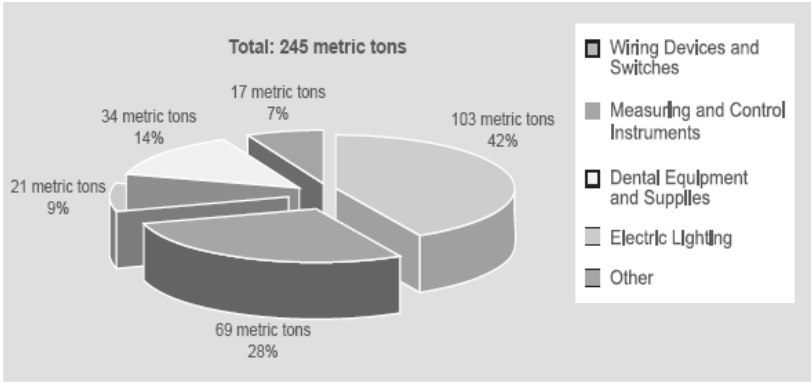
- **Mercury Cell Chlor-Alkali Production**
 - U.S.
 - Current Inventory: >2,300 metric tons
 - Average per facility: 300 metric tons
 - From 1980 to 2001, U.S. demand in chlor-alkali production reduced from 358 to 30 metric tons (92 percent reduction).
 - Global
 - Global Reservoir: ~ 14,000 metric tons

11



U.S. and Global Product and Process Demand Comparison (cont'd)

Total U.S. Mercury Use in Products (2001)



Category	Amount (metric tons)	Percentage
Wiring Devices and Switches	103	42%
Measuring and Control Instruments	69	28%
Dental Equipment and Supplies	34	14%
Electric Lighting	21	9%
Other	17	7%
Total	245	100%

U.S. EPA. EPA's Roadmap for Mercury, available at <http://www.epa.gov/mercury/pdfs/FINAL-Mercury-Roadmap-6-29.pdf>, p. 36.

12



13

- ### Mercury-Containing Products and Alternatives Database
- Initiated pilot database in Fall 2005
 - Organize data collected from mercury-containing product research
 - Build upon data compiled in Northeast Waste Management Officials Association's (NEWMOA's) Interstate Mercury Education and Reduction Clearinghouse (IMERC) database

14



Mercury-Containing Products and Alternatives Database

- IMERC database contains national sales data (since 2001) submitted by manufacturers located in thirteen states
 - Based on sales of mercury-containing products per state
 - Data updated every three years
- EPA's database is designed to
 - Evaluate the effectiveness of mercury reduction efforts
 - Provide outreach about mercury-containing products and alternatives

15



Mercury-Containing Products and Alternatives Database (cont'd)

- Manufacturer Data
 - Provides data on
 - mercury-containing products
 - alternatives
 - contact information
 - use description
 - quantity of mercury
 - costs

16



Mercury-Containing Products and Alternatives Database (cont'd)

- **Comprehensive Scope**
 - Nationwide and all product sectors
 - IMERC limited to data on products sold in participating states
- **Extensive Resources**
 - Incorporates IMERC database, industry association reports, market studies, etc
- **Target Audience**
 - General public and more technical audience

17



Mercury-Containing Products and Alternatives Database (cont'd)

- **Potential Benefits**
 - Support for voluntary and regulatory reduction programs
 - Expansion to include identification and monitoring of mercury product imports and exports
 - Adaptation of database for use in other countries to track global mercury product use and partnerships
 - Available late 2007

18



Mercury-Containing Products and Alternatives Database (cont'd)

- **Contact:**
 - Timothy Lehman
 - Lehman.timothy@epa.gov

19

International Context

- International concerns over mercury (Hg)
 - UNEP Governing Council Decisions
 - Global Mercury Assessment
 - SAICM Provisions
- PRTRs as a tool for SCM and right-to-know
- Three pilot projects in Latin America (2007-2008): Chile, Ecuador, and Panama
 - Contribution to the creation of partnerships for Hg risk reduction
 - Implemented in collaboration with UNEP
 - Funds provided by US EPA

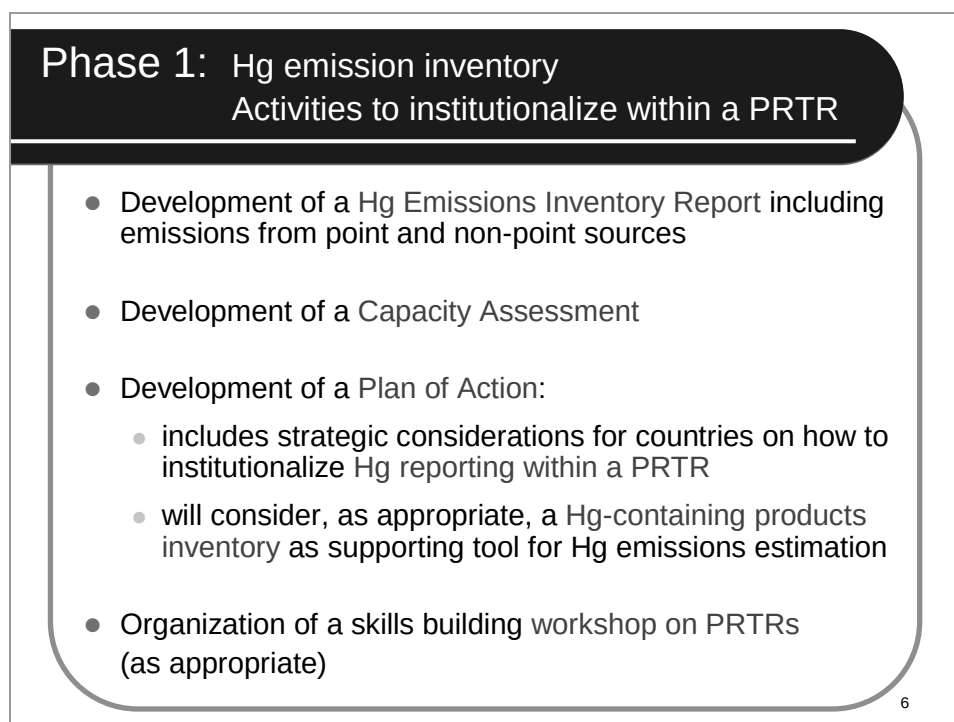
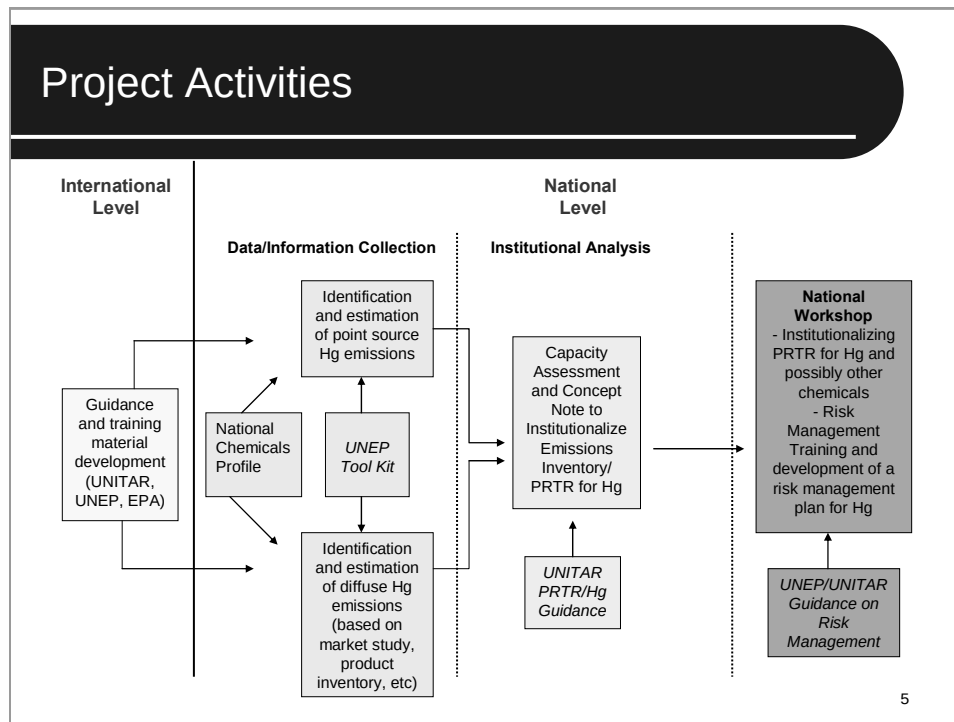


3

International Project Objectives

- Strengthen capacities to identify and measure Hg emissions and transfers
- Generate data on mercury use and emission patterns, including point and diffuse sources
- Explore the institutionalization of annual reporting of Hg emissions through a PRTR
- Strengthen skills to identify and assess risk management options to reduce Hg emissions
- Test and further develop guidance materials aimed at assisting governments in identifying and reducing Hg emissions

4



Key Features of a PRTR

- Catalogue/database of the nature and quantity of releases and transfers
- Data collected from point sources of pollution, such as factories; as well as from diffuse sources, such as agricultural operations or transportation activities
- Typically covers releases to air, water, and land as well as wastes transported to treatment and disposal sites

7

Key Features of a PRTR

- Periodic collection of information to allow tracking of trends over time
- Use of common identifiers for chemicals, facilities, and locations to facilitate comparison and aggregation of the data
- Computerization of the information for ease of analysis
- Dissemination of the information to government policy makers and the general public



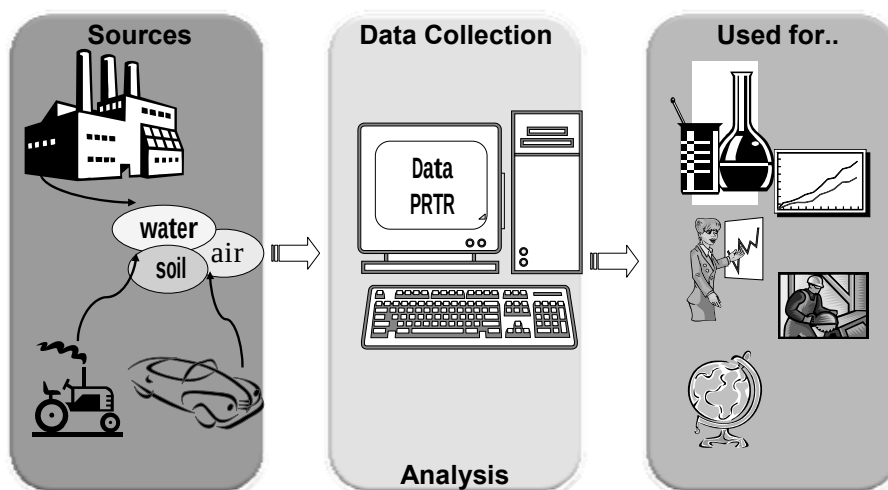
8

Key Features of a PRTR

- May include mapping the data to discern the proximity of pollution sources to population centres or to ecologically sensitive areas (highlighting potential health or environmental impacts and effectively targeting management efforts)
- Trends in the data can reveal the progress being made by individual facilities or industrial sectors in reducing waste and minimizing pollution, or for identifying opportunities for improvement
- Tool for promoting efficient and effective policies for environmental protection and sustainable development

9

Key Features of a PRTR



10

Phase 2: Preparatory capacity building Draft Hg risk management plan

- Preparatory Capacity Building Workshop for Developing a Hg Risk Management Plan
- Participation of national stakeholders
- Development of a draft National Risk Management Plan for Hg

11

Phase 3: Institutionalize a Hg PRTR Adopt a Hg risk management plan

- Organization of a National multi-stakeholder workshop
- To discuss and endorse:
 - the plan to institutionalize a Hg inventory within a national PRTR
 - the National Risk Management Plan for Hg

12

Rationale for Project Activities

- **Hg Inventory Development**

- Provides initial information on Hg emissions and uses not available before

- **PRTR**

- Provides regular information on emissions (e.g. once a year)
- Integrates Hg inventory data and may improve information gathering processes
- Allows monitoring effectiveness of selected risk management measures (Risk Management Plan)

13

Rationale for Project Activities

- **Hg Risk Management Plan**

- Based on available information (inventory, capacity assessment)
- Provides specific measures for Hg risk reduction (legal, economic, etc.)

14

Technical Workshop for the Latin American Pilot Countries (Ecuador, June 2007)

- Knowledge management event
- Technical experts from project countries and external participants
- Will discuss methodologies to estimate point and non point sources
- Tool kit will serve as a basis
- Will provide an initial discussion about a methodology to develop a Risk Management Plan for Hg

15

UNITAR Guidance and Support to Project Countries

- *Guidance Documents:*
 - *"Integrating Mercury Pollution Information into a National PRTR System: Institutional and Other Strategic Considerations"*
 - *"Developing a Risk Management Plan for a Priority Chemical"*
 - Other relevant international guidance (e.g. UNEP's Tool Kit)
- Participation of UNITAR and international experts in national workshops and events
- Provision of comments on project documents
- UNITAR Project Help Desk

16

Project Funds and Organization

- 30,000 USD per country
- Project duration of 1.5 years
- Implemented by the Ministry of the Environment in each country
- Project coordination through a National Multi-Stakeholder Coordinating Committee, including:
 - Government Departments
 - Private Sector and Industry
 - Non-Governmental Organizations
 - Universities and Research Organizations
 - Other interested parties

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For More Information



Programmes in Chemicals, Waste and Environmental Governance

UNITAR

www.unitar.org/cwg

cwg@unitar.org

18

UNEP MERCURY PROGRAMME

By Desiree Narvaez, UNEP DTIE Chemicals Branch



WORKSHOP TO REDUCE USE AND RELEASE OF MERCURY IN
PRODUCTS FOR
THE ASIA PACIFIC
Bangkok, Thailand, 17-19 May 2007

UNEP Mercury (Hg) Programme

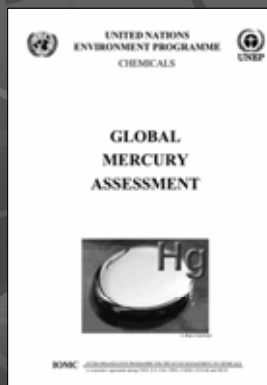
Mercury and Other Metals Programme
Chemicals Branch,
Division of Technology, Industry, and
Economics (DTIE) , United Nations
Environment Program (UNEP)

1

Why a global assessment of Hg*?

- Initiated by UNEP Governing Council in February 2001 (21st session)
- Responded to concerns raised in different fora that national/regional action not sufficient to address Hg pollution

* Hg = mercury



Global Mercury Assessment Key findings- global cycling



- Hg is persistent and cycles globally – emissions in any continent can contribute to deposition in others thus an international issue
- Due to long-range transport, even nations with minimal Hg releases, and other areas remote from industrial activity, may be adversely affected.

FreeFoto.com



Coal-fired power plant

3

Key findings – impacts on health and environment of global concern



- Studies from numerous geographic areas indicate a significant portion of humans and wildlife throughout the world are exposed to methyl-Hg levels of concern
- Many humans/wildlife across the globe are at risk, largely due to consumption of contaminated fish

FAO



Tuna fishing in the Mediterranean

Key findings – growing problem in developing countries



- Hg may be more problematic to less-developed regions (growing energy demand, poor waste treatment facilities, artisanal gold mining activity, etc.)
- Uses being phased out in developed countries may still be ongoing in developing countries

UNIDO



Using liquid Hg to amalgamate gold

Sufficient basis for international action



- Sufficient evidence of significant global adverse impacts from Hg to warrant further international action
- Better understanding important, however, not necessary with full consensus on all aspects or complete evidence in order to start initiating action globally
- Outline of possible options for addressing problems – covering short, medium and long-term goals



6

Decision 2003

Need for global policy response

The Governing Council

- Endorsed conclusions of the Working Group
- Decided (GC 22/4) national, regional and global actions should be initiated ASAP
- Urged all countries to adopt goals and take actions to identify exposed populations and reduce anthropogenic Hg releases



UNEP Headquarters Nairobi

7

Establishment of a UNEP Mercury Programme

- To support efforts of countries to take action to reduce Hg pollution, the Governing Council requested UNEP to initiate technical assistance and capacity building activities to support the efforts of countries.
- In response, UNEP established a mercury programme within its Chemicals Branch in Geneva, Switzerland.



United Nations, Geneva

8

UNEP Mercury Programme -



Aims to assisting countries to understand and address Hg problems, through

- Building inventories of uses and releases
- Identifying populations at risk
- Developing communication and outreach to at-risk populations
- Initiating actions to reduce uses and releases of Hg, including promoting Hg-free products, technologies and processes, using environmentally friendly alternatives
- <http://www.chem.unep.ch/mercury/>

9

UNEP Mercury Programme - Building capacity



- 7 awareness raising workshops in 2004/05
- Establish and maintain an information clearing-house
- Produce/obtain guidance materials for
 - Developing inventories of Hg releases
 - Identifying populations at risk
 - Communication/outreach to populations at risk
 - Options/approaches to reduce Hg releases



UNEP Workshop, Trinidad

10

Governing Council 2005



- **GC 23/9** omnibus decision on sound **chemicals management**
- Synergies among Conventions (Montreal, Basel, Rotterdam, Stockholm) and the Chemicals Branch of UNEP
- Bali Strategic Plan for Technology Support and Capacity Building
- Strategic Approach to International Chemicals Management (SAICM)

11

GC 23/9 : Strengthened the UNEP Mercury Programme



- Reiterated the conclusions of the GMA report on the global adverse impacts of Hg on health and environment
- Reiterated its decision that national, regional and global actions should be initiated ASAP
- Urged all countries to adopt goals and take actions to identify exposed populations and reduce anthropogenic Hg releases



12

UNEP Summary of supply, trade and demand information on mercury



- Mercury trade statistics
(UNComtrade, Eurostat, US
ITC, other organizations)
- Global production and
supply of mercury
- International Trade in
Mercury
- Global demand of mercury

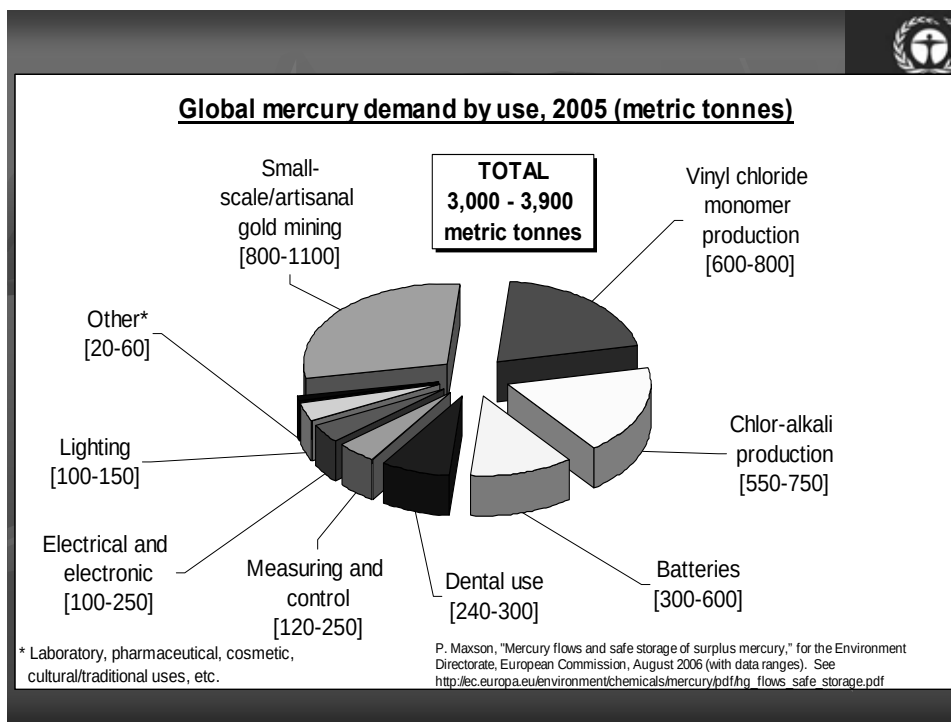
13

Global mercury supply, 2005, in metric tonnes



■ Primary mercury mining	1350-1600
■ By-product mercury	450-600
■ Recycled mercury from chlor-alkali wastes	90- 140
■ Recycled mercury – other	450- 520
■ Mercury from chlor-alkali cells (decommissioning)	600- 800
■ Stocks	0-200
Total	3000-3800

14



UNEP Governing Council 24 Decision 24/3 IV

- *Recognizes* that current efforts to reduce risks from mercury are not sufficient to address the global challenges posed by mercury;
- *Concludes*, therefore, that further long-term international action is required to reduce risks to human health and the environment and that, for this reason, the options of ENHANCED VOLUNTARY MEASURES and NEW or EXISTING INTERNATIONAL LEGAL INSTRUMENTS will be reviewed and assessed in order to make progress in addressing this issue;

16

UNEP Governing Council 24 Decision 24/3 IV



- *Recognizes* that a range of activities are required to address the challenges posed by mercury, including
 1. substitution of products and technologies;
 2. technical assistance and capacity-building; development of national policy and regulation;
 3. data collection, research and information provision, bearing in mind the need to provide assistance to developing countries and countries with economies in transition

17

UNEP Mercury Programme - Facilitating national action



- Encourage and support development of national and regional action plans to address Hg pollution
- Mobilize technical and financial resources to support national, regional and global efforts and capacity-building
 - possible small grants programme (USD 50,000)
 - priorities, sample project proposal

<http://www.chem.unep.ch/mercury/support.htm>

<http://www.chem.unep.ch/saicm/qsp.htm>

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Priority areas for technical assistance :

GC 24/3 IV



- (a) To reduce atmospheric mercury emissions from human sources;
- (b) To find environmentally sound solutions for the management of waste containing mercury and mercury compounds;
- (c) To reduce global mercury demand related to use in products and production processes;
- (d) To reduce the global mercury supply, including considering curbing primary mining and taking into account a hierarchy of sources;

19

Priority areas for technical assistance :

GC 24/3 IV



- e) To find environmentally sound storage solutions for mercury;
- (f) To address, considering the results of the analysis the remediation of existing contaminated sites affecting public and environmental health;
- (g) To increase knowledge on areas such as inventories, human and environmental exposure, environmental monitoring and socio-economic impacts

20

UNEP Guidance Document - Toolkit for Inventory Development



- Completed in Nov 2005
- Translations in other UN languages
- Inception workshop
- Pilot testing at national level in selected Asian countries
- Work with UNITAR and PRTR in selected Latin American countries

<http://www.chem.unep.ch/mercury/toolkit/default.htm>

21

UNEP Guide on Use and Release of Mercury



- Power & Heat Production and Refinement and Use of Oil & Gas
- Primary (virgin) Metal Production
- Production of recycled metals 'secondary production'
- Production of other minerals and materials with Hg impurities³⁹
- Intentional use of Mercury as an auxiliary or catalyst in industrial processes
- Production, use and disposal of consumer products with intentional use of mercury
- Other intentional products/process use
- Waste Incineration
- Waste treatment, disposal, deposition/landfilling

22

Synergies with the Basel Convention



- Development of technical guidelines on the environmentally sound management of mercury waste
- Pilot testing in selected countries

23

TWO GUIDANCE DOCUMENTS UNDERWAY



1. Awareness raising toolkit

2. Guidance document with WHO/FAO/JECFA

- Communicate risks to vulnerable groups
- Identify populations at risk due to Hg exposure
- Awaiting WHO work on risk benefit analysis



24

TWO GUIDANCE DOCUMENTS UNDERWAY



1. Awareness raising toolkit

2. Guidance document with WHO/FAO/JECFA

- Communicate risks to vulnerable groups
- Identify populations at risk due to Hg exposure
- Awaiting WHO work on risk benefit analysis

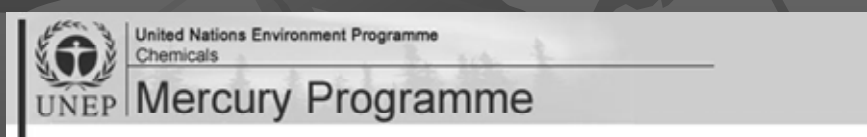


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Further information can be found at:



<http://www.chem.unep.ch/mercury/>



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PARTNERSHIPS TOWARDS MERCURY REDUCTION IN PRODUCTS

By Desiree Narvaez, UNEP DTIE Chemicals Branch

Mercury Partnerships

May 2007

Presentation to the Asian Mercury Products Workshop

1

Presentation Outline



- i. UNEP Governing Council Decision 24/3 related to mercury
- ii. Current Status of UNEP Mercury Partnership Programme
- iii. Next Steps on Mercury Partnerships
 - Products Partnership

2

UNEP GC Decision 24 related to mercury



- Acknowledges widespread concern over the serious effects of mercury on human health and the environment and the urgent need for international action.
- Identifies a number of strategies to undertake actions on mercury.
- Partnerships are identified as an important voluntary approach to reducing mercury.

3

GC 24 Decision on Partnerships



Requests the Executive Director, working in consultation with Governments and other stakeholders, to strengthen the UNEP Mercury Partnerships by:

- a) Developing an overarching framework for the UNEP Mercury Partnership:
 - Organizing a meeting of partners and other stakeholders
 - Development of business plans, identify partnership goals
 - Development of operational guidelines
- b) Expand number and scope of partnerships to include new, growing sectors: vinyl chloride monomer production, non-ferrous metals mining, cement production, waste combustion;
- c) Enhancing the artisanal and small scale gold mining partnership;
- d) Endeavour to secure adequate funds for the Global Mercury Partnership efforts.

4

Partnership Potential...

a well-developed voluntary framework:

1. Provide a framework for collaborative actions, working towards a common goal.
2. Can be an effective and useful mechanism in achieving immediate mercury reductions and in meeting overall programme objectives:
 - Sets targets/timelines, improves linkages, creates a venue for immediate actions.
 - Flexible character, opportunity for ambitious targets.
 - Can facilitate negotiations & ratifications of any potential future instrument.
3. Drives creative solutions/encourages innovation.

5



Mercury partnership activities

have been initiated in a number of key areas.

artisanal/small-scale gold mining;

coal combustion;

chlor-alkali sector;

reduction in products

batteries, dental amalgams, measuring and control (largely medical sector), electric and electronic switches, fluorescent lamps, cosmetics; and

air transport and fate research.

6

Ongoing and planned activities for Mercury in Products



- Health care sector;
- Waste management guidelines with Basel Convention;
- Awareness raising;
 - This workshop is an initiative under the mercury in products partnership area.
- Mercury in Schools (The Philippines and USA)
- Linkages within Division of Trade, Industry and Economics Sustainable Consumption & Production Branch as well as UNIDO Cleaner Production Centres.

7

UNEP needs in the Overarching mercury partnerships:



Country input to call for information letter by 15 June 2007:

- Seek comments on existing partnership program and on current goals and initiatives.
- Small, informal exploratory meeting - Geneva, June 2007.
- Seek comments on proposed forthcoming process.

Partner participation in overarching partnership meeting in March 2008:

- goal to formalize the overarching partnership framework and business plan.

8

For more information:



- <http://www.chem.unep.ch/mercury/>

- **Contact:**

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SYNERGIES WITH THE BASEL CONVENTION

By Ibrahim Shafii, Secretariat of the Basel Convention

Slide 1

Mercury Waste: Synergies with the Basel Convention

***Ibrahim Shafii
Secretariat of the
Basel Convention***



Slide 2

Contents of the Presentation

- Background of the Basel Convention
- Classification of mercury wastes in Basel Convention
- Basel Convention COP mandate on mercury
- Basel Convention Work Programme on Mercury



Slide 3

Goal of the Basel Convention

- To protect human health and the environment from the adverse impacts of hazardous and other wastes from the generation, transboundary movements and management

– entered into force on 5 May 1992

– 168 States Parties and European Community



Slide 4

Hazardous Wastes Controlled by the Basel Convention



- Annexes I, VIII and IX, exhibiting Annex III characteristics (**Art. 1(1)(a) of Annex I**)

- Annex II (**Art. 1(2)**)

- Wastes considered hazardous under the national legislation of a Party, as notified to the Secretariat under Article 3 (**Art. 1(1)(b)**) (This information may be accessed at the Secretariat's website: [www.basel.int / natdef / frsetmain.php](http://www.basel.int/natdef/frsetmain.php))



Slide 5

Environmentally Sound Management

- Central Policy instrument is Environmentally Sound Management (ESM):

“taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes”

- ESM includes minimizing the generation of such wastes, reducing transboundary movements, improving treatment and disposal, and ensuring such wastes are handled as close as possible to where they were generated



Slide 6

Classification of mercury waste in the Basel Convention

Annex I

- Y1 – Clinical wastes from medical care in hospitals, medical centres and clinics
- Y17 – Waste resulting from surface treatment of metals and plastics
- Y18 – Residues arising from industrial waste disposal operations
- Y29 – Mercury; mercury compounds



Slide 7

Classification of mercury waste in the Basel Convention

Annex VIII (List A)

- A1010 – Metal wastes and waste consisting of alloys of ...mercury**
- A1030 – Wastes having as constituents or contaminants any of the following....mercury; mercury compounds**
- A1170 – Unsorted waste batteries (when containing Hg)**
- A1180 – Waste electrical and electronic assemblies or scrap containing e.g. Mercury-switches; glass from CRTs (containing Hg)**
- A2010 – Glass waste from CRTs and other activated glasses**



Slide 8

Classification of mercury waste in the Basel Convention

Annex VIII (List A)(contd)

- A4020 – Clinical and related wastes**
- A4100 – Wastes from industrial pollution control devices**
- A4140 – Waste consisting of or containing off-specification or outdated chemicals corresponding to Annex I categories**



Slide 9

Basel Convention COP Mandates on Mercury

Decision VIII/33 of COP8

- **Adopted the programme and budget for 2007-2008 and agreed to include a new Strategic Plan focus area on mercury**
- **Agreed that in cooperation with UNEP to develop partnerships around the theme of environmentally friendly technologies and awareness raising regarding avoidance, use and disposal of mercury wastes; develop capacity building and technical assistance programmes to reduce and prevent pollution from mercury; and to develop guidelines on ESM of mercury waste with emphasis on sound disposal and remediation practices.**



Slide 10

Basel Convention Work Programme on Mercury 2007-08

In cooperation with UNEP Chemicals:

- **to develop partnerships around the theme of environmentally friendly technologies and awareness raising regarding avoidance, use and disposal of mercury wastes;**
- **develop capacity building and technical assistance programmes to reduce and prevent pollution from mercury; and**
- **to develop guidelines on ESM of mercury waste with emphasis on sound disposal and remediation practices.**



Slide 11

Basel Convention Work Programme on Mercury 2007-08

Component I: Development of technical guidelines on ESM of mercury waste

- A draft Table of Contents were developed
- Process for selection of consultants to develop the full technical guidelines is in progress
- First draft expected in June 2007
- Comments/input will be invited from Parties and other stakeholders
- Draft technical guidelines will be presented to the OEWG meeting in September 2007
- Work through a small intersessional working group (if established by OEWG)
- Possible adoption by COP9 (June 2008)



Slide 12

Basel Convention Work Programme on Mercury 2007-08

Component II:

In cooperation with UNEP Chemicals

- implementation of pilot projects in selected countries on environmentally sound technologies and awareness raising regarding avoidance, use and disposal of mercury and its wastes; and
- develop capacity building and technical assistance programmes to reduce and prevent pollution from mercury
- Subject to availability of funds



Slide 13

FURTHER INFORMATION



Secretariat of the Basel Convention
International Environment House
15 Chemin des Anemones
Chatelaine CH-1219
GENEVA, SWITZERLAND
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E-mail: ibrahim.shafii@unep.ch



TECHNOLOGY CONVERSION TO MERCURY-FREE ALTERNATIVES : OVERVIEW

By Peter Maxson, Concorde Eas/West Sprl

- Overview -

Technology Conversion to Mercury-Free Alternatives

Peter Maxson
Concorde East/West Sprl - Brussels

“Reducing Mercury Use and Release in Products”

Workshop organised and sponsored by:
UNEP Chemicals Branch - Division of Trade, Industry, and Economics
Ministry of Natural Resources and Environment of the Kingdom of Thailand
United States Environmental Protection Agency

Bangkok, 17-19 May 2007 – Siam City Hotel

Slide 2

Mercury-free technologies

- **Alternative technologies exist (except lamps?)**
- **Reliability is good**
- **Prices are most often competitive**
- **Requirement of mercury device as a spare part is not common**
- **For manufacturers: healthier working environment, less hazardous waste disposal, better public image, etc.**
- **Then why not convert to mercury-free?**

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

Slide 3

Barriers to change

- **Insufficient awareness of contribution to mercury problems**
- **Lack of awareness of alternatives**
- **Lack of local suppliers**
- **Unfamiliarity with the design or function**
- **It is most easy to continue the “old ways”**
- **For manufacturers: need investment funds, process change, customer education, maybe new worker skills, etc.**

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

Slide 4

Concerns about the largest uses

- **Small-scale gold mining**
 - A large problem, but our understanding of the sector, and ability to address it, is improving
- **VCM (China & Russia)**
 - Large and growing user (China)
- **Chlor-alkali**
 - Relatively small number of exceptionally polluting plants
 - Larger number of plants that have received little attention
- **Batteries containing mercury**
 - Mostly East Asia and South Asia sources and uses, but decreasing
 - Responding to international concerns, but regional use may persist

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Slide 5

Major global mercury uses – 2005

Global mercury demand (2005)	Metric tonnes
Small-scale/artisanal gold mining	650-1,000
Vinyl chloride monomer (VCM) production	600-800
Chlor-alkali production	450-550
Batteries	300-600
Dental use	240-300
Measuring and control devices	150-350
Lighting	100-150
Electrical and electronic devices	150-350
Other (paints, laboratory, pharmaceutical, cultural/traditional uses, etc.)	30-60
Total	3,000-3,900

Note: In each of these sectors some mercury recycling takes place, involving the recovery of mercury from products or wastes. Therefore, "net consumption" of mercury in any of these sectors may be significantly lower than "gross consumption."

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Slide 6

Two examples – major uses – diffuse pollution

- Chlor-alkali
- Dental mercury amalgam

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Slide 7

For each example

Key issues for this overview:

- main problems
- alternatives
- costs of conversion
- barriers
- conversion progress

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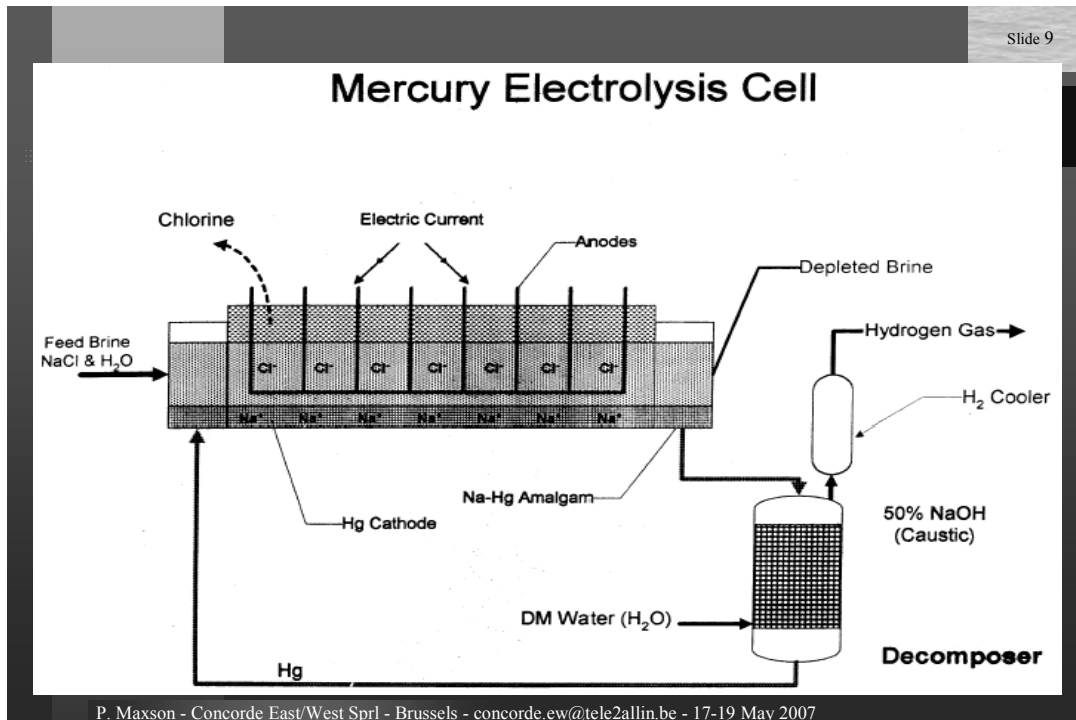
Mercury-cell chlor-alkali production

Slide 8



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Slide 9



Slide 10

Chlor-alkali – main problems

- **Major mercury consumer**
- **Significant emissions and enormous unexplained losses of mercury**
- **Mercury releases to air virtually impossible to measure and adequately control**
- **Mercury releases to water and waste disposal also frequently excessive**
- **Many workers unaware of hazards**

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Slide 11

An open mercury cell – no precautions



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Slide 12

Chlor-alkali – alternatives

- The membrane process is generally considered the best mercury-free alternative
- The asbestos diaphragm is another alternative, and an asbestos-free diaphragm has also been developed
- Alternatively, some facilities are trying to demonstrate that can reduce emissions to a low and insignificant level

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Slide 13

Chlor-alkali – cost of conversion

- **The cost of conversion is quite variable, and typically includes site cleanup costs**
- **Actual costs typically average in the range \$US400-600 per tonne chlorine capacity**
- **This cost must be balanced against large electricity savings (20-30%), lower waste disposal costs, human health benefits, etc.**

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Slide 14

Chlor-alkali – barriers to progress

- **Facility files emission reports declaring low emissions – impossible to control**
- **Return on investment frequently > 5 years**
- **Facility threatens to close if required to convert, implying loss of local jobs**
- **Operator does not wish to know extent of groundwater and soil contamination**
- **Facility may have concrete plans to lower emissions**

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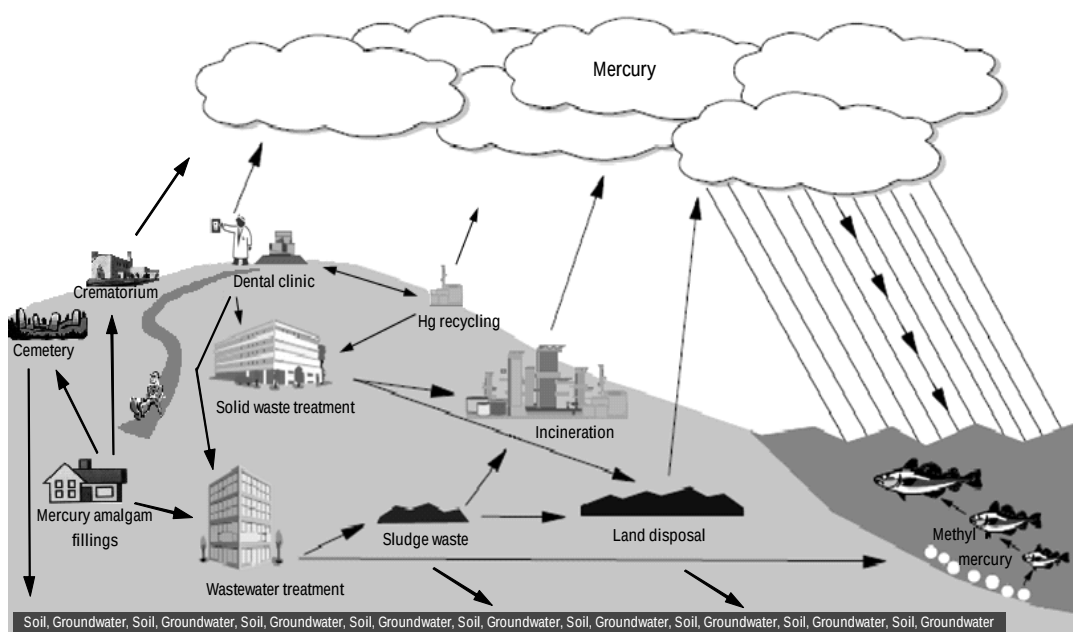
Chlor-alkali – actual progress

- Many countries (Portugal, Canada, Japan, Norway, Ireland, etc.) have already phased out the mercury-cell process; no new mercury cells are being built
- Facilities in the US, EU and India periodically converting to mercury free
- UNEP, WCC, Euro Chlor partnership to provide expertise to reduce mercury uses and releases
- Many facilities have already taken extensive measures to reduce mercury emissions
- In the EU, the IPPC Directive has proposed full conversion to mercury-free by 2007, OSPAR by 2010, while industry suggests 2020

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Dental mercury amalgams

Slide 16



Slide 17

Dental mercury amalgam – main problems

- **Low level of awareness among many dental staff members of hazards**
- **Mercury inventory in mouths is substantial**
- **Very diffuse source of mercury releases**
- **Impossible and costly to control all points of mercury release**
- **Transformation of some dental mercury to methylmercury, which may enter the food chain, especially via fish consumption**

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Slide 18

Dental mercury amalgam – alternatives

Alternatives used in Sweden estimated at:

- **composites (78%)**
- **glass ionomers (13%)**
- **amalgam (6%)**
- **compomers (3%) and**
- **ceramic (1%)**

Alternatively, far greater efforts may be made to remove mercury from the dental waste stream and dispose of it as hazardous waste

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Slide 19

Dental mercury amalgam – cost of alternatives

- **Dentists normally charge more for alternatives**
- **Actual cost of filling materials is typically a minor percentage of dental treatment**
- **Installation of separators in dental clinics in the US estimated at \$US 50-100/month, and permits (if proper maintenance) >90% of mercury to be separated from the waste stream**
- **Full costs of mercury amalgams to human health and environment are very high**

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

Slide 20

Dental mercury amalgam – barriers to progress

- **Dental associations may not encourage dentists to favour alternatives**
- **Insurance companies may not reimburse higher cost of alternatives**
- **Alternatives may require some additional training or techniques for proper use**
- **In many regions there is little government pressure on dentists to remove mercury from waste and dispose as hazardous waste**

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Slide 21

Dental mercury amalgam – actual progress

- **Denmark, Japan, Sweden, Finland, Norway are phasing out or strongly discouraging mercury amalgams**
- **Some health programmes are no longer reimbursing mercury fillings**
- **The EU is encouraging separators in clinics, and emission controls on crematorium gases**
- **Various states in the US are taking some similar actions**

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

Slide 22

More information on mercury-free chlor-alkali - 1

- **PA Maxson, *Status report: Mercury cell chlor-alkali plants in Europe*, Concorde East/West Sprl for the European Environmental Bureau, Brussels, October 2006.**
- **BREF Chlor-alkali (2001), *Reference Document on Best Available Techniques in the Chlor-Alkali Manufacturing Industry*, European Integrated Pollution Prevention and Control (IPPC) Bureau, IPTS, Sevilla, December 2001. Available at <http://eippcb.jrc.es/pages/Fmembers.htm>**
- **Euro Chlor website <http://www.eurochlor.org>**
- **US EPA (1997b), *Mercury Study Report to Congress*. US EPA, Dec. 1997. Available at: <http://www.epa.gov/mercury/report.htm>.**

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

More information on mercury-free chlor-alkali - 2

Slide 23

- **Fugitive emissions (website).** Detailed operational methods for prevention of fugitive air emissions have been developed by US chlor-alkali firms. See <http://www.usepa.gov/Region5/air/mercury/hgcontrolguidancefinal.pdf>.
- **EU Press release (2005).** European Commission Press release IP/05/303, "State aid: Commission endorses €18.5 million of aid to reduce mercury emissions in Italy," Brussels, 16 March 2005
- **Maxson, P. (2004): Mercury flows in Europe and the world: The impact of decommissioned chlor-alkali plants.** European Commission, Brussels. Available at: europa.eu.int/comm/environment/chemicals/mercury/pdf/report.pdf.

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

More information on reducing dental mercury - 1

Slide 24

- **PA Maxson, Mercury in Dental Use: Environmental Implications for the European Union,** Concorde East/West Sprl for the European Environmental Bureau, Brussels, May 2007.
- <http://www.newmoa.org/prevention/topic/toc.cfm?hub=103&subsec=7&nav=7>
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P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

More information on reducing dental mercury - 2

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- **Maine DEP.** See a detailed comparison of mercury and non-mercury measuring devices and instruments performed for the Maine Department of Environmental Protection at www.maine.gov/dep/mercury/lcspfinal.pdf and the proposed strategy based on that report at www.maine.gov/dep/mercury/productsweb.pdf. Following the submission of this strategy, the Maine Legislature enacted a prohibition on the sale of most mercury measuring devices and instruments effective July 2006.
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More information on reducing dental mercury - 3

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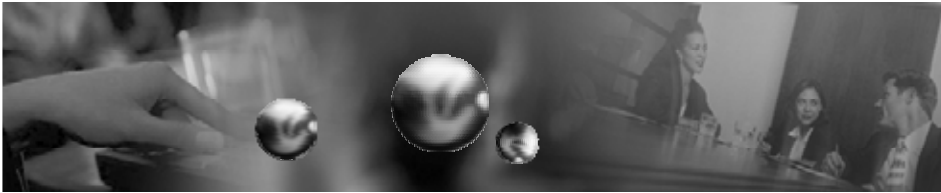
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INITIATIVES BY U.S. STATES TO REDUCE USE OF MERCURY IN PRODUCTS

By Maria Doa, U.S. EPA

Initiatives by U.S. States to Reduce Use of Mercury in Products



United Nations Environment Program
Mercury Products Workshop
Bangkok, Thailand
May 17, 2007

Maria J. Doa, Ph.D.
Director, National Program Chemicals Division
U.S. Environmental Protection Agency



Key Topics

- **State laws to reduce mercury use in products**
- **State database on mercury products**
- **State resources on ways to reduce mercury use in products**

2



Framework of Federal and State Law

- **Responsibility for environmental protection lies with both federal government and governments of individual States**
- **State governments can promulgate laws that are more environmentally protective as federal laws and regulations**
- **For mercury in products and wastes, some States have taken initiatives that go beyond federal requirements**

3



State Laws to Reduce Mercury in Products

- **Categories:**
 - Labeling
 - Bans
 - Phase-outs
 - Reporting from manufacturers and sellers
- **Summary of State legislation**
www.newmoa.org/prevention/mercury/modelleg.cfm
- **Model State Legislation**
 - www.newmoa.org/prevention/mercury/modelleg.cfm

4



State Laws: Labeling

- **9 States require some products sold in their States to have a label stating mercury was added to make the product**
- **Labels on products, packaging, and inserts (written instructions in packages)**
- **Exceptions: button cell batteries, thermometers**
- **www.newmoa.org/prevention/mercury/imerc/abelinginfo.crm**

5



State Laws: Bans on Certain Mercury Products

- **Numerous States restrict mercury use within State**
 - **Restrictions on sale of elemental mercury**
 - **Restrictions on use of mercury in schools**
- **Prohibit sale of certain mercury products:**
 - **Fever thermometers**
 - **Thermostats**
 - **Measuring devices**

6



State Laws: Phase-outs of Certain Mercury Products

- **Restrictions on sales based on amount of mercury or type of product**
- **Exemptions**
 - **Maker or seller must apply**
 - **Must plan to collect and manage at end of product life**
- <http://www.newmoa.org/prevention/mercury/imer c/productban.cfm>
- <http://www.newmoa.org/prevention/mercury/imer c/phaseoutinfo.cfm>

7



State Laws: Reporting Requirements

- **Some States require manufacturers to report on mercury content of products**
- **Product categories**
 - **Electrical switches and relays**
 - **Thermostats**
 - **Measuring devices (barometers, flow meters, medical devices)**
 - **Fluorescent lamps**
 - **Batteries**
 - **Dental amalgam**
 - **Laboratory and chemical reagents**

8



Reporting Requirements, cont'd

- **Who must submit information?**
 - Companies in 7 States that sell mercury products:
 - Manufacturers
 - Distributors (sellers)
- **What information do companies report?**
 - Which mercury products they sell
 - Amount mercury in the products
 - Amount mercury they use in all products in US
- **Information enters IMERC database**

9



IMERC database

- **IMERC = Interstate Mercury Education and Reduction Clearinghouse**
- **13 member States**
- **IMERC in more depth**
 - operated by Northeast Waste Management Officials Association (NEWMOA)
 - NEWMOA is non-profit association of state governments
 - IMERC provides assistance to states that have enacted mercury reduction legislation
 - information for industry & public on mercury products and State programs

10



IMERC Database

- **Contains mercury products information**
 - The required reporting by manufacturers and sellers is entered in database
 - Available to public
 - Online, searchable
 - Updated periodically
- **Uses:**
 - Helps States develop restrictions on mercury products
 - Tracking trends in mercury use
 - Consumer education

11



IMERC Database: Tracking Mercury Reductions

- **21 manufacturers of mercury products reported elimination of those products 2002-2004**
- **Total annual mercury reduction: 3 tons**
- **www.newmoa.org/prevention/mercury/imerc/notification**

12



State Resources: Fact Sheets

- **Other NEWMOA resources on mercury reduction**
- **Fact Sheets on mercury products:**
 - **Cooking equipment**
 - **Electrical switches and relays**
 - **Dental Amalgam**
 - **Measuring Devices**
 - **Thermostats**
 - **Fluorescent lamps**
- **www.newmoa.org/prevention/mercury/imerc/Factsheets**

13



State Resources: Lamp Recycling

- **A priority for many States is increasing recycling of fluorescent lamps**
 - **Aim is to keep mercury out of incinerators and landfills**
 - **Focus is on commercial property owners**
- **NEWMOA has written guidance**
- **www.newmoa.org/prevention/mercury/lamprecycle/index.cfm**

14



State Resources: Schools

- **NEWMOA's materials on mercury in schools:**
 - help educate people about the problem
 - help communities reduce and remove school mercury
 - include fact sheets, check lists, case studies
- **Numerous incidents of mercury spills**
- **Potential exposure to children**
- **Clean up is expensive and disruptive**

15



State Resources: Thermometer Exchanges

- **Many States have organized mercury fever thermometer exchanges**
 - Pharmacies
 - Local community agencies/groups
 - Health care facilities
- **www.neewmoa.org/prevention/mercury/schools/publicize.cfm**

16



State Resources: Background Information on Mercury Topics

- **Quick guides on pollution prevention**
 - overview of mercury in products
automobile sector (mercury switches)
 - dentistry
 - health care
 - schools
 - thermometers
 - thermostats
- **www.newmoa.org/prevntion/topic hub**

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For more information...

- **[www.newmoa.org/prevention/mercury/i
merc.cfm](http://www.newmoa.org/prevention/mercury/i merc.cfm)**

18

PHOTOS OF DAY 1



MERCURY IN HEALTH CARE : WHO POLICY PAPER

by Hisashi Ogawa, World Health Organization (WHO) - Western Pacific Regional Office

Management of Mercury in Health Care Waste

1 -Background

Mercury is a naturally occurring heavy metal. At ambient temperature and pressure, mercury is a silvery-white liquid that readily vaporizes and may stay in the atmosphere for up to a year. When released to the air, mercury is transported and deposited globally. Mercury ultimately accumulates in lake bottom sediments, where it is transformed into its more toxic organic form, methyl mercury, which accumulates in fish tissue.

Mercury is highly toxic, especially when metabolized into methyl mercury. It may be fatal if inhaled and harmful if absorbed through the skin. Around 80% of the inhaled mercury vapour is absorbed in the blood through the lungs. It may cause harmful effects to the nervous, digestive, respiratory, immune systems and to the kidneys, besides causing lung damage. Adverse health effects from mercury exposure can be: tremors, impaired vision and hearing, paralysis, insomnia, emotional instability, developmental deficits during fetal development, and attention deficit and developmental delays during childhood. Recent studies suggest that mercury may have no threshold below which some adverse effects do not occur.

2 -Contribution from the health-care sector and Regulation

Health-care facilities are one of the main sources of mercury release into the atmosphere because of emissions from the incineration of medical waste. The Environment Minister of the Canadian province of Ontario declared on December 2002 that emissions from incinerators were the fourth-largest source of mercury. In the United States, according to US Environmental Protection Agency (EPA) in a 1997 report, medical waste incinerators may have been responsible for as much as 10% of all mercury air releases.

Health-care facilities are also responsible for mercury pollution taking place in water bodies from the release of untreated wastewater. According to a 1999 report, health-care facilities may also have been responsible for as much as 5% of all mercury releases in wastewater. Environment Canada estimates that more than one-third of the mercury load in sewage systems is due to dental practice.

Dental amalgam is the most commonly used dental filling material. It is a mixture of mercury and a metal alloy. The normal composition is 45-55% mercury; approximately 30% silver and other metals such as copper, tin and zinc. In 1991, the World Health Organization confirmed that mercury contained in dental amalgam is the greatest source of mercury vapour in non-industrialized settings, exposing the concerned population to mercury levels significantly exceeding those set for food and for air.

(Source: <http://www.who.int/ipcs/publications/cicad/en/cicad50.pdf>)

According to a report submitted to the OSPAR Commission, in the United Kingdom, annually 7.41 tonnes of mercury from dental amalgam are discharged to the sewer, atmosphere or land, with another 11.5 tonnes sent for recycling or disposed with the clinical waste stream. Together, mercury contained in dental amalgam and in laboratory and medical devices, account for about 53% of the total mercury emissions.

Waste incineration and crematoria are also listed as major sources of mercury emissions. Many countries, such as Armenia, Cameroon, Ghana, Honduras, Pakistan, and Peru, recognize the contributions from hospital thermometers, dental amalgams, hospital waste and/or medical waste incinerators but lack quantitative data. Despite the lack of data, there is good reason to believe that mercury releases from the health sector in general are substantial.

Some countries have restricted the use of mercury thermometers or have banned them without prescription. A variety of associations have adopted resolutions encouraging physicians and hospitals to reduce and eliminate their use of mercury containing equipment.

3 – Occupational health hazard

A variety of studies demonstrate that mercury containing health-care equipment will invariably break. Small spills of elemental mercury on a smooth, non-porous surface can be safely and easily cleaned up with proper techniques. However, beads of mercury can settle into cracks or cling to porous materials like carpet, fabric, or wood, making the mercury extremely difficult to remove. Spilled mercury can also be tracked on footwear. Inadequate cleaning and disposal may expose already compromised patients and health-care staff to potentially dangerous exposures.

4 – Alternatives

A recent study found that at least one manufacturer of the non-mercury alternative was identified where the cost differences between mercury and non-mercury technologies were minimal. The research findings suggest that many non-mercury alternatives are available to address the full range of functions required by consumer products. For health care, these include blood pressure devices, gastrointestinal devices, thermometers, barometers, and in other studies, include the use of mercury fixatives uses in labs.

Both mercury and aneroid sphygmomanometers have been in use for about 100 years, and when working properly, either gives accurate results. Of all mercury instruments used in health care, the largest amount of mercury is used in mercury sphygmomanometers (80 to 100g/unit), and their widespread use, collectively make them one of the largest mercury reservoirs in the health-care setting. By choosing a mercury-free alternative a health-care institution can make a tremendous impact in reducing the potential for mercury exposure to patients, staff and the environment. Aneroid sphygmomanometers provide accurate pressure measurements when a proper maintenance protocol is followed. It is important to recognize that no matter what type of blood pressure measurement device is used both aneroid and mercury sphygmomanometers must be checked regularly in order to avoid errors in blood pressure measurement and consequently the diagnosis and treatment of hypertension.

5 – International Conventions

The UNEP Governing Council concluded that there is sufficient evidence of significant global adverse impacts from mercury to warrant further international action to reduce the risks to humans and wildlife from the release of mercury to the environment. The UNEP Governing Council decided that national, regional and global actions should be initiated as soon as possible and urged all countries to adopt goals and take actions, as appropriate, to identify populations at risk and to reduce human-generated releases.

6 – Strategy

To understand better the problem of mercury in health-care sector, it is recommended that countries conduct assessments of current mercury usage and waste management programs. WHO proposes to work in collaboration with countries through the following strategic steps.

Short-term: Develop mercury clean up and waste handling and storage procedures. Until countries in transition and developing countries have access to mercury free alternatives it is imperative that safe handling procedures be instituted which minimize and eliminate patient, occupational, and community exposures. Proper procedures should include spill clean up response, educational programs, protective gear, appropriate waste storage containment, staff training, and engineered storage facilities. Countries that have access to affordable alternatives should develop and implement plans to reduce the use of mercury equipment and replace them with mercury-free alternatives. Before final replacement has taken place, and to ensure that new devices conform with recommended validation protocols, health-care facilities will need to keep mercury as the “gold” standard to ensure proper calibration of mercury sphygmomanometers.

Medium-term: Increase efforts to reduce the number of unnecessary use of mercury equipment. Hospitals should inventory their use of mercury. This inventory should be categorized into immediately replaceable and gradually replaceable. Replaced devices should be taken back by the manufacturer or taken back by the alternative equipment provider. Progressively discourage the import and sale of mercury containing health-care devices and mercury use in health-care settings, also using global multi lateral environmental agreements to this end. Provide support to countries to make sure that the recovered mercury equipment is not pushed back in the supply chain.

Long-term: Support a ban for use of mercury containing devices and effectively promote the use of mercury free alternatives. Support countries in developing a national guidance manual for sound management of health-care mercury waste. Support countries in the development and implementation of a national plan, policies and legislation on mercury health-care waste. Promote the principles of environmentally sound management of health-care waste containing mercury, as set out in the UN Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Support the allocation of human and financial resources to ensure procurement of mercury free alternatives and a sound management of health-care waste containing mercury.

The most common potential mode of occupational exposure to mercury is via inhalation of metallic liquid mercury vapours. If not cleaned up properly, spills of even small amounts of elemental mercury, such as from breakage of thermometers, can contaminate indoor air above recommended limits and lead to serious health consequences. Since mercury vapour is odourless and colourless, people can breathe mercury vapour and not know it. For liquid metallic mercury, inhalation is the route of exposure that poses the greatest health risk.

Department of Protection of the Human Environment Water, Sanitation and Health 20 Avenue

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August 2005

MANAGEMENT OF MERCURY IN HEALTH CARE WASTE

By Hisashi Ogawa, World Health Organization (WHO), Western Pacific Regional Office



Slide 1

Mercury in Health Care: WHO Policy Paper

Hisashi Ogawa
WHO Western Pacific Regional
Office

Slide 2

Sources of mercury in health care

- Thermometers
- Sphygmomanometers
- Dental amalgam
- Gastrointestinal tubes
- Laboratory chemicals
- Pharmaceutical products
- Electrical applications
- Medical waste incineration, open burning, burning in barrels, gasification, pyrolysis, etc.



Slide 3

Occupational exposure to mercury

- Common pathway is inhalation of mercury vapours (odourless and colourless)
- Permissible concentration for occupational exposure by NIOSH – 0.05 mg/m³
- Equipment breakage and spills occur frequently, but risk perception is low
- Spillage accident is often not reported, and handled carelessly with no protective gear

Slide 4

Mercury release from health care

- **Health care facilities are one of the main sources of mercury release into the atmosphere because of emissions from medical waste incineration**
- **Health care facilities are responsible for mercury pollution taking place in water bodies from the release of untreated wastewater**
- **Mercury contained in dental amalgam is the greatest source of mercury vapour in non-industrial settings**

Slide 5

Strategies

- WHO recognizes that a significant portion of mercury release comes from the health-care sector, and therefore proposes to work with countries through the following strategies
- Short- term
- Medium-term
- Long-term

Slide 6

Short-term strategies

- Develop clean up and waste handling procedures
- Procedures should include:
 - Spill clean up response,
 - Educational programmes
 - Use of protective gear
 - Waste storage containment
 - Staff training
- Countries to initiate phasing out process

Slide 7

Medium-term strategies

- Reduce the number of unnecessary use of mercury equipment
- Inventory of mercury use and the categorization of items into immediate replaceable and gradually replaceable
- Return of replaceable devices to the manufacturer or to the provider of alternative devices
- Progressively discourage the sale and use of mercury containing devices
- Ensure support to countries so that recovered mercury equipment is not recycled back to the supply chain

Slide 8

Long-term strategies

- Support a ban of use of mercury devices and promote the use of alternatives
- Support in developing & implementing national plan, policies & legislation on mercury
- Support allocation of human and financial resources
- Promoting principles of environmentally sound management of health-care waste under the Basel Convention

STRATEGIES TO PROMOTE MERCURY FREE HEALTH CARE

By Josh Karliner, Health Care without Arm (HCWH)

Slide 1



Strategies to Promote Mercury Free Health Care

Joshua Karliner, International Team Coordinator, Health Care Without Harm
www.noharm.org
www.mercuryfreehealthcare.org

UNEP Mercury Products Workshop
Bangkok, May 18, 2007

Slide 2

What is HCWH?



HCWH's work sits at the intersection of two core principles—

- the right to health care and***
- the right to a healthy environment***

We take the Hippocratic Oath: "First Do No Harm," as our point of departure.

We address the paradox inherent in health care systems that pollute and therefore undermine human health.

We transcend that paradox by advocating for a healthier, more ecologically sustainable health care sector and positive alternatives to polluting technologies, products and practices.

Slide 3

Who Is Health Care Without Harm?



"the Campaign for Environmentally Responsible Health Care"

Health Care Without Harm is an international coalition of 443 organizations in 52 countries working to transform the health care sector so it is no longer a source of harm to people and the environment.

Issues: Alternatives to medical waste incineration, mercury, PVC in the health care sector. Green buildings. And more.

Offices in: USA, Prague, Buenos Aires, and Manila. Partners in South Africa and India.

www.noharm.org

Slide 4

HCWH Global Mercury Goals



1. Phase mercury out of the health care industry, globally.
2. Replace mercury in health care with viable, cost-effective alternatives and safely dispose of mercury as it is phased out of the health care system.
3. Contribute to broader coalition, governmental and inter-governmental efforts to eliminate environmental contamination from mercury.

Slide 5

Mercury in Health Care As Messenger

- Addressing mercury in health care raises the public and policy makers' awareness of the issue.
- Eliminating mercury in health care can be a key part of a national, regional and global strategy.



Slide 6

The HCWH Mercury Experience in the US

- Convinced all the top pharmacy chains in the nation to stop selling mercury thermometers.
 - 11 of the top 15 national retailers
 - 20,429 of 31,844 retail stores or 64% no longer sell mercury thermometers
- With allies, passed mercury thermometer bans in 11 states.



Slide 7



- Worked through H2E to convince more than 5,000 hospitals, to sign a pledge to eliminate the use of mercury by 2005
- Convinced the largest Group Purchasing Organizations (GPOs) to take mercury "off contract," including Consorta (buys for 480 hospitals), and Premier and Novation (3,100 hospitals).
- Currently working to convince hospitals to only donate mercury-based medical devices based on prior-informed consent and donor responsibility, or to curtail the practice.

Slide 8

Mercury Free Medicine in the European Union

- Many countries phasing out mercury.
- EU about to ban mercury thermometers; considering sphygmomanometers.
- Sweden has eliminated mercury from health care almost entirely.
- European Commission has approved a mercury export ban. Products may be next.
- HCWH working in coalition on these issues.



Slide 9

New WHO Policy on Mercury in Health Care



World Health Organization

Short Term: Develop and implement plans to reduce the use of mercury equipment and replace with mercury-free alternatives. Address clean-up, storage, disposal.

Medium Term: Increase efforts to reduce use of unnecessary mercury equipment

Long Term: Support a ban of mercury containing devices and promote alternatives.

Slide 10

Four Challenges for Mercury Substitution in Health Care

three "A's" and the Big "D"

We must replace mercury with devices that are:

- **Accurate**
- **Affordable**
- **Available**

The fourth challenge:

- **DISPOSAL**



Slide 11

HCWH Mercury Campaign in Asia, Africa and Latin America

1. Education
2. Demonstration on the ground
3. Policy Development and Implementation
4. Moving Markets— fostering supply and demand.

Slide 12

1. Education: HCWH/UNEP Partnership www.mercuryfreehealthcare.org

Phase 1: 2006

- **SE Asia— Manila—January 25-26, 2006.**
200 Health care leaders from 7 countries in the region
- **Latin America—Buenos Aires August 3-4.**
150 Health care leaders from 11 countries in the region.

Phase 2: 2007

- **Southern Africa – Durban, November 14-16, 2007**
- Country workshops in **Brazil, Mexico, Malaysia, Vietnam**

Phase 3— Contemplated for 2008

- **South Asia, India – 2008**
- More country workshops and policy initiatives.



Slide 13

2. Demonstration: Toward Mercury Free Health Care Change on the Ground

Asia

- More than 30 hospitals already moving toward mercury-free health care in Philippines.
- India– 5 hospitals have piloted mercury free health care. Toxics Link expanding this work.
- China– SEPA, US EPA and HCWH piloting mercury free health care in Beijing.
- HCWH workshops in 2007 in Malaysia, and possibly Vietnam.

Latin America

- More than 40 hospitals moving toward mercury-free health care in Argentina.
- 42 hospitals in Sao Paulo Brazil have switched to mercury free health care. More than 50 more are committed to doing so. HCWH supporting these efforts.
- Mexico, HCWH is working with Mexican government and CEC to pilot mercury free health care in two hospitals in 2007.



Slide 14

3. Policy Initiatives

National Policy Model

- Philippine Ministry of Health developing national policy in the form of Administrative Order to phase out mercury from health care across the country.
- Philippine Department of Environment and Natural Resources has required regional offices to set up storage facilities for mercury containing devices and supplies.

Municipal Policy Model

- City of Buenos Aires, Argentina has issued policy to phase out mercury from 33 public hospitals and 38 health care centers– largest public health system in Argentina. HCWH/US EPA/UNEP engaged in a partnership to support this effort in 12 hospitals). This could be a model for large cities in developing countries.

Policy Development: HCWH/UNDP/WHO

- Global Environment Facility project to pilot mercury free health care in 7 countries: Senegal, Lebanon, Latvia, India, Vietnam, Philippines, Argentina. Policy component.

Global Policy.....



Slide 15

Health Care Leaders Call for a Binding Treaty

"We will advocate through our health care institutions, national governments and professional associations for national legislation and a binding international instrument to substantially reduce global supply and demand of mercury."

-Manila Declaration on Mercury Free Health Care, January 26, 2006

"We...agree to...advocate for a legally binding international instrument, or the inclusion of organic mercury in the Stockholm Convention, so as to substantially reduce the global mercury supply and demand."

--Buenos Aires Declaration, August 4, 2006



Slide 16

4. Moving Markets: Mercury-based Medical Device Industry

Total Global Medical Device Industry Market more than \$100 billion.

Production is growing in Asia. China and India are key producers.

- **Mercury Thermometers**

China: Annual Production (2003): 120 million (40 million for domestic consumption, and 80 million for export.

India: Exports 570,000

- **Mercury Sphygmomanometers**

China: Annual Production: More than 1 million

India: Exports 60,000.

(Sources: Global Village of Beijing; Toxics Link)

- **Alternative Devices: HCWH is investigating**

Anecdotal evidence shows that India and China are increasing production and export of mercury-free devices.

ASIA HAS THE POTENTIAL TO PRODUCE THE ALTERNATIVES AND SELL THEM GLOBALLY



Slide 17

4. Moving Markets: Toward Mercury Free Health Care *Fostering Alternative Industry*

- Must change both demand and supply at the same time.
- Identify existing suppliers of alternatives. HCWH South East Asia has produced a guidebook
- Support the development of affordable, accurate non-mercury thermometer industry in India, China and elsewhere.



Slide 18

Philippines Moving Forward

Demonstrating Change

- South Cotabato Hospital (150 beds) procuring alternative thermometers and blood pressure devices
- National Children's Hospital (250 beds) and Philippine Heart Center (300 beds) training doctors, nurses, staff, waste handlers.
- Manila Adventist Medical Center, 150 beds, has switched to alternative thermometers and blood pressure devices.
- Central Luzon Doctor's hospital 200 beds, conducting comprehensive mercury audit.
- Davao is conducting region-wide inventory.



Slide 19

Philippines Moving Forward

2. **Shifting Policy**–
Administrative Order
Mercury Waste Management
3. **Moving Markets**– Identifying suppliers,
increasing demand.
4. **Working Regionally in SE Asia.**

Slide 20



Mercury in Vaccines a Precautionary Approach

- Despite the lack of conclusive scientific evidence of harm from thimerosal, enough plausible concern has been raised to justify reformulating vaccine preparations so that they do not require thimerosal.
- This conclusion is justified because organic mercury is a neurodevelopmental toxicant and there are viable alternatives to vaccine formulation without sacrificing safety or efficacy.
- Regulators, public health officials and pharmaceutical companies have recognized this and moved to phase-out thimerosal use in the US and in several European countries.
- Such phase-outs, by switching to single-dose vaccines that do not require thimerosal as a preservative, are positive steps, but do not address the broader problem of multi-dose vaccine preparations in developing countries, where thimerosal use continues.
- In this regard, viable options for the delivery of multi-dose vaccines in developing countries should be developed as a matter of priority. This effort should be led by the World Health Organization, with participation from other intergovernmental agencies, national governments, pharmaceutical companies, international NGOs and foundations.

Slide 21



MERCURY REDUCTIONS IN THE DENTAL SECTOR IN SWEDEN

By Eva Sandberg, Swedish Chemical Agency, Sweden



Slide 1



Mercury Reductions in the Dental Sector in Sweden

Eva Sandberg
Senior Adviser
International Secretariat
Swedish Chemicals Agency

KEMI
KEMIKALIEINSPEKTIONEN
www.kemi.se

Slide 2

Outline

- Background (brief)
 - The mercury problem in Sweden
 - Swedish policy on mercury
 - Actions
- Dental amalgam phase-out
- Mercury Reductions in the Health Care Sector (2nd part)

KEMI
KEMIKALIEINSPEKTIONEN
www.kemi.se

Slide 3



Slide 4

Sweden in brief

9 million inhabitants
3 major urban areas

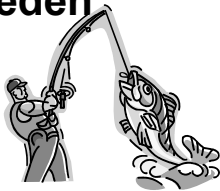
410 000 km² total area
240 000 km² forest land
>100 000 lakes

0.7 tonnes Hg air emission
4.2 tonnes Hg deposition
(mainly from outside Sweden)

KARTA ÖVER SVERIGE

KEMI
KEMIKALIEINSPEKTIONEN
www.kemi.se

Slide 5



Mercury is a problem in Sweden

Fish in 50 000 lakes exceeds WHO limit (0.5 mg Hg/kg).

Levels in forest soil increases and probably effects important soil microbial functions.

Deposition must be reduced by 80% to reach safe levels.

International action needed.

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KEMIKALIEINSPEKTIONEN
www.kemi.se

Slide 6

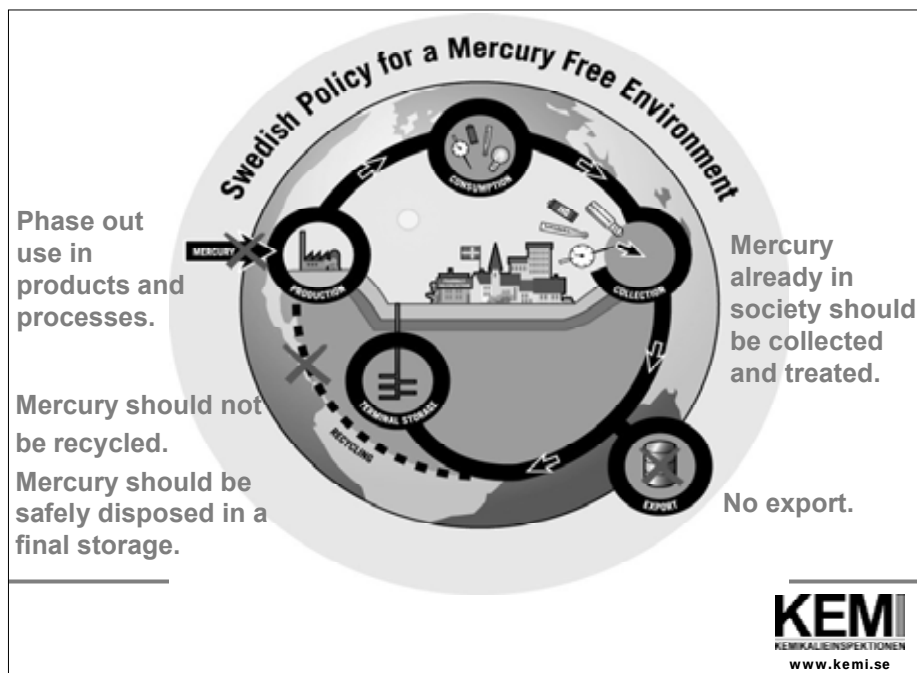
Environmental Quality Objective: A non-toxic environment

Interim target regarding mercury

- Newly manufactured finished products will as far as possible be free from mercury, as soon as possible, but no later than 2007.
- Nor will mercury be used in production processes unless the company can prove that human health and the environment will not be harmed.
- Finished products already available will be handled in such a way that mercury is not released to the environment.
- The spread to Sweden by air or water of mercury will decrease continuously.

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Slide 8

Swedish actions in brief

- Ban on the sale of fish from certain lakes in the early **1970's**
- General recommendation for fish consumption
 - Pregnant and breast-feeding women: No consumption
 - General public: Once a week
- Reductions of emissions from point sources
- Ban on certain Hg-containing products in **1992**
- Export ban entered into force 1997 →

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Slide 9

... actions in brief

- Collection of Hg and identification of Hg-products
1994 – 1999
- Parliament decision 2003 on final storage of Hg
and Hg-containing waste, latest 2015
- Notification Feb 2006 to EU and WTO of a general
ban on Hg and Hg- containing products
(use, placing on the Swedish market, export and
import)
 - Not yet entered into force



Slide 10

Swedish regulation on mercury

- Mercury and its compounds and preparations
may not be exported professionally from
Sweden
- Certain goods (measuring instruments, electrical
components such as switches, thermostats, relays
and circuit breakers) containing mercury may not
be manufactured or sold or used if not in use
before 1995
- These goods may not be imported from third
countries or exported from Sweden



Slide 11

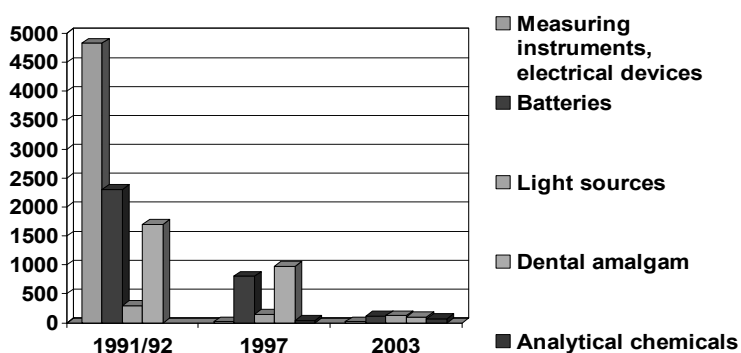
Investigation of a national general ban on the marketing and use of Mercury

- Includes for example dental amalgam, chemicals and chlor-alkali industry
- Proposal to Government 30 June 2004
- Report is available in English at www.kemi.se



Slide 12

Yearly supply of mercury in products in Sweden (kg)



Slide 13

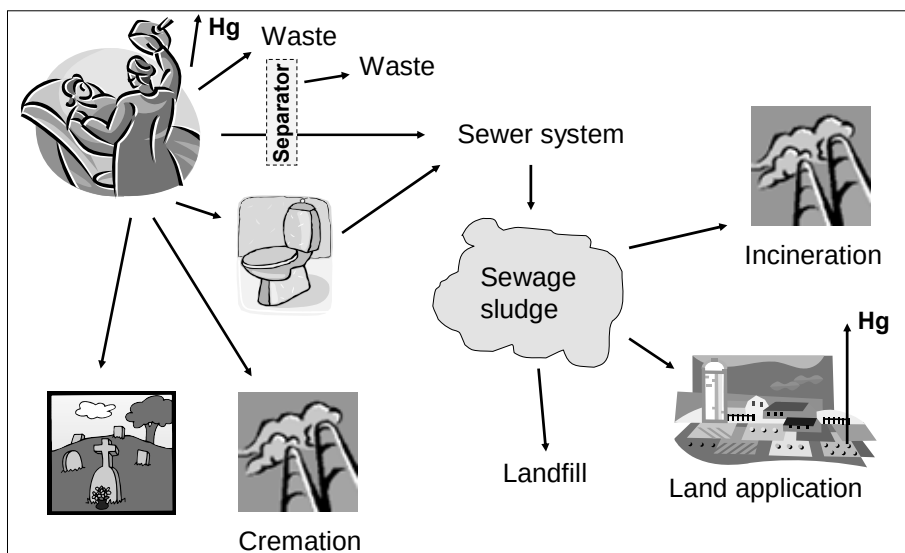
Dental amalgam

- Dental amalgam contains about 50 % Hg
- Mercury is released to the environment at several steps
- Risks to the environment and to human health



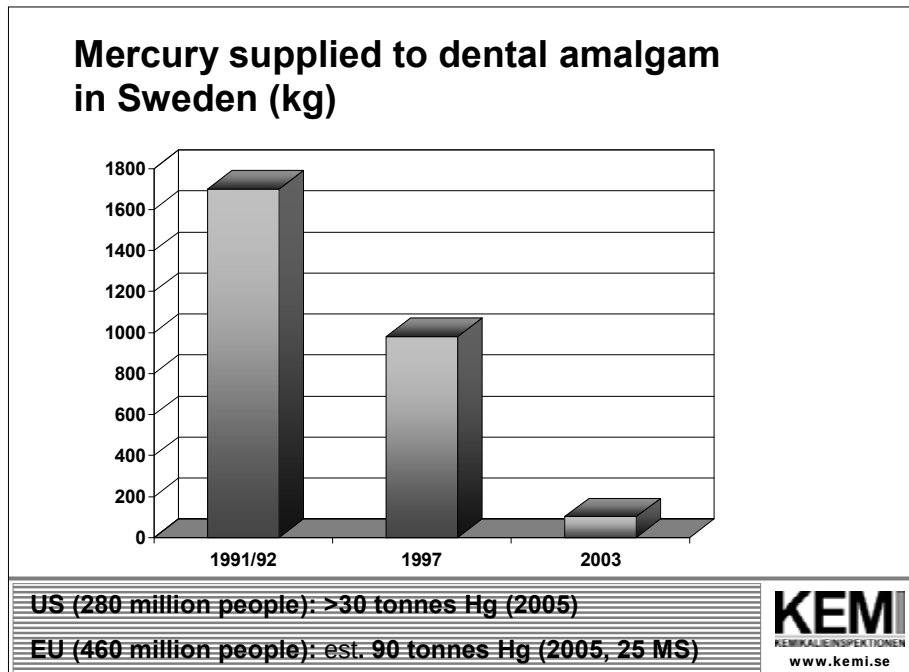
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Slide 14



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Slide 15



Slide 16

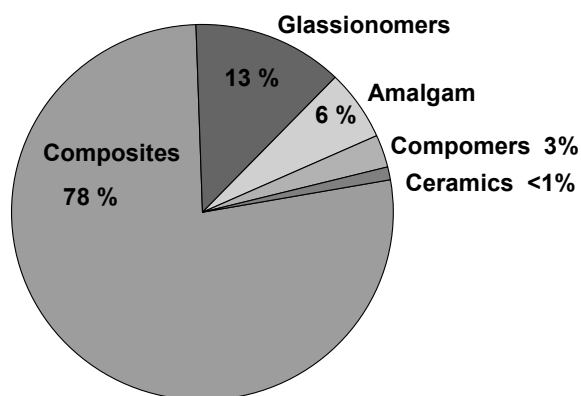
Mercury-free dental fillings

- Dental amalgam has been replaced almost totally during the last six to seven years in Sweden
- Swedish suppliers of dental materials and users from both public and private sector are the sources of the used statistics in the new report
- Composites are the most commonly used materials in Sweden

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Slide 17

The shares of dental filling materials used in Sweden (% by weight*)

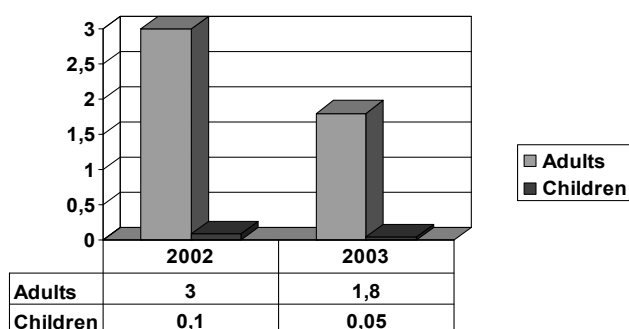


* One kilo of composites will fix many more teeth than one kilo of amalgam due to the differences in weight of the materials.

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Slide 18

Amalgam fillings in % of total fillings at Folktandvården in Sweden 2002 and 2003



Source: Swedish Board of Health and Welfare

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Slide 19



Success factors

- High awareness of the environmental and health risks among patients and dentists.
- Demand for and access to other filling materials.
- Agreement between the state and the county councils in 1995 to phase-out use from children's dentistry.
- Since 1999 no financial support given from Swedish dental insurance for amalgam fillings.

Slide 20



Thank you for your attention!

Thanks to colleagues Petra Ekblom and Ulla Falk

MERCURY REDUCTIONS IN THE HEALTH CARE SECTOR : THE SWEDISH EXPERIENCE

By Eva Sandberg, Swedish Chemical Agency, Sweden

Slide 1



Mercury Reductions in the Health Care Sector – The Swedish Experience

Eva Sandberg
Senior Adviser
International Secretariat
Swedish Chemicals Agency

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Slide 2



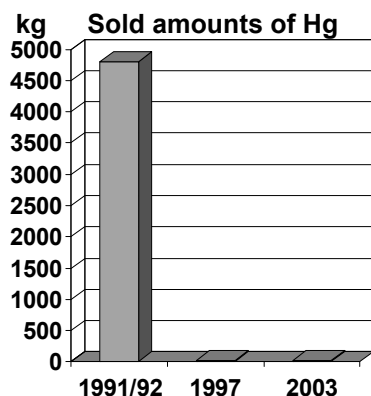
Mercury Reductions in the Health Care Sector – The Swedish Experience

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Senior Adviser
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Swedish Chemicals Agency

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www.kemi.se

Slide 3

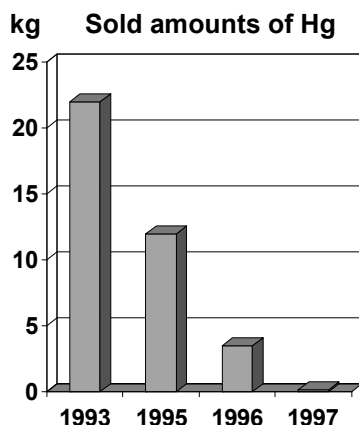
Measuring instruments and electrical components/devices



- Prohibitions for import, marketing and sale in 1992-93
- In general alternatives were available
- Time-limited exemptions

Slide 4

Thermometers



- Ban in force 1993
- No dispensations or exemptions in health sector

Slide 5

Sphygmomanometers for blood pressure measurements

- Mercury sphygmomanometers, phasing out started in the 1980's and is now complete
- Aneroid equipment, mercury-free technique for routine but also precise measurements

Slide 6

Plethysmographic devices both for blood flow and blood pressure measurements

Slide 7

Strain gauge techniques

- Both mercury and mercury-free techniques
- Mercury technique is the only validated method for certain kinds of arteriosclerosis
- Not medical but economical reasons that mercury technique is still used

Slide 8

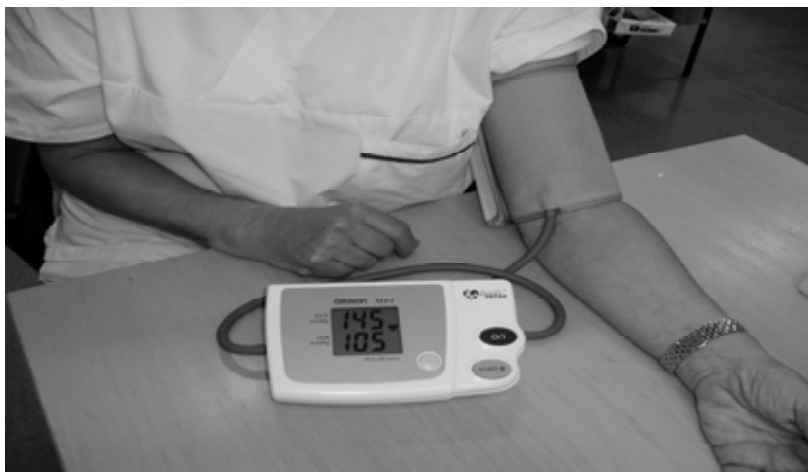
- mercury technique is used for research due to reference material that has been built up
- within 4-5 years mercury-free technique will be fully validated and can be used both for clinical and research purpose

Slide 9

Oscillometric-, Doppler-, photocell techniques

- Mercury-free techniques
- Replacement cost restrict immediate acceptance
- Within 4-5 years fully validated

Slide 10



Slide 11

Reports available at www.kemi.se

- Kemi PM No 9/05. **Mercury-free Dental fillings – Phase-out of amalgam in Sweden.** 2005.
- Kemi PM No 7/05. **Mercury-free blood pressure measurement equipment – Experiences in the Swedish healthcare sector.** 2005.
- Kemi Report No. 4/04. **Mercury – Investigation of a general ban.** 2004.
- Mercury in products – a source of transboundary pollutant transport, 1997



Slide 12



Slide 13





MERCURY
GLOBAL CHALLENGE – GLOBAL SOLUTIONS

Mercury is a global environmental problem. This fact is well documented and widely accepted. The magnitude of the mercury problem has been analysed, discussed and acknowledged globally in UNEP's Governing Council and other leading international and regional fora. Some measures have already been taken to reduce supply, demand and releases. But there is still need for further global action.

A LEGALLY BINDING INSTRUMENT ON MERCURY FOR FAIR AND EFFECTIVE LONG-TERM ACTION

A legally binding international instrument could be the most expedient tool for creating a common vision and coordinating measures to overcome the global mercury problem, in a fair manner.

<http://www.norden.org/kemikaliegruppen/sk/mercury.asp?lang=6>



Slide 14



Thank you for your attention!

Thanks to colleagues Petra Ekblom and Ulla Falk



MERCURY REDUCTIONS IN SCHOOLS AND HOSPITALS

By Maria J. Doa, U.S. EPA

Slide 1



Mercury Reductions in Schools and Hospitals

United Nations Environment Program
Mercury Products Workshop
Bangkok, Thailand
May 17, 2007

Maria J. Doa, Ph.D.
Director, National Program Chemicals Division
U.S. Environmental Protection Agency

Slide 2

The Big Picture: Schools

- U.S. schools face many challenges.
- Environmental health issues usually take a back seat.
- Stockpiles of chemicals, including mercury, are but one of many environmental and safety issues.
- Often schools do not have any staff that focus exclusively on environmental or environmental health issues.

Slide 3

Schools: Why Be Concerned About Chemical Management?

- Health hazards: immediate & long-term
- Safety hazards: stability of shelves, storage methods and incompatibility
- Environmental harm: groundwater, discharges to streams/rivers, air pollution
- Hidden costs/liabilities: lawsuits, fines, paperwork/fees, insurance premiums, etc

Slide 4

Examples Poor Management Practices

- Water reactives near/under sink
- Heavy containers on high shelves
- Corrosives on (corroded) metal shelves
- Flammables stored on wood
- Alphabetical storage (incompatible?)
- Unlabeled/"mystery" contents
- Chemicals next to food

Slide 5

Incompatible Chemical Storage



Slide 6

Inappropriate Storage



Slide 7

No Security: Easy Access to All



Slide 8

Case Study: Washington, D.C.

- On October 2, 2003 a student obtained 250 milliliters of liquid elemental mercury from a science laboratory.
- Contamination spread via several modes of transportation on student shoes and clothing.
- Breathing zone mercury vapor concentrations were greater than EPA standards.
- The school was closed for cleanup and reopened after about a month.
- Eleven homes were found to be contaminated and about 16 families were displaced for a month.
- Total cleanup costs were about \$1,500,000.

Slide 9

Costs and Benefits

- Cleaning up after an incident is costly:
 - Cleanout costs average \$5,000 per school, but can be \$30,000 or more if radioactive or explosive chemicals are involved.
- Cleanout and prevention programs are good investments:
 - Prevention programs can eliminate potential incidents.

Slide 10

U.S. Schools Chemical Cleanout Campaign (SC3)

- Our preliminary estimates for the US: a minimum of 33,000 middle and high schools across the country have unnecessary or mismanaged chemicals, potentially affecting 21 million middle and high school students nationwide.

Goals SC3 of the Program

- Remove outdated, unknown, excessive, or unnecessarily hazardous chemicals from secondary schools;
- Establish prevention activities such as good purchasing and management practices;
- Raise national awareness of the problem and create sustainability of the program.

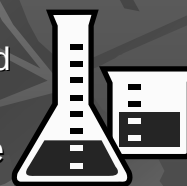


Slide 11

U.S. Schools Chemical Cleanout Campaign (SC3)

Participating schools receive up to \$25K for:

- technical assistance, school audits, and training;
- teacher and administrator education and awareness-building;
- resources for hazardous chemical waste handling and disposal;
- emergency response planning;
- pollution prevention plan for avoiding future stockpiles.

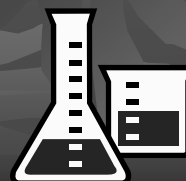


Slide 12

U.S. Schools Chemical Cleanout Campaign (SC3)

Results From 10 Pilots in 2004

- 500 Schools cleaned out
- Over 72,000 pounds chemicals recovered
- Over 1500 teachers, personnel trained
- \$235,000 leveraged from other sources
- Over 585,000 children affected

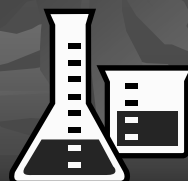


Slide 13

U.S. Schools Chemical Cleanout Campaign (SC3)

Types of Chemicals Recovered from Pilots:

- Ignitables, reactives: 23.8%
- Multiple Hazards 21.3%
- Toxics and Poisons: 23.9%
- Corrosives: 15.3%
- Other: 8.1%
- Carcinogens, expected carcinogens: 4.7%
- Not Harmful: 2.9%



Slide 14

Mercury Reduction and Chemical Management in Philippine Schools

- Two mercury spills in 2006 resulted in students being poisoned.
- EPA provided technical assistance with the clean-up.
- Pilot project between the Philippine government, the University of the Philippine and the U.S. EPA through the UNEP Mercury Products Partnerships.

Slide 15

Project Description

- Under UNEP Partnerships, EPA is working with the Philippine to get mercury out of schools and promote safe chemical management.
- A case study will be developed.
- Development of train-the-trainer manual
- Conduct multi-day workshop seminar on proper use and management of mercury and other dangerous chemicals in schools.

THE INTERAGENCY COMMITTEE FOR ENVIRONMENTAL HEALTH APPROACH TO A MERCURY SPILL : THE ST.ANDREW'S SCHOOL STORY

By Irma Makalinao, Philippines

Slide 1



The Interagency Committee for Environmental Health Approach to a Mercury Spill: The St. Andrew's School Story

Irma R. Makalinao MD FPSCOT DPPS
Professor of Pharmacology and Toxicology
University of the Philippines College of Medicine

Philippine Society of Clinical and Occupational Toxicology

Slide 2

Some information about St Andrews School



Total Student
Population = 2364

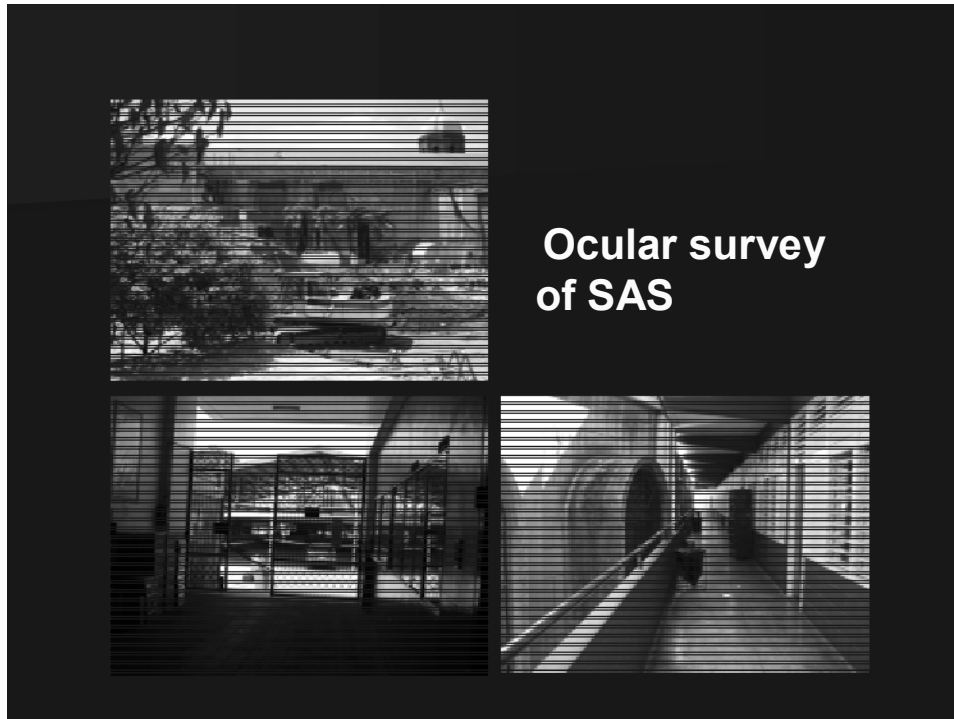
- High School = 1100
- Elementary = 1050
- Pre-school = 214

Total Staff = 140

- 69 Teachers
- 71 Support

From the IACEH reports and presentation

Slide 3



Slide 4

Case Presentation

- On February 16, 2006 an UNQUANTIFIED amount of Mercury were spilled in SAS rooms 130 and 131
 - RELEVANT SCHOOL AUTHORITIES WERE NOT NOTIFIED
 - NO IMMEDIATE CLEAN UP OF THE ACUTAL SPILL WAS DONE
 - NO IMMEDIATE DECONTAMINATION OF THE CHILDREN WAS DONE

Slide 5

A PROBLEM DISCOVERED

- **The INDEX CASE:** a telephone referral to UP NPMCC of a 14 year old male with exposure to mercury last Feb 16, 2006 with complaints numbness, redness and pain of the extremities



- **SAS teacher requested for examination of the rest of the 80 children who belonged to the rooms with mercury spill – FURTHER CLINICAL INVESTIGATION**



Slide 6

Clinical History & Course

- **Exposure:** February 16, 2006 morning , 80 students, Gr 7, ages 13-14 years old and the Science teacher from St. Ambrose and St. Francis de Sales sections exposed to elemental mercury

HOW MUCH MERCURY = approximately 150, 100 gms?????

- **Mode of Exposure:** Dermal and inhalational
- **Onset of symptoms:** Late afternoon-early evening

- **Symptoms:**

Headache	57.0%	Fever	26.0%
Pruritus	41.9%	Cough/colds	23.6%
Dyspnea	36.6%	Chest pain	20.4%
Weakness	35.5%	Muscle pain	17.2%
Dizziness	34.4%	Nausea	16.1%

Numbness 8.5%

Redness/swelling of upper extremities 4.3%

From the IACEH reports and presentations by DOH

Slide 7

ACUTE MERCURY VAPOR POISONING: METAL FUME FEVER

- **106 students/faculty screened by UP NPMCC on February 20, 2006**
- **97 underwent evaluation on February 21-22, 2006**
- **10 students were admitted at PGH because of fever, rashes, difficulty of breathing, chest pain, body malaise**

Slide 8

A PROBLEM DISCOVERED

The INDEX CASE: a telephone referral to UP NPMCC of a 14 year old male with exposure to mercury last Feb 16, 2006 with complaints numbness, redness and pain of the extremities



SAS teacher requested for examination of the rest of the 80 children who belonged to the rooms with mercury spill – FURTHER CLINICAL INVESTIGATION



**AN INTERAGENCY RESPONSE
ACTIVATED**

Slide 9

ONE OF THE FIRST STEPS TAKEN



Slide 10

IACEH Key players and Task Force Mercury for SAS and others

- Department of Health
- Department of Environmental and Natural Resources
- Department of Labor and Employment Occupational Safety and Health Center
- Department of Interior and Local Government (Bureau of Fire Protection Special Rescue Unit)
- Department of Education
- University of the Philippines Manila
 - National Poison Management and Control Center
 - Department of Pharmacology and Toxicology
- AD HOC members of the Task Force Mercury
 - IACEH (specified)
 - Office of Congressman Eduardo Zialcita
 - The Local government and City Health officials of Paranaque
 - The SAS representatives
 - School officials
 - Parents and alumni
- Private organizations

Slide 11

THE MERCURY RESPONSE CONSIDERATIONS

1. GENERAL INFORMATION
2. MERCURY VAPOR ACTION LEVELS
3. MERCURY MONITORING AND SAMPLING
EQUIPMENTS
 1. Mercury monitoring/ Screening in the Field
 2. Mercury sampling for Off-site analysis
4. MERCURY CONTAMINATION ASSESSMENT
 1. Site access
 2. Relocation program

Slide 12

THE MERCURY RESPONSE CONSIDERATIONS –cont'd

5. REMOVAL
 1. Pre-Decontamination Documentation
 2. Screening of items
 3. Decontamination procedures
 1. **Mercury vacuum**
 2. **Mercury cleaning solutions**
 3. **Decontamination by sealing**
 4. **Heating and Venting**
 4. Confirmation of clean-up
 5. Disposal
 6. Waste Profile and Manifest

Slide 13

THE MERCURY RESPONSE CONSIDERATIONS –cont'd

6. DOCUMENTATION PROCEDURE FOR
CONTAMINATED ITEMS
 1. Replacement Considerations
 2. Restoration

Slide 14

Some of the Issues raised

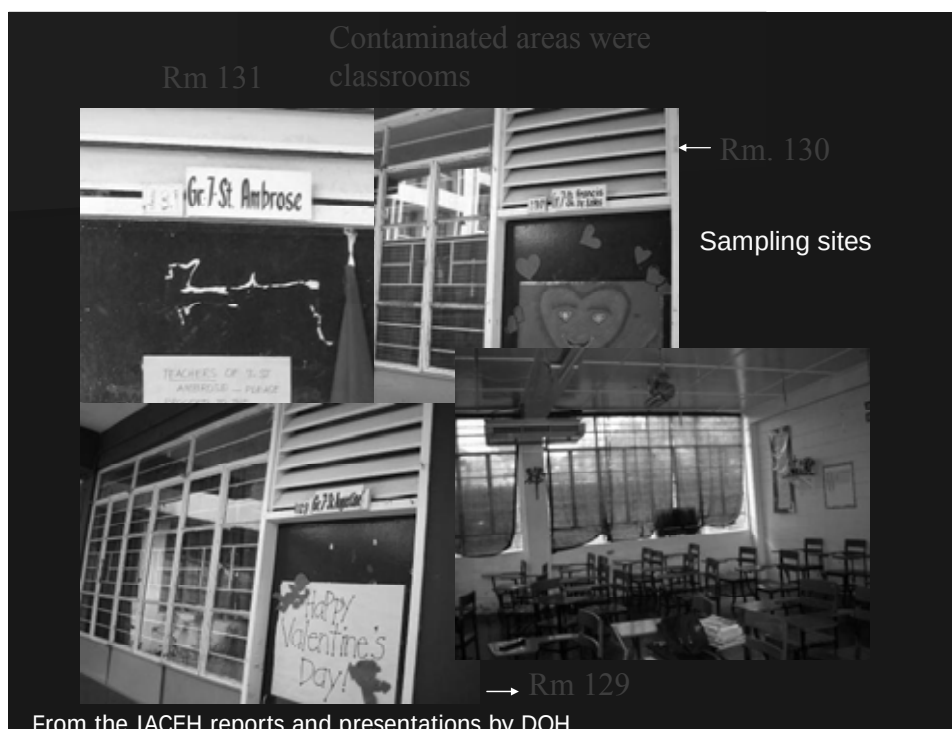
- Clean up goals (which standard are we going to use?)
 - HEALTH GUIDANCE Values and reoccupancy levels
- Was this is small spill or a large spill?
- Do we have the capability to clean the place (trained manpower and equipments)
- Do we need assistance from outside the country?
- Do we have policies and legislation in place?

Slide 15

Inventory of Available Resources for the Environmental Sampling:

1. EOHO-NCDPC: RAE sampling equipment and mercury (Hg) direct reading detector tubes – 6 pieces, alcohol-free wet wipes for swipe samples, zip-locked plastic bags, labels, markers, flashlight, chemical cartridge respirators for mercury (1 set), nitrile gloves and safety glasses.
2. OSHC-DOLE: Low flow sampling pump, Chemical cartridge respirator, safety glasses and gloves.
3. SRU-BFP: Chemical protective clothing (CPC) for level B, Self-contained breathing apparatus, safety boots, gloves, decontamination equipment, Draeger samplers, fire truck.

Slide 16



Slide 17

Air Sampling



**Low Flow Sampling
Pump of the OSHC-
DOLE**



From the IACEH reports and presentations by DOH

Slide 18

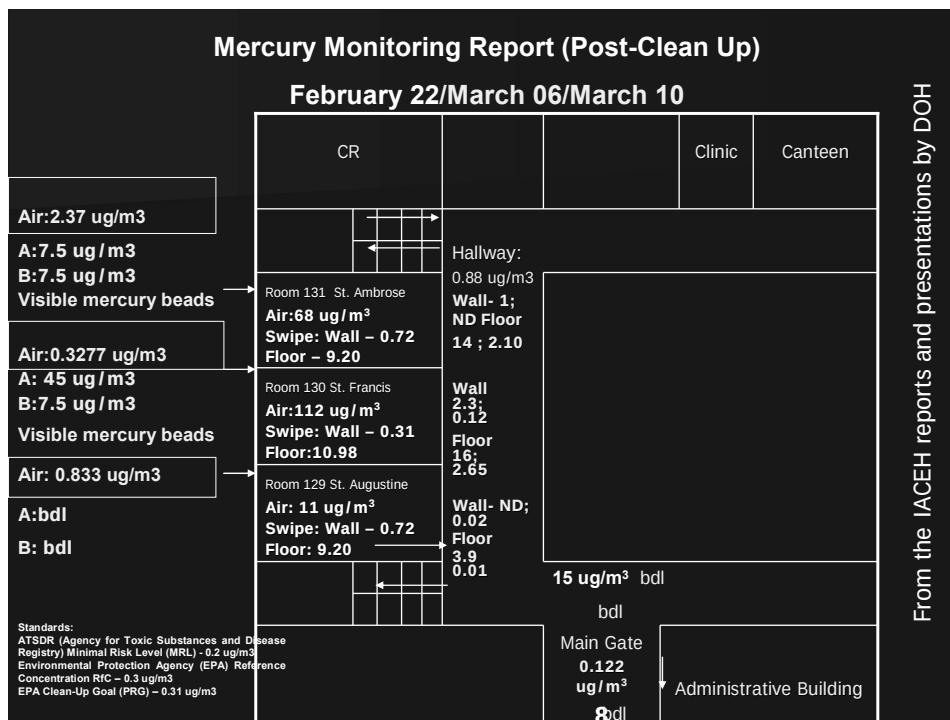
Comparison of Post-Clean Up monitoring and the Independent sampling after the clean-up

Areas Monitored	Ambient Concentration of Mercury, mg/m ³		
	Before Clean-up	After Clean-up	
	22 Feb 2006 (OSHIC)	6 Mar 2006 (CHEMPRO)	10 Mar 2006 (OSHIC)
At garage area about 6 meters from gate of classroom	0.011	-	bdl
Guard station near main gate	0.015	-	bdl
Along street fronting main gate	0.008	-	bdl
Gate	-	0.00012	-
Room 131 (1.5 m height)	0.068	0.00237	0.0075
Room 130 (1.5 m height)	0.112	0.00032	0.045
Room 129 (1.5 m height)	0.011	0.00083	bdl
Room 131 (below 1.5 m height)	-	-	0.0075
Room 130 (below 1.5 m height)	-	-	0.0075
Room 129 (below 1.5 m height)	-	-	bdl
Library	-	-	bdl
Hallway / Passageway	-	0.00881	-

*bdl = below detection limit

From the IACEH reports and presentations by DOH

Slide 19



Slide 20




Air sampling activities were done on;

(a) February 22 and March 10, 2006 (post-clean-up monitoring) by the ff:

Rapid environmental monitoring assessment/15 minute sampling

SRU-BFP / DILG
EOHO-NCDPC-DOH
OSHC-DOLE
DPT-CM/UP

(b) March 25-27, 2006 (SRU,DOH,UP)

Direct reading Jerome MVA 431X (machine from Shell)



Slide 21

Moving forward to clean St Andrews

Collaboration with the private sector and the
school initiatives

Assistance for Clean up provided by the US
Environmental Protection Agency

Slide 22

Mercury in Schools

- bulk elemental mercury
- laboratory chemicals (e.g., mercury oxide, mercury chloride), mercury sulfate, mercury nitrate, mercury iodide)
- mercury laboratory thermometers, fever thermometers
- mercury barometers
- molecular motion demonstration devices with liquid mercury
- mercury switches

Slide 23

Where do we go from here?

1. CRITICAL ISSUE:
 1. Ensuring the health and safety of the school community particularly of children and pregnant women
 2. REOPENING OF THE SCHOOL
2. BENEFITS ANTICIPATED:
 1. POLICY and Legislation
 2. Creation of a quick response program
 3. CAPACITY BUILDING for the different line agencies of government (DOH, DENR, DILG, DOLE-OSHC, DEP ED), the SAS, the GLOBE CARE
 4. "Mercury Free School" - possibility

MERCURY REDUCTION IN THE ELECTRICAL PRODUCT INDUSTRY

By Mark A. Kohorst, National Electrical Manufacturer's Association (NEMA)



UNEP Workshop on Mercury Use and Release in Products: Bangkok, Thailand

MERCURY REDUCTION IN THE ELECTRICAL PRODUCT INDUSTRY

MARK A. KOHORST
NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
May 2007

1



SUMMARY

- What is NEMA?
- What is Mercury Consumption in the U.S.?
- What Progress has Electro-Industry Made?
 - Mercury Switches and Relays
 - Batteries
 - Lamps
 - Thermostats
- What do we Anticipate in the Future?

2



NEMA VITAL STATISTICS

- U.S. Trade Association for Manufacturers of Products Used in the Transmission, Distribution, Control, and End-Use of Electricity
- Membership Exceeds 430 US Manufacturers
 - 8 Industry Divisions, 52 Product Sections:
 - Batteries to Lamps to Surge Arresters to X-Rays, etc.
 - Product Shipments Totaling \$100 billion
- Leaders in **Industry Standards** - More than 500 Industry Standards; Internally and With ANSI and IEC
- Advocacy, Data Collection & Analysis, Technical Support

3



YOUR HUMBLE PRESENTER

- Senior Manager, Environment, Health & Safety
- Executive Director, Thermostat Recycling Corp
- 20 Years as Consultant in EH&S Issues
- Formerly Environmental Economist, US EPA Hdqs, Officer of Water

4

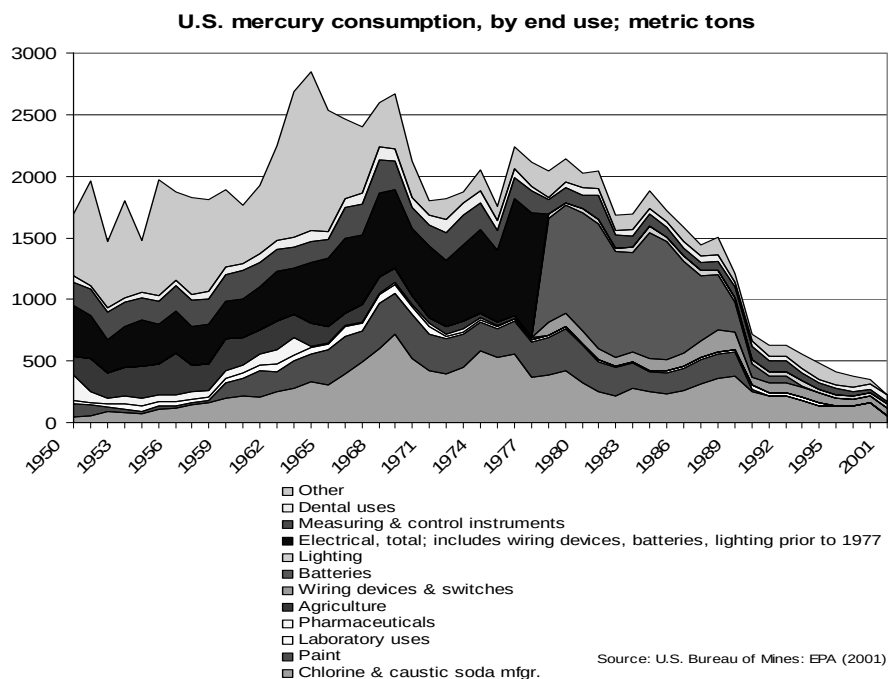


**** INDUSTRY USE OF Hg HAS FALLEN DRAMATICALLY ****

- United States Geological Survey Estimates
 - ~2,000 Metric Tonnes in 1980
 - 350 MTs in 1997
 - 200 MTs in 2001
- GLBTS* Estimate: "... it appears that mercury use declined more than 50 percent between 1995 and 2003, assuming that mercury use by other sectors has remained constant since 1997."

U.S. EPA and Environment Canada "Great Lakes Binational Toxics Strategy, Management Assessment for Mercury," Feb 2006, Pg. 6

5





IMPACT OF REDUCED CONSUMPTION - MSW INCINERATORS -

**** INCINERATOR EMISSIONS DOWN DRAMATICALLY ****

- US EPA Data
 - 1990 - 45.2 tons from MSW Incinerators
 - 2001 - 2.2 tons (< 2% of US anthropogenic emissions)
 - 95% Reduction
- **Primary Factor:** 1990 Clean Air Act Amends
- Source Reduction (*i.e.*, products)
- Increased Recycling
 - Draft EPA Estimate: 40-80 tons/year

7



- LANDFILLS -

**** LANDFILL EMISSIONS: SMALL CONTRIBUTOR in U.S. ****

- 1998 EPA MERCURY REPORT TO CONGRESS
 - Landfill Emissions < 0.1 ton in 1994-95
- 2002 NEW JERSEY MERCURY REPORT:
 - "Low concentration of mercury in landfill gas...argues that no efforts to control this source are necessary at this time." [Vol III, Ch 3, pg 157]
- 2004 SWANA REPORT [Solid Waste Assn of North America]
 - "MSW landfills can provide for the safe, efficient and long-term management of disposed products containing heavy metals without exceeding limits that have been established to protect public health and the environment . . . for extremely long periods of time if not forever."
- 2005 RHODE ISLAND COMMISSION REPORT
 - "Emissions of mercury from Rhode Island landfills would be less than 1 lb"

8



MERCURY PRODUCTS - SWITCHES AND RELAYS -

- **Switches:** Products or devices that open or close an electrical circuit, or a liquid or gas valve
 - Includes Float, Tilt, Pressure, Temperature Switches,
- **Relays:** Products or devices that open or close electrical contacts to control the operation of other devices in the same or another electrical circuit
 - Includes Displacement, Wetted, and Contact relays, and Flame Sensors



9



SWITCHES AND RELAYS Contd

** MANY APPLICATIONS **

➤ **Switches**

Tilt: Electric, Gas, & Water Meters, Motor Vehicles, RV Leveling Units, RV Satellite/TV Antenna,, Space Heater, Hospital Bed, Manufacturing Appls

Pressure Controls: Fire Control Units, Manufacturing Equip

Float Switches: Pump & Pump Systems

Other: "Inertia Switches" in Motor Vehicles Braking Systems

➤ **Relays**

Manufacturing Equip, Telecommunications Circuit Boards,



Mercury Wetted Relays

10



SWITCHES AND RELAYS Contd

** LARGEST HG VOLUME PRODUCT CATEGORY **

➤ Switches

- **Great** Variation in Hg Content
- "Tilt" Switch can Be 50 mgs to 5000 mgs
- "Float" Switch from 100 mgs to 67 **Grams**

➤ Relays

- Even **More** Variation; 10 mg to 153 Grams
- Sometimes Sold as 'Units' that Contain 30 Relays per Unit

➤ Total Hg Content in US Products: 2001 *

Components = 54 tons

Final Prods = 7 tons

Total = ~ 61 Tons

* As reported to US
Regional Clearinghouse 11



SWITCHES AND RELAYS Contd

** NON-HG ALTERNATIVES EXIST IN MANY CASES **

NEMA Example 1: Industrial Automation

➤ Power Contact Output Modules

- Contain 4 Mercury-Wetted Relays, 3 g per Relay
- Used in Logic Program Controllers (M&C Instruments)
- Soldered Onto Circuit Board, Hermetically Sealed
- Alternatives Exist in **New** Modules
- Cannot be Retrofitted Into Existing Units!

The Good News . . .

- Bus-to-Bus Sales, 1000 Units Globally?
- Thorough Labeling
- Mfr is Phasing Out Mercury Units - 2010??

12



SWITCHES AND RELAYS Contd

NEMA Example 2: Medical Imaging

➤ X-Ray Imaging Systems

- Contain Hg - Switches to Supervise Tilting Angle
- Alternatives Exist for New Models
- Retrofitting of Existing Systems Continues Due to Compatibility Issues
- Existing Systems Also Refurbished and Resold

The Good News

- Clearly Bus-to-Bus Sales, Small Volume
- Expert Installation, Service, Mgt at End-of-Life
- In US, Total Hg in 2004 Sales = 4 lbs!
- Mfrs Phasing Out Mercury Units

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MERCURY IN LAMPS



➤ Fluorescent

- Schools, Offices, Stores

➤ High Intensity Discharge

- Metal Halide
- Cold Cathode ("Neon")
- High Pressure Sodium
- Mercury Vapor
- Street Lights, Floodlights, Industrial Lighting, Entertainment

➤ Older Mercury Technologies

- Mercury Short-Arc, Mercury Xenon, Mercury Capillary

14



LAMPS Contd

- **Hg Contributes to Efficient Operation of Fluorescent Lamps**
 - Efficiently generates ultra-violet energy, which is absorbed by phosphor coating on glass. Phosphor fluoresces, emits visible light
 - Metal halide and most HPS use mercury as starting aid and voltage control
- **U.S. Lighting Industry Mercury Use (Est. Tons)**

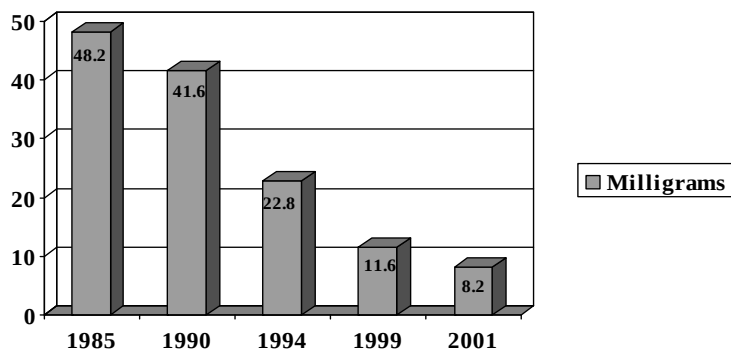
<u>1995</u>	<u>1997</u>	<u>2004</u>
33	32	8

15



LAMPS Contd

** Lamp Industry - Steady Progress in Reducing Hg Content **



Mercury Contained in Four-Foot Fluorescent Lamp - Industry Average

16



LAMPS Contd

** Hg CONTAINING LAMPS ARE ENERGY EFFICIENT **

➤ CFLs Burn Many Hours Longer, Use Less Power

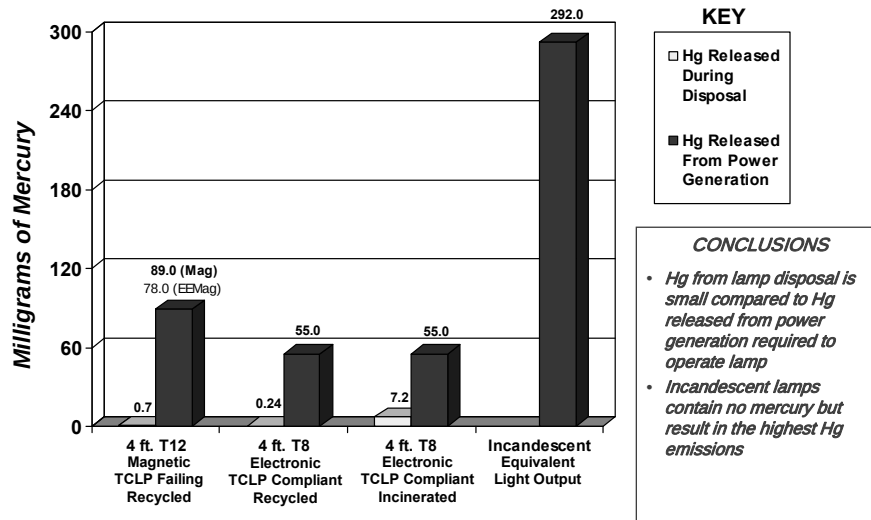
Higher Efficiency + Fewer Replacements = Less Energy Use
 Less Energy Use = Reduced Power Plant Emissions
 Lower Emissions = Less Mercury, etc. in the Environment

➤ US EPA, ENERGY STAR Program

- "If every household in the US replaced one light bulb with an ENERGY STAR qualified CFL, it would prevent enough pollution to equal removing 1 million cars from the road."

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Lifetime Mercury Emissions



*Based on 20K burning hours, Hg content of 23 mg per T12 lamp, and 8 mg per T8 lamp.
 Hg content of fuels is the US weighted average for fossil and non-fossil fuels,
 calculated from "Environmental and Health Aspects of Lighting: Mercury" J.IES 1994.
 Disposal emissions assume 3% in residuals of recycling, 90% from incinerators.



LAMPS Contd

**** NEMA MERCURY IN CFLs COMMITMENT ****

Applicability

- Applies to CFLs manufactured or imported after **April 15, 2007**

Product Scope:

- Limited to Integral Self Ballasted CFLs; all base types

Maximum Dose Level

- 0-25 Watts: 5 mg total mercury (Based on EU RoHS)
- 25- <40 Watts: 6 mg total mercury (Needed at these wattages)

Conformance

- Voluntary manufacturer's declaration *via* web site

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LAMPS Contd

**** LAMP RECYCLING ****

- WWW.LAMPRECYCLE.ORG and WWW.ALMR.ORG
 - Sponsored by NEMA Lamp Manufacturers, Lamp Recyclers
 - Contains Regulatory Information
 - Lists Recycling Contacts Across the US
 - Links to U.S. EPA Documents
- **EPA/NEMA/SWANA Recycling Outreach**
 - \$820,000 EPA Grant
- **National Lamp Recycling Rate**
 - Est at ~24% Nationwide
 - Higher for Industry, Govt; Lower for Hshlds

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- MERCURY THERMOSTATS -

**** MERCURY SWITCH MECHANICAL THERMOSTATS ****

- ~ 2.8 grams/Switch, 1.4 Switches/Thermostat
- Mercury Rolls Freely in Glass Tube of a Switch; Breaks or Makes Electrical Circuits; Signals for Heat or Cooling
- Mercury Stats ***Can*** Have Advantages Over Alternatives
 - Reliability, Durability
 - Energy Efficiency
 - Retrofitability
 - Cost
 - Difficult for Visually Impaired, Handicapped
- ***Not Environmentally Preferable Choice***

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THERMOSTAT RECYCLING CORPORATION

- **Non-Profit - Founded 1997 By Three Major US Manufacturers:**
 - Honeywell, White-Rodgers, General Electric
- **Began in 9 US States, 2001 Went to All Lower 48**
- **Cost-Efficient Program Utilizing "Universal Waste Rule"**
 - UW = Certain widely generated hazardous wastes
 - Handlers are subject to less stringent standards for storage, transportation, and collection of UWs
 - Thermostats are UW

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THERMOSTAT RECYCLING CORPORATION Contd

- **TRC Signs Up Wholesalers AND HVAC Contractors**
 - More Than 1400 Wholesalers Currently Participating
 - Apr 225 Contractors Thru March 2006
- **Participant Pays One Time \$25 Fee per Container**
 - Plastic Container, 1x1x2 Feet
 - Inner Plastic Liner, Ties
 - Instructions
 - Mailing Labels
- **The TRC Pays all Transport and Hg Recovery Costs**

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THERMOSTAT RECYCLING CORPORATION Contd

- Full Bin is Shipped Free to Clipping Site @ Honeywell
 - 50 - 100 Stats



- Clipped Ampoules Sent to Mercury Recycler
- TRC Maintains Data on Stats and Lbs of Mercury
- Publishes Results;
WWW.NEMA.ORG/TRC

25



THERMOSTAT RECYCLING CORPORATION Contd

** TRC COLLECTION RESULTS **

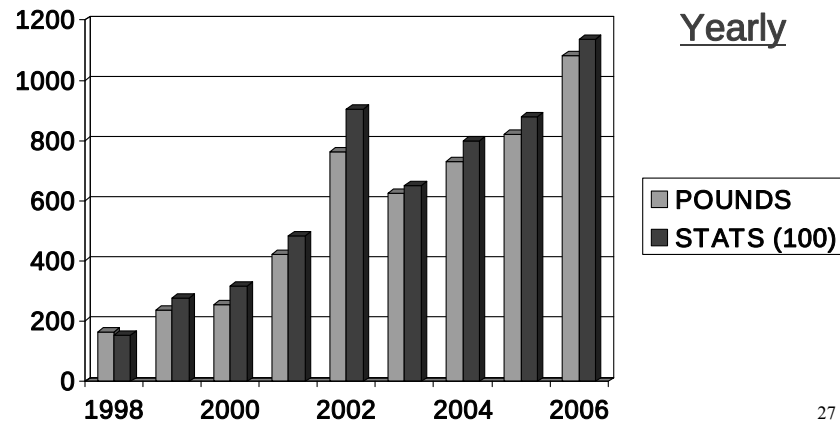
	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
THERMOSTATS	48,104	61,487	64,957	80,094	87,899	113,658
LBS MERCURY	401	530	626	729.4	819.8	1082

- Total for Program: 559,398 Stats, 5,121 Lbs Mercury
(Through Dec 2006)
- Projection for 2007?: 150,000 Stats, 1,500 Lbs Mercury

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THERMOSTAT RECYCLING CORPORATION Contd



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THERMOSTAT RECYCLING CORPORATION Contd

** TRC WORKS BECAUSE **

- Hg Content is **High** (500-1000 times > CFLs or Button Batteries)
- Economies of Scale by Using Existing Limited Distribution System
- Products are Sturdy, Handled Properly by Contractors
- ***TRC Brings in Business***

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THERMOSTAT RECYCLING CORPORATION Contd

**** TRC EXPANSION INITIATIVES ****

- **2004: Opened Program to Contractors Directly**
- **2006: Pilot Projects**
 - Financial Incentives to Recycle in Two States
 - Household Haz Waste (HHW) Facilities in Five States
- **2007: Household Hazardous Waste Facilities Nationwide**
- **2007: Canada?**

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MERCURY PRODUCTS - BATTERIES -

**** LEADERS IN REDUCING MERCURY CONTENT ****



➤ **Industry Consumption 1980s: >1000 Tons Hg/Year**

- Alkalines 8,000-12,000 PPM
- Zinc-Carbon ~100 PPM
- Mercuric Oxide 35-40% Mercury by Weight



➤ **Manufacturers PHASED OUT Mercury by 1993**

➤ **Predated US Federal Ban by 3 Years**



- *Mercury-Containing and Rechargeable Battery Management Act* (Public Law 104-142; 42 USC 14301 et seq.)
- Formalized Mercury Phase-Out
- Banned Mercury in All but Button Cells



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BATTERIES Contd

** BUTTON CELLS (BCs) **

- **Only Remaining Mercury Containing Batteries**
 - Used in hearing aids, digital thermometers, insulin pumps, portable medical monitors, hospital pagers, watches, toys, and calculators
- **By U.S. Fed Law: Cannot Exceed 25 mg Mercury per cell**
- **Three Mercury BC Chemistries**
 - Silver oxide (watch) 2.5mg
 - Zinc air (hearing aid) 8.5 mg
 - Alkaline (misc.) 11 mg



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BATTERIES Contd

- **53,000 Average Hearing Aid Batteries = 1 Lb Mercury**
- **Annual Total = ~ 1.1 tons mercury (2004 Sales)**
- **Why Not Zero Mercury?**



- Small size and need to provide maximum energy leaves little room for *gas buildup* before cell begins to bulge, possibly causing leakage and/or rupture

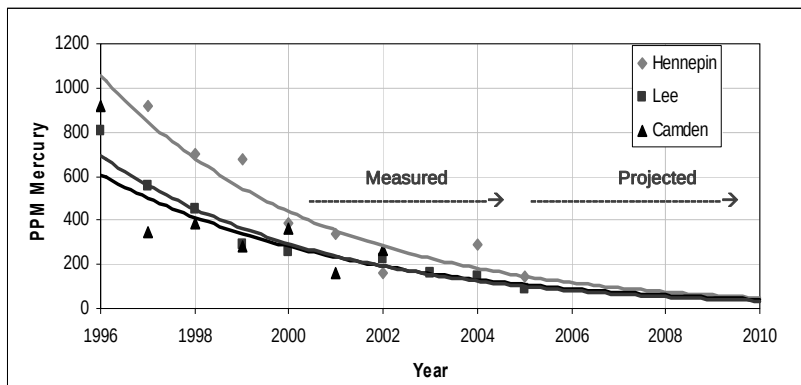
- ***April 2006 - NEMA Announced Commitment to Stop Manufacturing Hg-added Button Cells by July 1, 2011***

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BATTERIES Contd

Impact of Mercury Reduction in Batteries in US: Trend in Avg Mercury Content from NEMA "Battery Sorts" (Alkalines)



33



SUMMARY

- **Contribution of U.S.-Made Electrical Products to Mercury in the Environment Has**
 - Declined Drastically in 2 Decades
 - Continues to Fall in all Product Areas
- **Reasons?**
 - Innovation & Substitution
 - Recycling
 - Regulatory Controls on Incinerators

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FUTURE TRENDS

- **Switches & Relays: More Hg-Free Alternatives**
- **Lamps: More Recycling; Greater Overall Mercury Reduction Due to Energy Efficient Technologies**
- **Thermostats: Fewer and Fewer Mercury T'stats Sold, More and More Collected**
- **Batteries: Button Cells Will Be Mercury-Free**

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CONTACT INFORMATION

Thank You for Your Attention!

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1300 North 17th Street
Rosslyn, Va. 22209
USA

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MERCURY RECYCLING IN LAMPS : COUNTRY EXPERIENCE

By Eisaku Toda, Ministry of the Environment, Japan

Slide 1

Mercury Recycling in Lamps - Country Experience -

Eisaku Toda
Environmental Health and Safety Division
Ministry of the Environment, Japan

Slide 2

Tragedy of methyl mercury poisoning – Minamata Disease

1956: First official report of “extraordinary disease” in Minamata city

1968: Government attributed the disease to methyl mercury originating from Chisso acetaldehyde plant

So far... about 3,000 patients eligible for compensation for health damage, and further 12,000 individuals certified for relief measures in a political settlement.

For an English brochure on the disease, see
<http://www7.ocn.ne.jp/~mimuseum/rekisitokyukun/eng/rekisitokyukuneng.html>



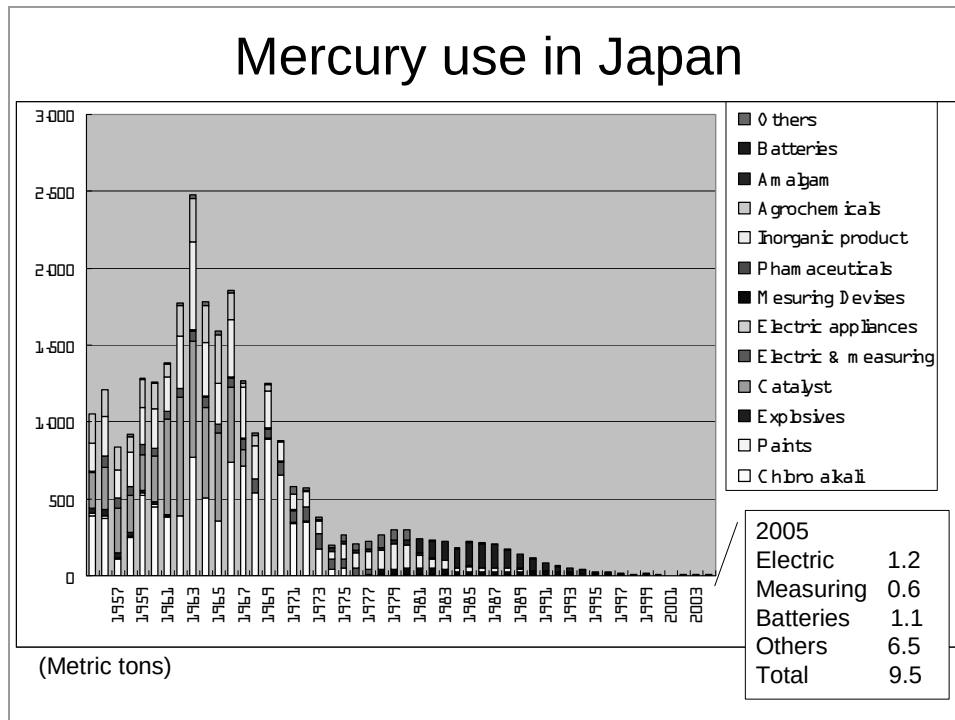
【胎児性水俣病患者】
(たいじせいみなまたびょうかんじゃ)



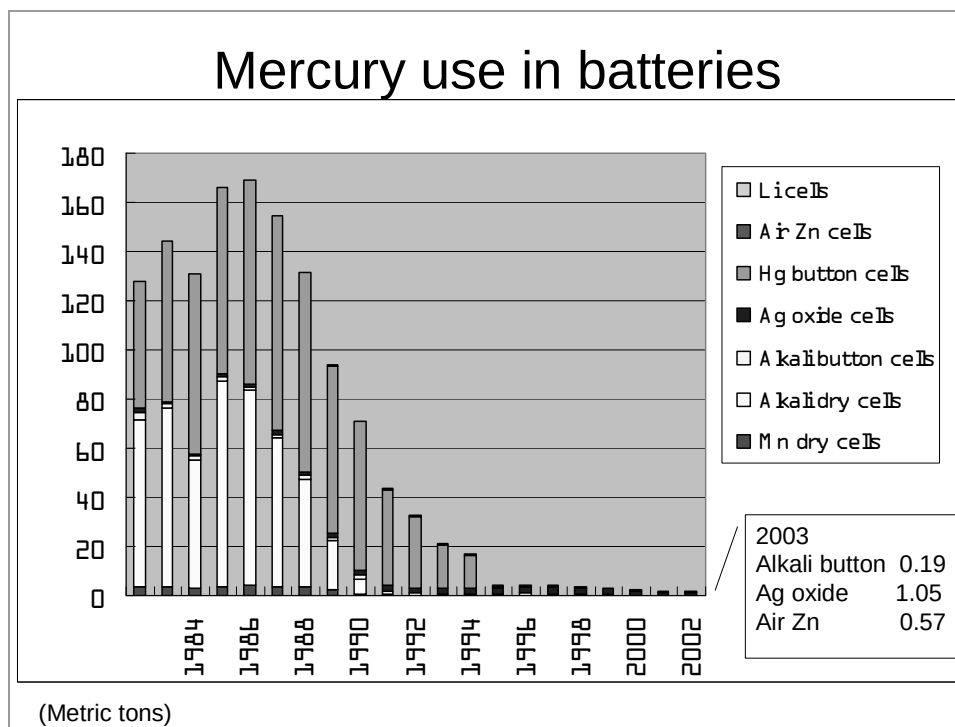
【水俣病の患者さん】
かんじゃ



Slide 3

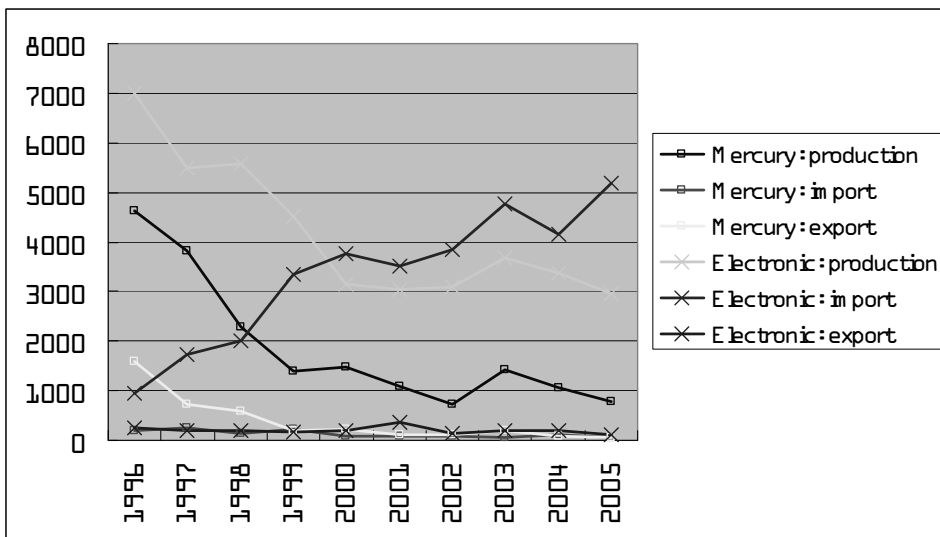


Slide 4



Slide 5

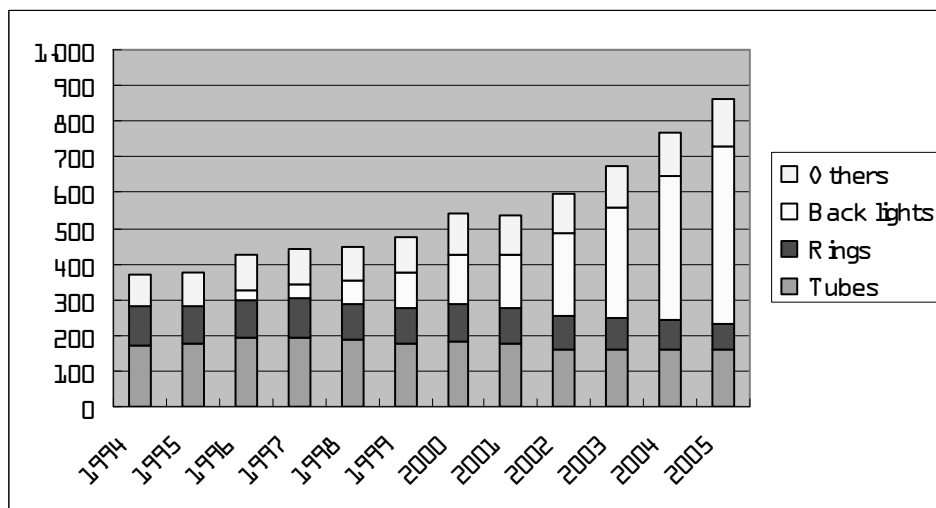
Thermometers



(Thousand units)

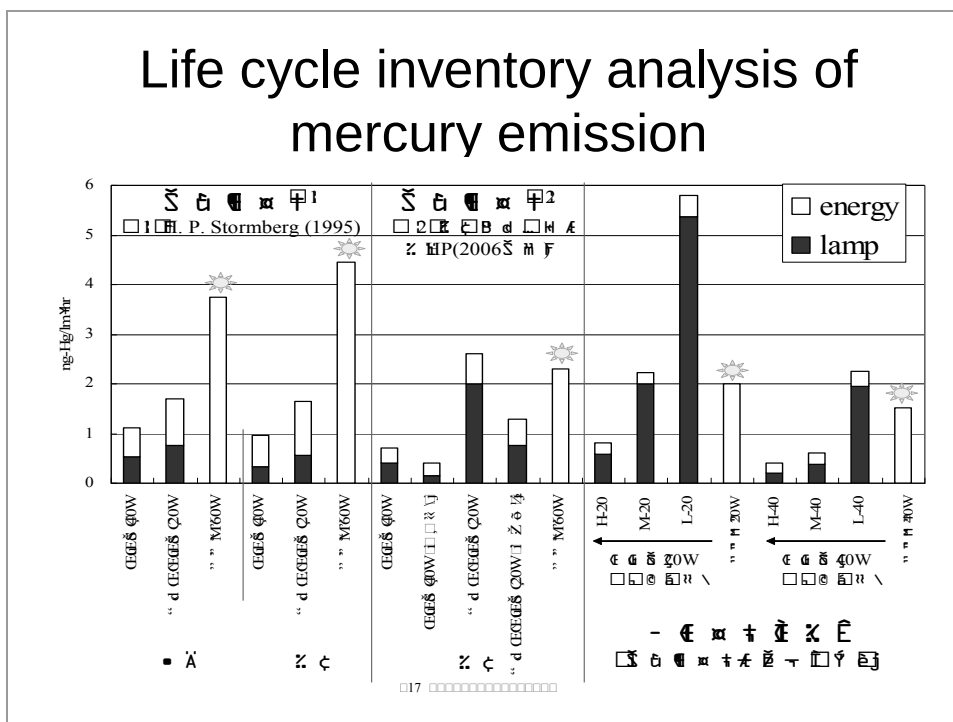
Slide 6

Production of fluorescent lamps



(million units)

Slide 7



Slide 8

Mercury contents in fluorescent lamps

- Average mercury contents in 40W tubes
50mg/tube (1975) → 10mg/tube (2000)
- Government procurement guideline under the Green Procurement Act:
10mg/tube

Slide 9

Batteries in municipal waste

- In 1986, the Ministry of Health and Welfare issued a guidance to municipalities on separating batteries in waste collection and recovery of mercury

	1992	1998	2005
Dry cells collected	7,600t	12,000t	11,300t
Mercury recovered	1,100kg	300kg	170kg

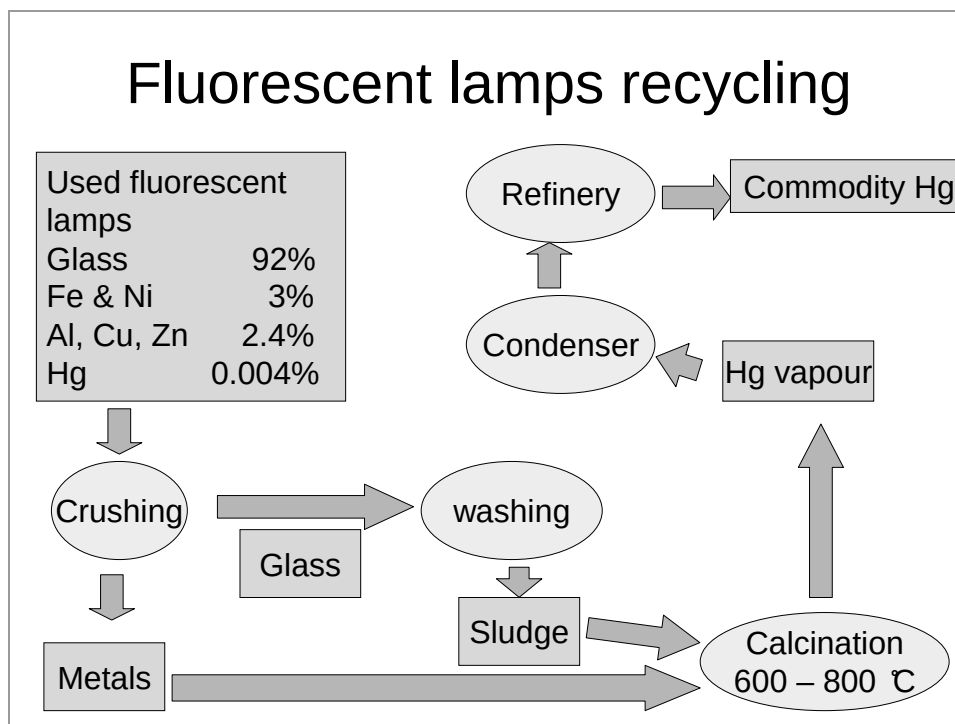
Slide 10

Fluorescent lamps in municipal waste

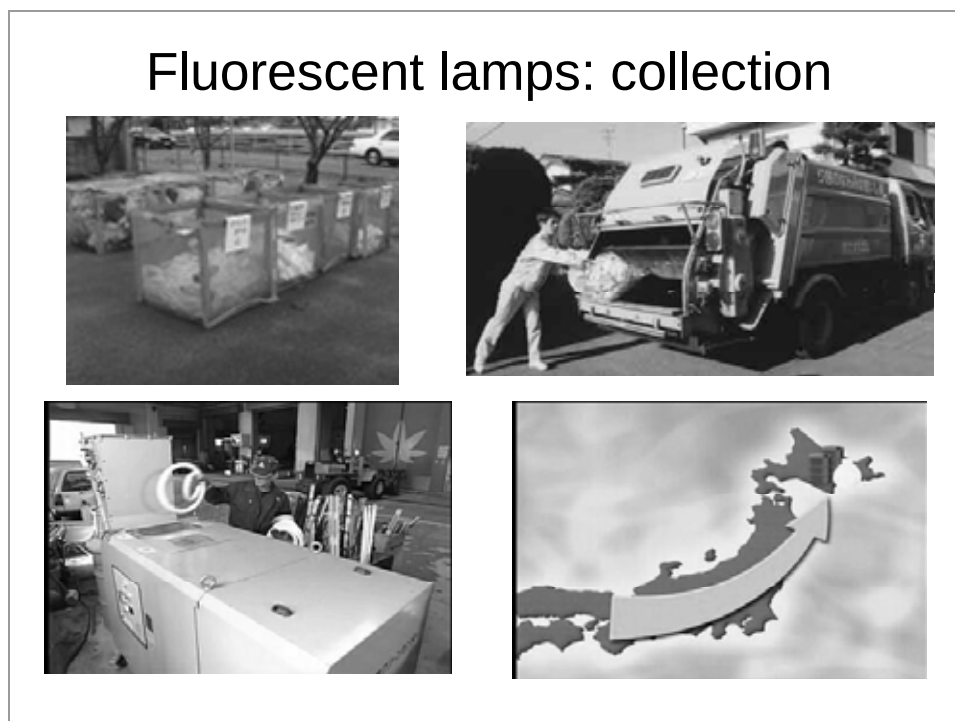
- In 1999, the Japan Waste Management Association started a collaborative collection and recovery initiative.
- Percentage recycled: 10-20%?

	1999	2001	2003	2005
Lamps collected	2,800t	4,300t	4,800t	5,000t
Mercury recovered	90kg	172kg	192kg	200kg

Slide 11

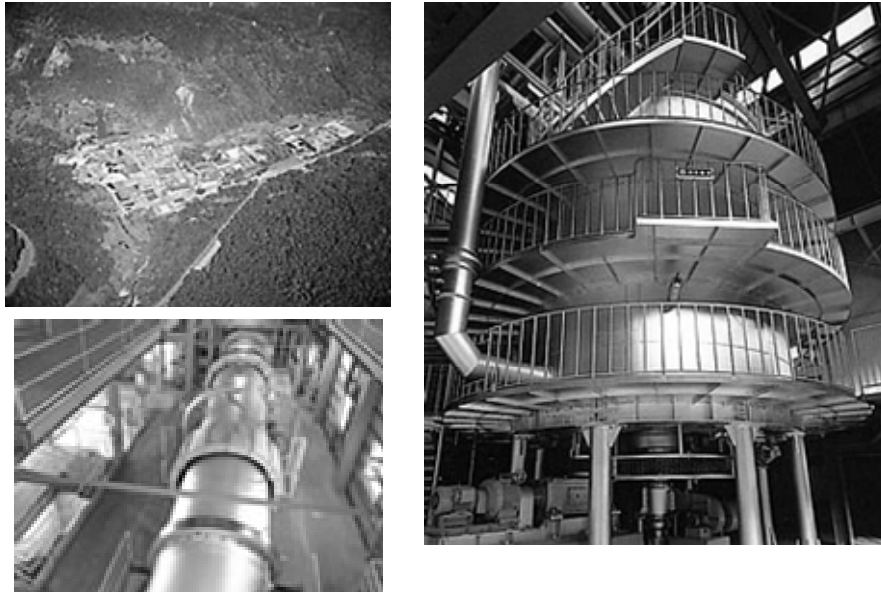


Slide 12



Slide 13

Fluorescent lamps: Hg recovery



Slide 14

And some wastes are imported

- In 2006, 90t of used batteries were imported from Taiwan to Japan, 3kg of used fluorescent lamps from Thailand to Japan



Slide 15

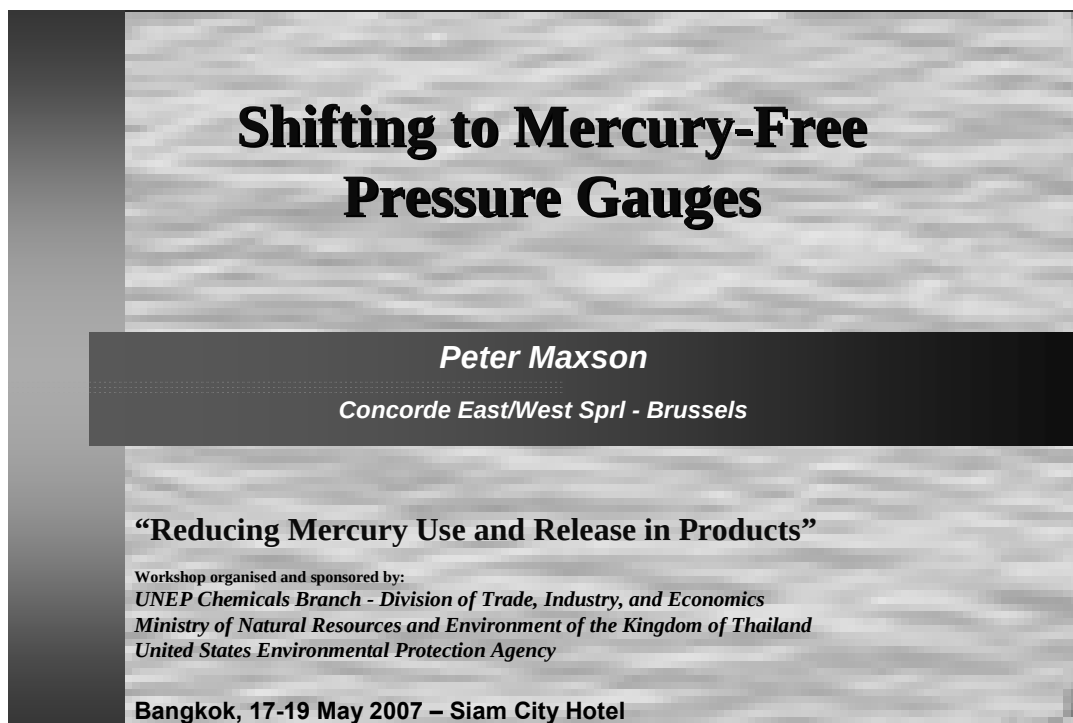
Trade in mercury

	Import	from	Export	to
2003	5,459	Spain, US	125,872	Netherlands, India, Egypt...
2004	3,454	Spain, Netherlands...	53,825	Netherlands, India, Vietnam..
2005	3,453	Spain, USA	107,031	Netherlands, India, Kenya...
2006	3,453	Spain, USA...	248,935	Iran, Hongkong, India...

(kg)

SHIFTING TO MERCURY-FREE PRESSURE GAUGES

By Peter Maxson, Concorde East/West Sprl



Shifting to Mercury-Free Pressure Gauges

Peter Maxson
Concorde East/West Sprl - Brussels

“Reducing Mercury Use and Release in Products”

Workshop organised and sponsored by:
 UNEP Chemicals Branch - Division of Trade, Industry, and Economics
 Ministry of Natural Resources and Environment of the Kingdom of Thailand
 United States Environmental Protection Agency

Bangkok, 17-19 May 2007 – Siam City Hotel

Slide 2

Major global mercury uses – 2005

Global mercury demand (2005)	Metric tonnes
Small-scale/artisanal gold mining	650-1,000
Vinyl chloride monomer (VCM) production	600-800
Chlor-alkali production	450-550
Batteries	300-600
Dental use	240-300
Measuring and control devices	150-350
Lighting	100-150
Electrical and electronic devices	150-350
Other (paints, laboratory, pharmaceutical, cultural/traditional uses, etc.)	30-60
Total	3,000-3,900

Note: In each of these sectors some mercury recycling takes place, involving the recovery of mercury from products or wastes. Therefore, “net” demand for mercury in any of these sectors may be significantly lower than “gross” demand.

P. Maxson - Concorde East/West Sprl - Brussels - concorde.ew@tele2allin.be - 17-19 May 2007

Slide 3

Pressure gauges - typical applications

- **Measuring**
 - gas meter pressure,
 - airflow measurements,
 - carburetor adjustment,
 - automatic dairy milking systems,
 - steam flow meter
 - atmospheric pressure
 - blood pressure
 - etc.

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Slide 4

Main types of pressure gauges

- **Manometer – measures pressure of liquids and gases**
- **Barometer – measures atmospheric pressure**
- **Sphygmomanometer – type of manometer – measures blood pressure in the arteries**

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Slide 5

Main problems

- **Substantial global reservoir of mercury (2000-4000 t?)**
- **Need maintenance periodically (sphyg manufacturers recommend every 6 months)**
- **Others need periodic replenishment**
- **Requires mercury inventory on site**
- **Possible air emissions**
- **Possible spills and breakage**
- **Eventual disposal – large chance of improper disposal**

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Slide 6

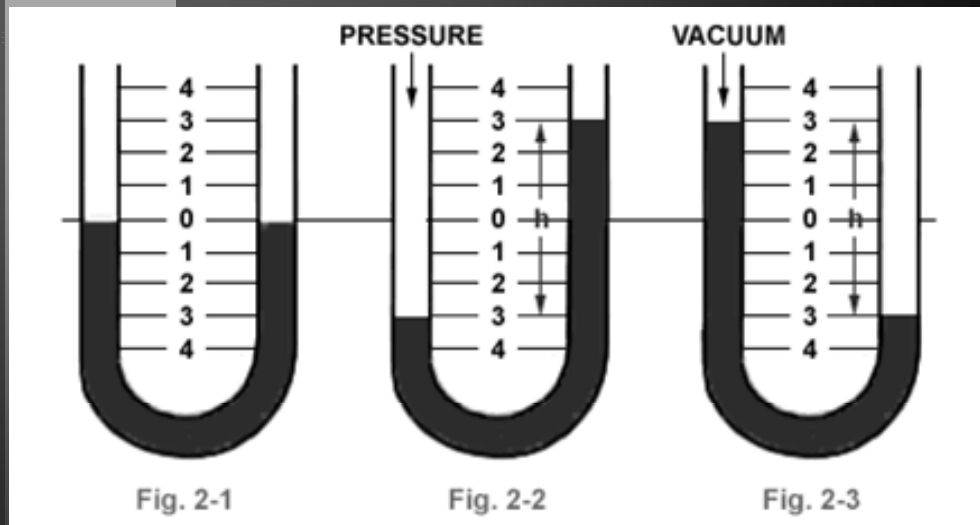
Two primary designs

- **Continuous monitoring of pressure differential, such as “U-tube”**
- **Mercury as a “heavy liquid,” often known as a “mercury column manometer”**

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Slide 7

U-tube manometer

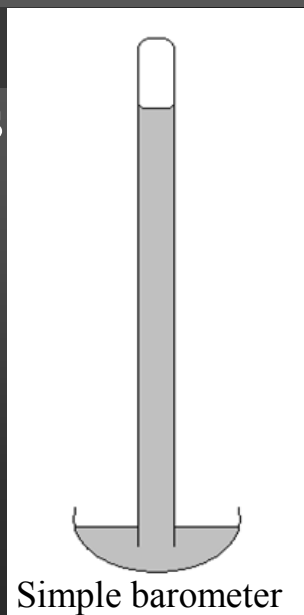
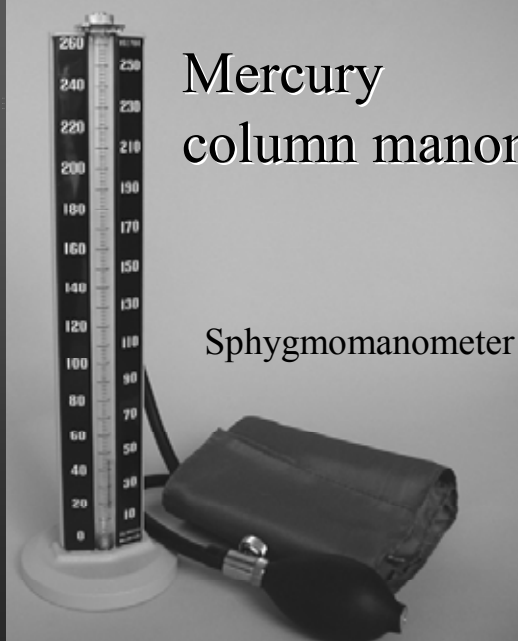


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Slide 8

Mercury column manometers

Sphygmomanometer



Simple barometer

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Slide 9

Sphygmomanometer

A sphygmomanometer (often condensed to “sphygmometer”) is a device used to measure blood pressure, comprising an inflatable cuff to restrict blood flow, and a mercury or mechanical manometer to measure the pressure. It is always used in conjunction with a means to determine at what pressure blood flow is just starting, and at what pressure it is unimpeded. Manual sphygmomanometers are used in conjunction with a stethoscope.

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Slide 10

Mercury-free manometers

Mercury column-type alternatives:

- **Flexible membrane**
- **Piezoelectric crystals**
- **Fibre-optic pressure sensors**

Pressure differential alternatives:

- **Substitute liquid or gas**

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Slide 11

Mercury-free manometer



Membrane-type manometer

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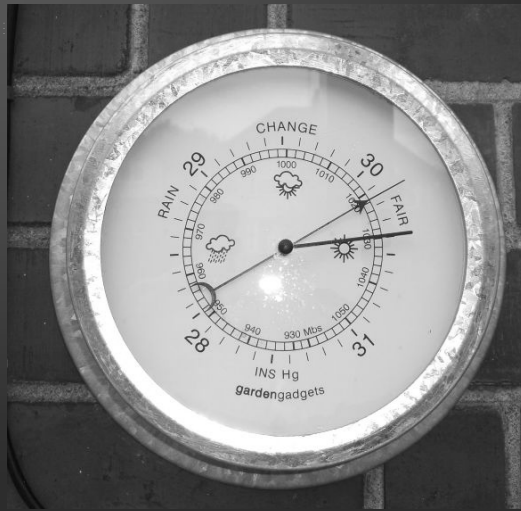
Mercury-free sphygmomanometers



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Slide 13

Mercury-free barometers



Aneroid barometer

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Slide 14

Mercury reduction programmes that include pressure gauges

- **Ban buying and selling**
- **Offer subsidies for replacement devices**
- **Many medical institutions (other speakers)**
- **Denmark, France, the Netherlands, Sweden, Norway, Canada, Japan(?) and some states in the US**
- **Cost of alternatives is generally comparable**
- **In cases where alternatives are more expensive, performance is often better as well**

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Slide 15

More information - 1

- UNEP (2002). Global Mercury Assessment, UNEP, December 2002.
- COWI (2002). ACAP and Danish EPA, Reduction of Atmospheric mercury emissions from Arctic countries – questionnaire on emissions and related topics. November 2002.
- Maag, J., Lassen, C. and Hansen, E. (1996): Massestrømsanalyse for kviksølv (substance flow assessment for mercury). Miljøprojekt no. 344, 1996, Danish Environmental Protection Agency, Copenhagen (in Danish with summary in English). Available at [www.mst.dk; publikationer](http://www.mst.dk/publikationer)
- Markmann P. N., Jensen, P. and Abildgård, J. (2001): Old heating plants still cause mercury pollution. NyViden from the Danish EPA. Available at: <http://www.mst.dk/project/NyViden/2001/11230000.htm>.
- LCSP (2003). An Investigation of Alternatives to Mercury Containing Products, Lowell Centre for Sustainable Production, 22 January 2003, available at <http://mainegov-images.informinc.org/dep/mercury/lcspfinal.pdf>
- NWF (2002). Mercury Products Guide, T Kuiken and F Stadler, National Wildlife Federation, Ann Arbor, Michigan, August 2002.

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Slide 16

More information - 2

- Nordic Council (2002). Nordic Council of Ministers, “Mercury – a global pollutant requiring global initiatives”, Copenhagen 2002.
- UNEP (2002). Global Mercury Assessment, UNEP, December 2002.
- INFORM. <http://www.informinc.org/fsmercalls.pdf> and <http://www.informinc.org/fsmerchealth.pdf>
- Maine DEP. See a detailed comparison of mercury and non-mercury measuring devices and instruments carried out for the Maine Department of Environmental Protection at www.maine.gov/dep/mercury/lcspfinal.pdf, and the proposed strategy based on that report at www.maine.gov/dep/mercury/productsweb.pdf. Following the submission of this strategy, the Maine Legislature enacted a prohibition on the sale of most mercury measuring devices and instruments effective July 2006. Appendix B to the report contains some examples of substantial cleanup expenditures resulting from measuring instrument breakage
- Healthcare initiatives. See www.sustainablehospitals.org, www.inform.org and www.h2e-online.org for detailed information regarding non-mercury alternatives in the health-care setting
- European Parliament (2005). <http://www2.europarl.eu.int/omk/sipade2?PUBREF=-//EP//TEXT+TA+P6-TA-2005-0045+0+DOC+XML+V0//EN&LEVEL=3&NAV=X>

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MERCURY REDUCTION IN THERMOSTATS

By Michael Bender, Mercury Policy Project

Slide 1

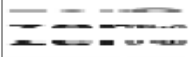
Mercury Reduction in Thermostats

*Presented by Michael Bender
Mercury Policy Project/Zero Mercury Working Group*

www.mercurypolicy.org

www.zeromercury.org

*UNEP Mercury Products Meeting
Bangkok, Thailand
17 May 2007*

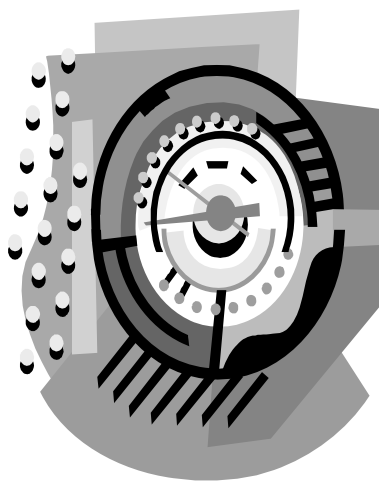


**Mercury
Policy Project**

Slide 2

Summary of Presentation

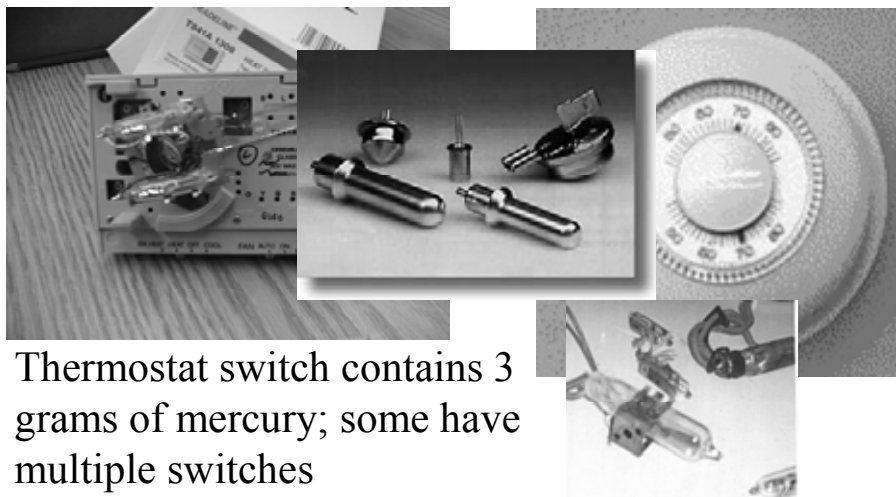
- Overview of Mercury Thermostats
- Disposal issues
- Availability of mercury-free alternatives
- Recommendations



**Mercury
Policy Project**

Slide 3

Mechanical Thermostats with Mercury Switches



Thermostat switch contains 3 grams of mercury; some have multiple switches

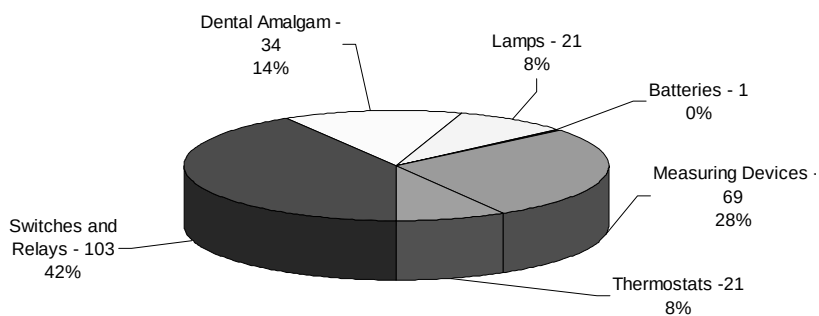


**Mercury
Policy Project**

Slide 4

Estimated Annual U.S.A. Consumption of Mercury in Products

Total Annual Consumption = 276 tons



Source: EPA 2004 International Mercury Market Study and the Role and Impact of US Environmental Policy.



**Mercury
Policy Project**

Slide 5

Mechanical Thermostats with Mercury Switches, Cont.

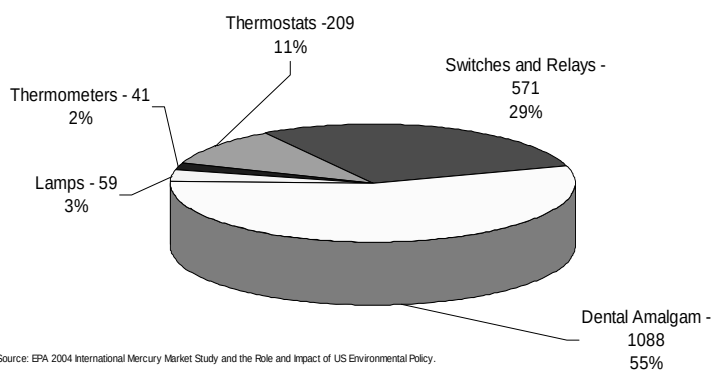
- Thermostats have life span of 20-30 years
- In the US, 83% of thermostats presently in use contain mercury
- Some governments, institutions only purchase mercury-free alternatives
- Many states in the US now ban the sale of mercury-containing thermostats



Slide 6

Estimated U.S. Mercury Reservoirs in Products

Total =1968 tons



Slide 7

Disposal Issues

- Once glass bulb breaks, this can occur through leaks, spills or evaporation
- This results in contamination of local area
- Also, releases to the air, especially through incineration, but also when bulbs are landfilled or otherwise disposed of



Slide 8

Purpose of University of Lowell Study for State of Maine, USA

- Evaluate the energy efficiency and pricing of mercury and non-mercury thermostats used for residential and commercial applications.



Slide 9

Lowell Study Scope: Technologies

- Electromechanical with mercury switches
- Electromechanical without mercury switches
- Electronic non-programmable
- Electronic programmable
- Out of scope: pneumatic, direct digital control, other


**Mercury
Policy Project**

Slide 10

Lowell Study Results

Factor	Electro-mechanical with Mercury Switch	Electro-mechanical without Mercury Switch	Electronic Non-programmable	Electronic Programmable
Number of energy efficient models included	5	6	6	10
Number of manufacturers of energy efficient models included	3	4	5	5
Price range	\$17.97 to 34.15	\$15.21 to \$38.84	\$18.00 to \$76.75	\$29.00 to \$151.45


**Mercury
Policy Project**

Slide 11

Mercury-free Thermostats

- Studies, including Lowell, show non-mercury thermostats accurate and reliable
- Programmable thermostats provide energy savings
- Reduce heating and cooling costs by 8%
- For more information, see:
www.maine.gov/dep/mercury/lcspfinal.pdf
or contact: Gregory_Morose@uml.edu



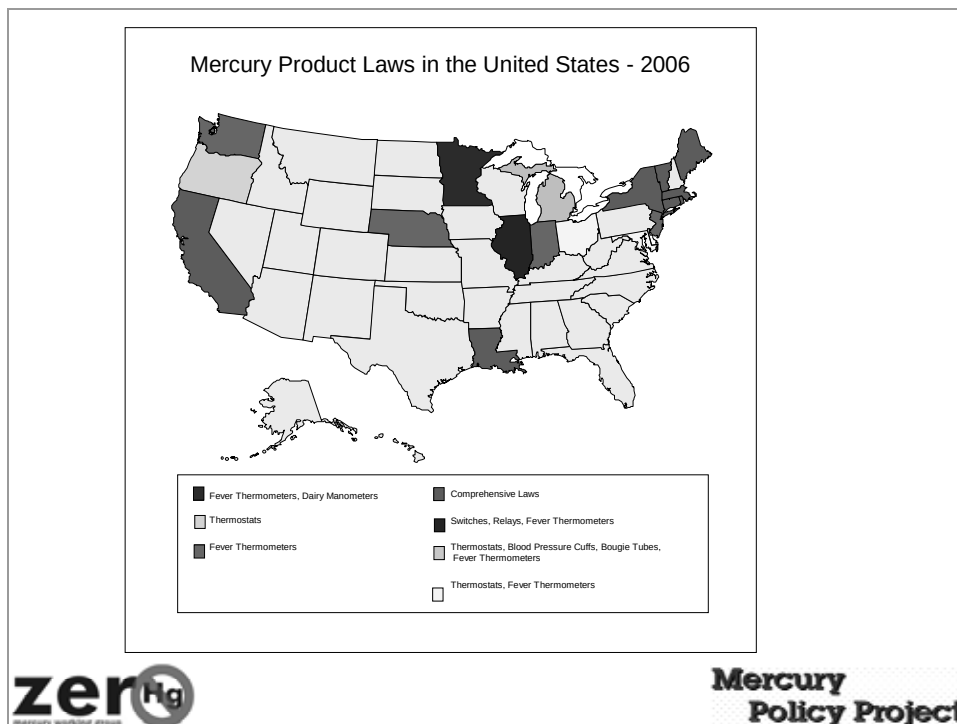
Slide 12

How to foster conversion?

- Governments and institutions can create demand for mercury free alternatives
- Procurement standards dictate specifications
- When alternatives are available and cost comparable, mercury products can be phased out



Slide 13



Slide 14

Recommendations

- Encourage production, availability of mercury-free alternatives
- Foster competitive pricing through government, institutional purchases of non-mercury thermostat
- Phase out sale of mercury thermostats
- Promote use of energy efficient non-mercury thermostats
- Encourage incentives for collection of discards

Slide 15

Acknowledgements

Thanks to the following organizations and individuals
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- David Lennett, NRDC
www.nrdc.org
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Lowell, Massachusetts



MERCURY IN COSMETICS

By Michael Bender, Mercury Policy Project

Slide 1

Mercury in Cosmetics

*Presented by Michael Bender
Mercury Policy Project/
Zero Mercury Working Group
www.mercurypolicy.org
www.zeromercury.org*

*UNEP Mercury Products Meeting
Bangkok, Thailand
18 May 2007*



Slide 2

Summary of Presentation

- Increasing popularity of skin whitening creams in Asia and all over the world
- Least expensive creams may contain mercury and other hazardous substance
- Mercury in creams poses health risk
- Risky products are in the marketplace
- Awareness and monitoring can reduce availability of hazardous creams



Slide 3

Increasing sales throughout Asia

- According to Japanese cosmetics giant Shiseido, sales of skin-whitening products in Asia grew by 20 percent between 1997 and 2003.
- In Thailand, the whitening lotion segment accounts for more than 60% of the country's annual US\$100 million facial skincare market.
- In Hong Kong, moisturizers account for 60% to 70% of the multi-million dollar skincare market, of which skin whitening products capture 40 percent.



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Slide 4

Use is Widespread & Increasing

- 4 out of 10 women in Hong Kong, Malaysia, the Philippines, South Korea and Taiwan now use a skin-whitening cream, a survey conducted by Synovate, a market research company, found.
- Carried out in 2004, 61 percent of respondents in Hong Kong, Malaysia, the Philippines, South Korea and Taiwan said they felt they looked younger with a fair complexion. Half of Filipino women, 45 percent of Hong Kong women and 41 percent of Malaysian women said they were currently using a skin-whitening product.



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Slide 5

Skin treatments including whitening are offered in Hong Kong's subway.



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Slide 6

Most creams considered safe, except (generally) for least expensive

- While most skin-whitening creams are considered safe, doctors, consumer groups and government officials are reporting dangerous consequences from some brands
- One problem, say doctors, is that the most effective, but risky skin-bleaching agents are often the least expensive
- Like mercury-based ingredients or hydroquinone, which in Thailand sells for about \$20 per kilogram, compared to highly concentrated licorice extract, which sells for about \$20,000 a kilo.

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Slide 7

POISONOUS CREAM!: Below is an example of a “skin-whitening” cream that contains poisonous mercury.



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Slide 8

Mercury Salts Can Be Absorbed

- The toxicity of mercury compounds has been extensively documented.
- Excessive mercury is very harmful to the nervous system and the kidneys
- High doses of mercury are associated with sight or hearing loss and hand tremors as well as personality changes, anxiety, insomnia, memory loss, progressing to cerebral palsy and potentially fatal kidney failure
- Even low doses of mercury exposure to the womb is especially harmful, causing nervous system, brain damage to the developing baby



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Slide 9

Risky products in the market place

- Dozens of imported cosmetics containing dangerous chemicals, such as hydroquinone, a carcinogenic substance, and mercury, have been found in local markets.
- Many of the products were whitening lotions and creams, imported from China and Thailand for consumers seeking fairer complexions.



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Slide 10

Hong Kong Study

- A study of 38 skin-whitening creams in Hong Kong in 2000 showed eight made by global cosmetic makers exceeded the US safety limits for mercury. Five were made in China and three in Taiwan.
- One woman was admitted to hospital and 13 others referred to specialists after using creams that had high mercury levels 9,000 and 65,000 times above recommended levels.
- Since 2002, Hong Kong's public has become more aware of problems that skin-whitening products cause.
- Reassuringly, a 2002 follow up study found that of the 32 skin-whitening products tested, all passed the safety requirement on mercury and lead content.



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Slide 11

Concerns with (mainly) illegal products

- Inexpensive black-market products with powerful but illegal bleaching agents are selling briskly throughout the poorer parts of South and Southeast Asia.
- Thailand's Food and Drug Administration has published a list of 70 skin- whitening creams circulating illegally around the country
- Indonesian officials have identified more than 50 banned cosmetics.
- There are also some questions about legitimate creams



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Indonesia Regulations

- The Indonesia Food and Drug Control Agency (BPOM) latest public warning was issued in 2004, when it identified 51 beauty products containing mercury and Rhodamin B color additive that were sold in markets across the country.
- In January 2006, police announced they had seized 200 boxes of cosmetic products containing mercury from a small manufacturing company in West Jakarta.
- The company produced imitation Unilever products such as Dove skin lotion, and fake Procter & Gamble products like Olay skin moisturizer and Head & Shoulders shampoo.



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Mercury Cosmetics and Manufacturing Locations

- Many soaps historically manufactured in UK
- 2003 EU export ban moved production overseas
- Research suggests creams containing mercury are manufactured in Dubai, Thailand, China, Taiwan, and Mexico
- Indonesia and S. Africa are thought to be large exporters of mercury cream



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Slide 14

Difficult to monitor imported products

- **Indonesian Consumer Foundation has reported that it is very difficult to stop entry of products into the market.**
- **One of the problems in monitoring these products is that often they are transported to the country by individuals who carry the products in their luggage.**
- **For example, a trader at a traditional market, who sells unlicensed cosmetics priced from Rp 5,000 (55 U.S. cents) to Rp 50,000 (US\$5.5), said a "friend" who regularly traveled to China provided him with the products.**



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Slide 15

Recommendations

- Ban manufacture, export, or import of mercury products by date certain
- Promote public awareness and monitoring, labeling is the most vital because the people should be empowered to protect themselves
- Investigate the effectiveness of existing laws, improve as necessary
- Launch public education campaigns to reduce demand for these products.
- Call on W.H.O. to fill critical research gap on detrimental impacts on developing babies



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Slide 16

Acknowledgements

Thanks to the following organizations and individuals for sharing ideas and/or slides for this presentation:



Linda Greer, NRDC
www.nrdc
Peter Maxson, Concorde
East/West, Inc.
UNEP staff



**Mercury
Policy Project**

TRADITIONAL AND RITUAL USES OF MERCURY

By Peter Maxson, Concorde East/West Sprl

**Traditional & Ritual
Uses of Mercury**

Peter Maxson
Concorde East/West Sprl - Brussels

“Reducing Mercury Use and Release in Products”

Workshop organised and sponsored by:
UNEP Chemicals Branch - Division of Trade, Industry, and Economics
Ministry of Natural Resources and Environment of the Kingdom of Thailand
United States Environmental Protection Agency

Bangkok, 17-19 May 2007 – Siam City Hotel

Slide 2

Why has mercury been endowed with mystical properties?

- **Appearance - “silver water”**
- **Alchemists - amalgamation properties**
- **Biocidal & anti-microbial properties – Egypt, snakes & scorpions, medicinal properties**
- **Neurological effects**
- **It is only natural that apparent ritual and medicinal effects were further exploited**

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Slide 3

Traditional/medicinal uses of mercury

- **Herbal & homeopathic remedies, often also prepared by traditional healers**
- **Ayurveda (the science of mercury is known as Rasa Vidya)**
 - “There is no better medicine than mercury, no greater god than Mahadeva, no better friend than the physician, and no better deed than a gift.”
– B. Mukherji

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One of the 18 steps in “purifying” mercury according to Rasa Vidya



Bottles in furnace coated with multani murti and filled with mercury and sulfur

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Slide 5

Traditional/medicinal uses of mercury

- **For pharmaceutical purposes, in some communities, mercury is sometimes taken internally to treat gastrointestinal disorders, or added to bathwater, detergent or cosmetic products, much as it has long been used in Western medicine.**

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Daily mercury dose $>50 \mu\text{g}/\text{d}$ in 8 of 54 different traditional Asian remedies (Garvey et al., IJEHR, 2001)

Vietnamese Green Raw Material	84.00
Yang Chun Yu Ye Kou Fu Ye	560.00
Precious Pills for Women	91.00
Pilulae Corticis Eucommiae et Ossis Tigris	210.00
Reinforce Sex Pill	140.00
Angelicae Natural Extraction	70.00
Xiang Sha Yanbg Wei Wan	140.00
Wuchi Pai Feng Wan	910.00

Notes: Total 8/54 (15%).

Daily dose for protection of public health is $20\text{--}25 \mu\text{g}$ per day.

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Traditional uses – example 1

- In 2004, a medical researcher purchased 70 traditional Ayurvedic preparations imported from India and Pakistan at Boston-area (USA) South-Asian grocery stores. 14 of the preparations were found to contain potentially toxic levels of mercury, lead and/or arsenic. These preparations were marketed to treat illnesses ranging from colic in children to urinary tract infections.

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Traditional uses – example 2

Dozens of Chinese medicines contain:

- *Cinnabaris* – a complex of sulphides that contain mainly mercuric sulphide;
- *Calomelas* – mercurous chloride (calomel); or
- *Hydrargyri oxydum rubrum* – red mercuric oxide

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Why are traditional uses a problem?

- **Not a major consumer of mercury, but very diffuse**
- **Often ingested internally, potential health problems**
- **Eventual emissions to air, wastewater and solid waste**
- **Often little oversight or government control**
- **May be widely used in some communities**
- **Hazardous content (Hg, Pb) typically not evident**

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Traditional uses - barriers to change

- **“Tradition” is difficult to influence, as it is based on generations of experience**
- **These treatments have been “successful”**
- **Uses may not be the result of a rational decision**
- **Often less expensive than other treatments**
- **Non-traditional alternatives may be unfamiliar or unavailable**

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Traditional uses - What can be done?

- **Control products in the market more often**
- **Raise awareness of Customs agents**
- **Improve enforcement of regulations on the content of medicinal products**
- **Publicize the hazards, especially specific cases of health problems**
- **Identify and raise awareness of alternative remedies that do not contain mercury (or other hazardous substances)**

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Ritual/cultural/religious uses of mercury

African, Latino and Afro-Caribbean traditions:

- **Santeria**
- **Palo**
- **Voodoo**
- **Espiritismo**

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Ritual uses – example 2

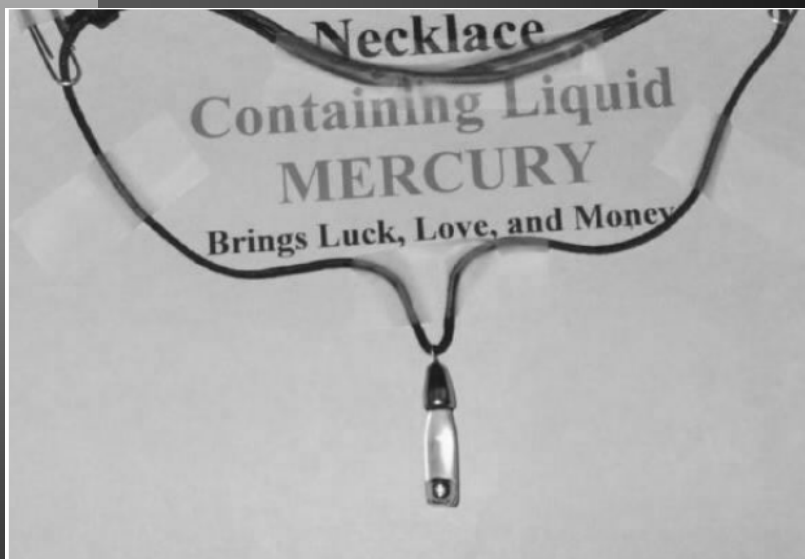
In Latino and Afro-Caribbean traditions, metallic mercury, often known as "*azogue*," is used:

- to attract luck, love, good health or money;
- to protect against evil; or
- to speed the action of spells through a variety of recommended uses, including:
 - carrying mercury in a sealed pouch prepared by a spiritual leader,
 - wearing it as an amulet,
 - sprinkling it on the floor or in an automobile,
 - mixing it with perfumes or
 - adding it to devotional candles or oil lamps.

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"Magic powers" of mercury



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Ritual uses – Hindu traditions

In Hindu scriptures, *parad* (mercury) is regarded as the best of all metals. The opportunity to touch and worship a *parad Shivalinga* (statue or icon) is believed by some to reward one's holy and good deeds done in the previous and present life. If one meditates beside a *parad Shivalinga*, it is believed the mind naturally gets concentrated. Mercury is used in such statues, objects and amulets throughout Hindu areas of India for a range of health-related, ceremonial and religious purposes.

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Large parad Shivalinga

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Slide 17

Buy on the internet...

**PARAD SHIVLINGA OF 11 KGS(APPROX.).....TO GET
MULTIPLE BENEFITS,,,VERY RARE TO GET THIS SIZE.**



**NOTE:- DELIVERY TIME IS MINIMUM 15 DAYS FROM THE
DATE OF PAYMENTS**

Cost: Within India including delivery by courier Rs.80000/-

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Parad beads

**PARAD MALA OF 108+1 BEADS OF 6-7 mm.
BEST QUALITY**



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Slide 19

Why are ritual uses a problem?

- **Not a major consumer of mercury, but very diffuse**
- **Often spread around living areas, potential health problems**
- **Eventual emissions to air, wastewater and solid waste**
- **Little oversight since these practices are often not public**
- **May be widely used in some communities**

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Ritual uses - barriers to change

- **“Ritual/religion” is difficult to influence, based on generations of culture and beliefs**
- **Many such uses are secretive**
- **Partial awareness of mercury interest may push practices further underground**
- **Many examples of how these practices seem to “work”**
- **If trusted religious leaders give guidance, one feels “obliged” to follow**

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Ritual uses - what can be done?

- Carry out further research on Hindu practices to better understand any hazards
- Raise awareness of known hazards, especially specific cases of health problems
- Work to eliminate the most dangerous practices such as spreading mercury on the floor, etc.
- Work with religious leaders to understand hazards and modify practices
- If mercury does have to be used, it should be kept in a secure place and well sealed
- When ritual users dispose of mercury, it must be done properly

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Slide 22

More information on traditional uses

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More information on ritual & cultural uses

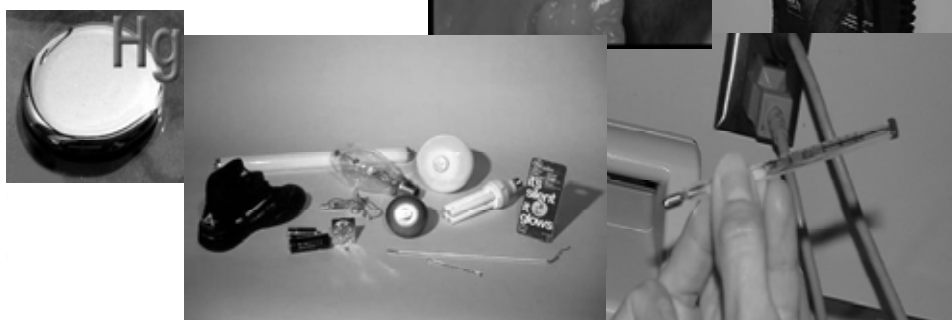
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REDUCTION OF MERCURY IN PRODUCTS ACTION PLAN

By Desiree Narvaez, UNEP DTIE Chemicals Branch

Reduction of Mercury in Products Action Plans



Action Plan

- describes the activities to be carried out and the related implementation strategies for responding to a priority or delivering a programme
- Consider country “context”- cultural, political, and administrative systems
- Objectives
 - define and put in place the necessary tools for implementing the national decisions on reduction of mercury use and release from products
 - to facilitate the mobilisation of resources from national, regional, sub-regional and/or international sources for the implementation of a chemicals management plan focused on mercury reduction
 - enable a team to focus on priorities by developing a common goal, objectives, activities, performance and evaluation indicators

2

Strategy, Action Plan, Measures

Program “strategies”, “action plans”, “measures”

- “Strategy” is an overall approach
 - “Action plan” is more detailed steps, activities, etc
 - “measure” is a particular approach
- All are part of a National Mercury Plan

3

Reducing Mercury Use and Release in Products

May include...

- Inventory and reporting
- Public information, awareness and education
- Policy development and legislation
- Technological/engineering improvement
- Institutional arrangements and monitoring
- Waste management (storage and disposal)

4

Proposed Steps for Developing an Action Plan

- 1. Establish context and analysis of issue- situation, gap and stakeholder analysis**
- 2. Formulate objectives**
- 3. Identify relevant management options**
(legal, operational, voluntary)
- 4. Establish criteria for evaluation and prioritisation**
(e.g. efficiency, affordability, practicability)
- 5. Evaluate and select management options to be applied**
- 6. Develop the Action plan implementation strategy**
(proposed activities; outputs; responsibilities: performance indicators; resource needs)
- 7. Proposed next steps and follow up**

5

1. Context and Analysis of Issue

- Establish current situation and state of knowledge in the country with regard to mercury in products
- Describe other relevant national, regional, sub-regional and international commitments, e.g. Rotterdam Convention; Basel Convention; International Code of Conduct; Stockholm Convention, SAICM
- Identify stakeholders within and outside Governments
- Conduct a gap analysis

6

Situation Analysis

- Responds to:
 - What is the present mercury in products situation in the country?
 - What mercury/chemicals initiatives exist?
 - Where do the challenges lie and what opportunities exist?
- Allows for a consideration of priorities.
- Includes stakeholder analysis

7

Gap Analysis

- Identifies what is missing with respect to:
 - Legislation and regulatory measures
 - Operational measures such as
Enforcement
 - Institutional measures
Analytical capacity
Material and human resources

8

2. Setting the Objectives

- Based on the established situation, define the necessary outcomes for your action plan; SMART objectives
 - S- specific
 - M- measurable
 - A- agreed
 - R- realistic
 - T- time-dependent
- and
- Identify the tools – institutional, legal/regulatory and operational – needed for implementing the country decision to reduce mercury use and release from products

9

3. Possible Management Options

- **Legal and administrative measures, e.g.:**
 - bans;
 - trade regulations;
 - distribution and use restrictions
- **Operational measures, e.g.**
 - surveillance & monitoring programmes;
 - conduct of inventory
 - technological requirements;
 - information handling and distribution;
 - training & education;
 - research & development;
 - law enforcement and control measures
- **Voluntary measures by industry sector(s) e.g. eco-labelling, substitution and replacement, product stewardship**

10

4. Criteria for Evaluation and Prioritisation

- **For the selection and prioritisation of management options - define criteria for evaluation and priority setting on the basis of specific national needs, circumstances and resources**
(e.g. socio-economic considerations; available infrastructures; affordability)

11

5. Evaluation and Selection of Suitable Management Options

- evaluate the different options and based on the set criteria select the options that are to be adopted and developed into an action plan implementation strategy for the country.

12

6. Action Plan Implementation Strategy – the foundation for the work

The strategy to be selected will with adequate criteria be adapted to the needs and national circumstances.

It should inter alia address:

- Assignment of responsibilities
- Definition of activities and outputs
- Development of work plan to include budget
- Formulation of implementation performance indicators
- Determination of resource needs

13

Reduction of Mercury in Products Action Plan Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures					
2. Operational measures - Inventory and Assessment - Awareness raising - Information education - Engineering & technological requirements - Institutional Arrangements/Monitoring					
3. Voluntary measures by industry - labeling					
4.					

14

Steps in Action Planning

1. Context and analysis of issue
2. Formulation of objectives
3. Identification of relevant management options
4. Establishing criteria for evaluation and prioritization of options
5. Evaluation and selection of management options at national level
6. Development of an action plan implementation strategy
7. Obtaining commitment

15

PHOTOS OF DAY 2



Where do we go from here?

1. **CRITICAL ISSUE:**
 1. Ensuring the health and safety of the school community particularly of children and pregnant women
 2. REOPENING OF THE SCHOOL
2. **BENEFITS ANTICIPATED:**
 1. POLICY and Legislation
 2. Creation of a quick response program
 3. CAPACITY BUILDING for the different line agencies of government (DOH, DENR, DILG, DOLE-OSH, DEP ED), the SAS, the GLOBE CARE
 4. "Mercury Free School" - possibility

Europe and the European Union



WORKING GROUP SESSIONS

GROUP A : REPORT OF DISCUSSIONS

Guide Questions

- **GENERAL QUESTION:**
- **What can Governments, NGOs/civil society, industry/private sector do to contribute to a reduction in mercury use and release-**

In mercury containing products in the health care sectors

- Medical Societies should be encouraged to lead in the promotion of mercury free health care
- Lao PDR – convince policy makers on the reduction of use of mercury
- Thailand – raise awareness of the medical professionals, educate policy makers, ban use of pesticides use in households than contain mercury from the Food and Drugs but no specific regulation on medical devices since most are sourced out from over-seas
- Kuwait- professional awareness and public awareness, government can subsidize for its nationals (mercury thermometer exchange)
- Iran – not very easy but not complicated. For the government – partial or sectoral ban. Work with country office of WHO for raising awareness, for industry sectors needs awareness raising, legislations. Legally binding instruments may be more complicated but a partial sectoral ban can be easier like through the WHO office in Tehran (WHO response: raise this at the level of the Country Office so it can be put forward to WHO Secretariat)
- Pakistan - NGO can be very good in strengthening knowledge
- Bhutan

Summary points

Awareness raising – education

Regulatory Policies

The role of WHO at the national and regional levels (include standards in the alternative medical devices)

Mercury in schools:

India- Awareness raising on the hazards of chemicals like mercury

Qatar- Information on mercury handling, hazards, general action plan

Palestine- awareness on the use of mercury and its harmful effects

USEPA- chemical industries to adopt schools

SPECIFIC QUESTIONS

- Which types of policy measures (regulations, legislation, administrative issuances, guidelines, etc.) do you have in your country for regulation and control of specific mercury containing products
-
- What initiatives/efforts does your country have on the waste management, storage and disposal of mercury containing products?
 - Technology transfer and infrastructure for disposal of mercury waste
 - Impose tax
 - Best available technology – not very good for elemental mercury
 - Need to be more selective about donated equipments that may already breakdown and therefore end up as waste
- Which are the main gaps or the missing regulatory measures needed to reduce demand of mercury containing products?
- What economic measures or incentives are needed to promote substitutes or alternatives to mercury containing products?
 - Supply and demand- if the substitute price will come down it will be good
 - Shipping technology transfer for mercury free alternatives
 - The mercury alternatives must not be expensive
 - Industries to set aside some funds for research on mercury free products
 - Research on mercury alternatives should be funded
 - Mercury containing devices exchange programs
- What institutional arrangements and capacities must be in place to promote substitutes or alternatives to mercury containing products? Which stakeholders must be involved?
 - Policy makers- environment and health
 - National advisory committee on mercury or interagency committee
- What other voluntary measures and activities can be done to reduce use of mercury containing products and its associated release?

GROUP B : REPORT OF DISCUSSIONS

Mercury Reduction in Consumer Products: Group Discussion

Co-chair: Joe DiGangi, EHF/IPEN

Soroush Modabberi, Iran

Rappateur: Brandon Turner, UNITAR

18 May 2007

Participants

- Bangladesh
- Canada
- Cambodia
- China
- Iran
- Japan
- Kiribati
- Malaysia
- Nauru
- Nepal
- Oman
- Philippines
- Thailand
- Tuvalu
- Singapore
- Pakistan
- Qatar
- Basel Secretariat
- Basel Action Network
- Concorde East/West Sprl
- Mercury Policy Project
- National Electrical Manufacturers' Association
- UNEP

Common Hg occurrence

- Use of Hg containing consumer products: thermometers, barometers, various medical equipment, energy-efficient lamps, batteries, etc.
- In many countries, products are often imported only, but knowledge/ identification of waste is limited
- For many countries the issue is management of products rather than production

Common capacity gaps for many countries

- Lack of data, knowledge, and awareness on Hg containing products as well as the importance of certain activities such as source separation, proper disposal
- Lack of capacity regarding data collection, analysis, laboratory sampling
- Lack of infrastructure in place regarding legislation, waste management, consumer information
- A range of capacity strengths exist in all countries; in some countries, strong capacities already exist regarding Hg

Common approaches that could be explored or have been undertaken by countries

- Capacity building: data collection, analysis, laboratory sampling
- Legislation and enforcement
- Green procurement, producer responsibility schemes, Hg free alternatives
- Identifying primary manufacturers: reducing supply of Hg containing products
- Awareness raising and education
- Waste management: source separation, identifying mercury recycling facilities
- Regional approaches, sharing lessons learned
- Building foundation of chemicals management to address Hg, MEAs, country priorities; for example:
 - Lab capacity; information/data gathering; legislation and enforcement; reporting; partnerships, step-by-step approach
- Country situation has highlighted various common issues, concerns, challenges:
 - A need to share lessons learned and experiences to address this transboundary issue; workshop is a contribution to this effort
 - Regional approach can be beneficial. Currently, many countries have various experience and mechanisms in place from which other countries may benefit
- Clearinghouse mechanism on Hg containing products and Hg free alternatives
- BAT/BEP approach to Hg emission reduction
- Parallels with Montreal Protocol approach
- Combining plans, recognising synergies
- Establishing a regional partnership on Hg products

ACTION PLANS : CAMBODIA, LAO PDR, THAILAND

Group 1: Cambodia, Lao PDR, Thailand

Reduction of Mercury in Products Action Plan

Implementation Strategy

General Objectives

- *To reduce Hg in products and promote Hg- free products*
- *To handle properly Hg wastes environmental sound manner*
- *To raise awareness at national, regional and sub-regional level*
- *To exchange information and promote collaboration among Asia-Pacific countries*
- *To contribute to Hg reduction and elimination in global level*

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures					
Laws and regulations	▪ Review and revise existing laws related to Hg management ▪ To prepare and amendment legislation related to management of release source of Hg • Development of strategy on	MoE (STEAs), M of Industry, M of Public Health, M of Commerce, M of Financial and other relevant stakeholders	3 Years (2007-2009)	▪ No. of reviewed and revised laws ▪ No. of new standard introduced ▪ Adopted Strategy ▪ Adopted Regulation ▪ Adopted Standards Guideline	• Funding for regulation/strategy proceeding (Both National and International Contribution) • Human resources (Expert, skilled staff) • Fund for infrastructure

	Hazardous Chemicals and Waste Management (including Hg) • Development of Regulation on hazardous chemicals uses (ban) • Development of standards of Hg in products and in the environment • Development of Guideline on Hg uses and how to handle Hg Waste				for Hg Waste storage and disposal • Subsidy of substitute products • Equipment for monitoring of law enforcement
Enforcement	▪ Market survey ▪ Scientific random inspection of products ▪ Import/Export control	MoE MoPH MoCommerce** M of Finance* M of Industry	Regularly	No. of sampling No. of violation	National government budget and other donor
Green procurement	▪ Promote alternative products in the procurement list ▪ Compulsory measure	MoE All gov. agencies	Regularly 2008	No. of Hg-free product categories added	National government budget and other donor
2. Operational measures					
Inventory and Assessment	▪ Conduct Hg inventory at national level ▪ Database of Hg-containing products/PRTR ▪ Research on health and environment impact	MoE, M of Industry, MoH, Local Authorities etc	By 2010	▪ Data on Hg uses ▪ No. of database ▪ No. of research	• Monitoring equipment • International Resource persons • Fund • National policies

Awareness raising Information education	▪ Produce educational media including publications, radio, TV, internet, etc • Raising awareness for policy makers, professional concerns and public in general • Integrating Hazardous chemical and waste management into school curriculum • Promote product label reading	NGOs, Manufacturers, M of Information, MoE, M of Industry, MoH and other related gov.	Regularly	▪ Level of understanding ▪ gradually change in people behavior ▪ Curriculum that include Hazardous chemical and waste management	• Facilities • Information sharing • WHO, UNEP support • NGOs input • Joint financial support from Industries
Engineering & technological requirements	▪ R&D on reduction of Hg use and alternative materials ▪ Promote technology transfer BEP/BAT ▪ Promote technology know-how on Hg management and waste disposal. ▪ Improvement landfill ▪ Introduction and promote sound management of waste in principle 3R-waste separation	Research and academic institutes, NGOs, manufacturers, MoE and city Municipality	5 years (2007-2011)	▪ No. of successful application ▪ Technology movement	
Institutional Arrangements/Monitoring	▪ strengthen cooperation among relevant agencies ▪ Establishing steering committee at both policy and technical level to ensure the	All stakeholders	5 years (2007-2011)	▪ Responsible Agencies and clear mandate ▪ Increased Capacity	

	collaboration and information sharing ▪ capacity building/training (for industry and gov.)				
3. Voluntary measures by industry			2007-2010		Input from Industries, NGOs
Labeling	▪ Promote Green Label ▪ Proper Labeling ▪ Training of staff/worker	All stakeholders		▪ No. of label awarded to Hg-free products ▪ Proper labeling	
Report (Global Reporting Initiative)	▪ Integrate environmental and health issues with financial report	Industries and NGOs		Published annual reports	
Responsible Care/Green Supply chain	▪ promote and implement RC and GSC concept	Industries and NGOs			
4. Information exchange	▪ Establish a process of information storage and access of data on Hg related issue ▪ Encourage and facilitate the contribution of NGO and stakeholder in Hg information exchange system	National and International Networks	Regularly	Information Accessibility	National and International Input

Note: *, **, In Cambodia the Department of Customs and Exise, MoEF is a leading for inspection the import and export all products at boder and the Department of CAMCONTROL responsible for controlling the products at the market. The other institution are the coordinating agencies in identify risk according to the Governmental Ordinace (Sub-Degree No.21 on The Facilitation of Trade Through the Risk Assessment).

Reduction of Mercury in Products Action Plan : Lao PDR Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	Development of strategy on Hazardous Chemicals and Waste Management (including Hg) Development of Regulation on hazardous chemicals uses (ban) Development of standards of Hg in products and in the environment Development of Guideline on Hg uses and how to handle Hg Waste	STEAs, MIT, MoH and other relevant stakeholders	2007-2010	Adopted Strategy Adopted Regulation Adopted Standards Guideline	Funding for regulation/strategy proceeding Human resources (Expert, skilled staff) Fund for infrastructure for Hg Waste storage and disposal Subsidy of substitute products Equipment for monitoring of law enforcement
2. Operational measures -Inventory and Assessment Awareness raising Information education	Conduct Hg inventory at national level Raising awareness for policy makers, professional concerns and public in general Integrating Hazardous chemical and waste management into school curriculum	STEAs, MIT, MoH MIC, STEAs, MIT, MoH etc M of Education, MIC, STEAs, MIT, MoH etc	By 2008 By 2010 By 2010	Data on Hg uses People became aware of Hg Uses and its Impacts and gradually change in their behavior Curriculum that include Hazardous chemical and waste	Monitoring equipment Resource persons Fund GOL policies Facilities Information sharing WHO, UNEP support NGOs input

Engineering & technological requirements	Promote technology know-how on Hg management and waste disposal.	Technology transfer and information exchange at regional and international level, NGOs and International Organization	2007-2010	management Technology movement	
Institutional Arrangements/Monitoring	Establishing steering committee at both policy and technical level to ensure the collaboration and information sharing	All relevant stakeholder		Responsible Agencies and clear mandate	
3. Voluntary measures by industry - labeling	Promoting Non-Hg product Proper Labeling Training of staff/worker	Industrial/Seller reluctant to import/produce Hg produce	2007-2010	Proper labeling Reduction in using Hg in their products	Input from Industries, NGOs
4.					

Reduction of Mercury in Products Action Plan : Cambodia Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures ACTION PLAN Revise or Develop the Legislation Related to Sound Management on Hg	- Undertake the law and policy assessment related to Hg management - To prepare and amendment legislation related to management of release source of Hg	MoE, MIME, MoH, MAFF, MoC, MoEF,	18 months		Governmental in-kind, International donors (UNEP, GEF, UNDP,...)
2. Operational measures -Inventory and Assessment ACTION PLAN Inventory Conducting	-Undertake comprehensive inventory of release of Hg	MoE and authority competence	1.5 month		UNEP
- Awareness raising Information education ACTION PLAN Strengthen the Capacity and Raise Public Awareness on Hg Issue and Hazard	-To raise awareness of Hg generation and its hazard to concerned people (policy maker, governmental institution, private sector, academy and NGO..). -Capacity building and	MoE, MIME, MoH, MAFF, MoC, MoEF, MoEYS, NGOs, Private sector	24 months		Governmental in-kind, International donors

- Engineering & technological requirements Institutional Arrangements/Monitoring ACTION PLAN Improvement Waste Management	institutional strengthening target to effective elimination of Hg -Improvement landfill - Introduction and promote sound management of waste in principle 3R-waste separation - To introduce and promote BEP/BAT	and stakeholder	3-5 years		International donors
3. Voluntary measures by industry - labeling					
4. Information exchange	-Establish a process of information storage and access of data on Hg related issue -Encourage and facilitate the contribution of NGO and stakeholder in Hg information exchange system	MoE	?		Govnt-? International donors

ACTION PLANS : SOUTHWEST ASIA

Reduction of Mercury in Products Action Plan : Bangladesh, Bhutan, Nepal, Pakistan, Iran

By SDPI (Pakistan), AIT (Nepal), Raihan Butt (Environmental Canada), Dr. Mahmood A. KHWAJA

Reduction of Mercury in Products Action Plan, Implement Strategy, General Objectives, Case Study: Sub-Regional case studies

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	- Built on existing Laws/Legislations & Regulations - Hazardous waste policy - Economic measures - Guidelines	Environment Authorities with other relevant agencies/stakeholders	2010-15	Development & Implementation of the policy/rules and regulations Guidelines established & Adopted Economic measures identified & necessary action taken	a. Financial Government, private sector, UNEP b. Technical Experts (International & Local), UNITAR, NGOs, CBO's
2. Operational measures	Inventory (baseline)	Regional Representative Committee (RRC)	2008-10	RRC established and functioning	a. Financial National Government (kind) UN agencies & Private sectors/partnership
-Inventory and Assessment	Development of Plan (equal participation of gender) for inventory & assessment with following sectors:	UNEP		Database established	b. Technical - Technical experts

Awareness raising Information education	Health sector Industrial sector Industrial products (imported products) Households Educational sector To be followed by its implementation	RRC/ National Government/NGOs/Media personnel	Ongoing	Awareness program in-placed, adopted to be followed by implementation	a. Financial National Government (kind) UN agencies & Private sectors/partnership
	Development of communication plan for stakeholders including the following sectors: Ministry of Education Ministry of Information and Communication Ministry of Health Healthcare units Media NGOs CBOs				
Engineering & technological requirements	To be assessed in the light of baseline data from inventory	Government, Private sector and R&D Institutions	2010-12		To de decided

Institutional Arrangements /Monitoring	Institution of RRC and Rules of procedure for RRC. Developing of monitoring program	National Government/UNEP	2008-09	Not applicable RRC in-placed and functioning and monitoring program in-placed	National Government& UNEP
3. Voluntary measures by industry - labeling	- Development of appropriate labels in consultation with industries and other stakeholders - Constitution of roundtable forums for stakeholders consultation and interaction - Awareness raising for all stakeholders	RRC National Governments, Chambers of Commerce & industry, NGOs, Media	2009	Labels established and adopted	RRC, National Government, Chambers of commerce & industry.
4.	•	b.			

Reduction of Mercury in Products Action Plan : Bangladesh Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	a. Special chemical section under Ministry of Environment and Forest b. Appointment of technical personnel/staffs S.C.S. c. Constitute of a National review committee to review existing rule and regulation regarding reduction of mercury and reduce in products and uses d. Identifying the gaps of existing rules and regulations e. Programme Development to follow up identified gaps	Department of Environment and Ministry of Environment and Forest	December 2010	Establishment of special section and Report of review committee and on chemicals and programme development	UNEP/UNDP/ And other international funding agencies
2. Operational measures -Inventory and Assessment	a. Development of plan for the inventory and assessment, awareness raising information education	Department of Environment and Ministry of Environment and Forest and Ministry	December 2009	a. Plan for inventory and assessment, rising awareness, information etc. in place of laboratory establishment and functioning National Review	a. Local/ National/ International funding agencies

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
- Awareness raising Information education - Engineering & technological requirements Institutional Arrangements/Monitoring	b. Upgrading the laboratory to establish mercury assessment. c. Constituting National Chemicals Advisory Committee involving all stakeholder, civil society industry etc. Special Chemical Section Development of Monitoring programme by SCS.	of Information		Committee	
3. Voluntary measures by industry - labeling	Awareness campaign, development of appropriate label through interactions with industry representatives and other stakeholders	Department of Environment and Ministry of Environment & Forest , Ministry of Industries and Ministry of Commerce	December 2009	Labels in place	Local/ National/ International funding agencies
4. Pursuance Basel BAN Amendment	a. Workshop/Seminar Meeting	Ministry of Environment and Forest	December 2009	Broad Agreement in place report of workshop/ seminar	Basel Convention Secretariat

Reduction of Mercury in Products Action Plan : Islamic Republic of Pakistan Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	1.Estblishment of Special Chemical Section (SCS) in MoE. 2. Hiring of technical staff for SCS. 3. Constitution of Steering Committee to review of existing rules and regulations regarding mercury and other chemicals and identifying gaps for the same. 4.Program development to fill up the identified gaps	Ministry of Environment (MoE), Pak.EPA & Provincial EPAs (P/EPAs)	December 2008	Establishment of SCS; Review committee constituted & program developed.	a. <u>Financial</u> Local & International UNEP and other donor agencies. b. <u>Technical</u> Experts/ Consultants Local & international, UNEAP and other donor agencies.
2. Operational measures -Inventory and Assessment - Awareness raising Information education - Engineering & technological requirements Institutional Arrangements/Monitoring	1.Development of a plan for inventory and assessment, awareness raising, information & education. 2.Establishment of analytical laboratory for mercury assessment in SCS 3.Constitution of a National Chemical Advisory Committee (NCAC) with representatives from all stakeholders	MoE, NCAC, SCS, Pak.EPA, P/EPAs	June 2009	Plan for inventory and assessment, information, education & awareness raising in place; laboratory established	Local & international, UNEP, UNITAR and other donor agencies.

	(Government, Industry, Civil Society etc.) 4.Development of monitoring program by SCS			and functioning and NCAC in place	
3. Voluntary measures by industry - labeling	1.Development of appropriate “Labels” in consultation with all stakeholders. 2. Consultation and interactions with industry & other stakeholders. 3.Awareneess raising	MoE, NCAC,SCS, Mo/Industries, Mo/Food & Agriculture, CBR, Pak. EPAs, P/EPAs, NGOs, Pak. Chamber of Commerce, Industry, Industrial Association and Research Institutes.	June 2009.	Labels developed and adopted	National & International and donor agencies.
4.					

ACTION PLANS : NORTHEAST ASIA

Slide 1

Group 3 Action Plan Proposed Implementation Strategy Summary

Participants:

China

Japan

Mongolia

EHF/IPEN

Mercury Policy Project

19 May 2007

**Workshop to Reduce Mercury Use and Release in
Products for the Asia Pacific Region**

Slide 2

Started discussion with country priorities

- Japan – Lamps
Trade (export)
- Mongolia – Inventory building
Gold mining (enforcement)
Awareness raising
- China – VCM production
Lamps
Button cell batteries
Inventory building

Slide 3

And then brain-stormed on what we learned from 2-day discussion

- Maximum Hg threshold in compact fluorescent lamps – voluntary initiative by supermarket, need for international co-ordination
- Phase out of Hg use in button cells by 2011, pledged by US industry
- Inventory of available mercury-free alternative

Slide 4

Then reviewed the action plan format proposed by the Secretariat

- Policy instruments:
 - Regulatory
 - Ban/regulation of production, use, trade
 - Technical specification...
 - Economic
 - Tax, subsidies...
 - Informational
 - PRTRs, labelling, MSDS...
 - Awareness raising
 - Voluntary
 - Industry initiative
 - Government/industry agreements...
 - Procurement

Slide 5

1. Policy/legal and administrative measures

Japan

Consider need for regulation on use, release or trade of Hg (as necessary)

Mongolia

Develop trade regulations inc. imports (2008)

Slide 6

2. Operational measures

Japan

Improve inventory of uses (end 2007)

Inter-ministerial committee on Hg (mid-2007)

Continue enviro, human, product monitoring

Develop inventory of exported Hg (end 2007)

Review and update procurement guidelines

Establish inventory of BAT/BEP for Hg alternatives

Improve PRTR release inventory (2008)

Slide 7

2. Operational measures

Japan

**Introduce labeling for Hg-containing products
(done for electronic appliances; consider for
lamps, med devices)**

Develop public awareness materials

Assist in enviro, human, product monitoring

Extend battery/lamp recycling in East Asia

Establish expert group on BAT

**Develop and disseminate guideline on Hg waste
(2007)**

Coordinate use and release inventory (2007)

Slide 8

2. Operational measures

Mongolia (2008 – 2009)

Build use inventory

Restrictions and ban on use

**Enhance training and education public and
industry**

Set environmental standards

Identify BAT/BEP

Strengthen national capacity

**Strengthen enviro impact monitoring from gold
mining**

Slide 9

3. Voluntary measures**Japan**

Participate in phasing out Hg use in button cell batteries (2011)

Strengthen recycling of batteries and fluorescent lamps

Mongolia

Develop voluntary agreement between government and industry

Slide 10

Proposed Northeast Asian Action Plan

1. Policy/legal and administrative measures	- consider subregional action plan	Governments	2008-2010
2. Operational measures			
- inventory and assessment	- build use and release inventory	Governments in co-operation with industry associations and UNEP	2007-2008
- Awareness raising information education	- enhance training and education for public and industry	Governments in co-operation with industry and NGOs	2007-
- Engineering and technological requirements	- consider environmental standards - identify best available technology and best practices	Governments in co-operation with industry and NGOs	2007-
- Institutional Agreements and Monitoring	- strengthen national capacity - strengthen environmental, human and product monitoring	Governments in co-operation with industry and NGOs	2007-
3. Voluntary measures by industry	- develop voluntary agreement between government and industry	Governments and industry	2008-
- Labelling	- develop information exchange scheme among industry	Industry	2007-

Proposed Northeast Asian Action Plan

Management Option	Proposed Activities	Responsible Person(s)	Target Dates	Performance Indicators	Resource
1. Policy/legal and administrative measures	- consider subregional action plan	Governments	2008-2010		
2. Operational measures					
- inventory and assessment	- build use and release inventory	Governments in co-operation with industry associations and UNEP	2007-2008		
- Awareness raising information education	- enhance training and education for public and industry	Governments in co-operation with industry and NGOs	2007-		
- Engineering and technological requirements	- consider environmental standards - identify best available technology and best practices	Governments in co-operation with industry and NGOs	2007-		
- Institutional Arrangements and Monitoring	- strengthen national capacity - strengthen environmental, human and product monitoring	Governments in co-operation with industry and NGOs	2007-		
3. Voluntary measures by industry	- develop voluntary agreement between government and industry	Governments and industry	2008-		
- Labelling	- develop information exchange scheme among industry	Industry	2007-		

Mercury Reduction Action Plan : Japan

Management Options	Proposed Activities	Responsible Persons	Target Dates	Performance Indicators	Resources Needed
1. Operational measures	Improve the inventory of mercury use in products. (Use in measuring devices, electric appliances, etc)	Government, in co-operation with industry associations and other stakeholders	End 2007: Obtain information on already identified gaps. Also identify further gaps. Continuous improvement.		Research contract
	Establish an inter-ministerial committee on mercury	Government	Mid-2007		None
	Continue environmental, human and product monitoring	Government and academia			Existing budget
	Develop inventory on use of mercury exported from Japan	Government and industry	End 2007		Research contract
2. Policy/legal and administrative measures	Consider the need for regulation on use, release or trade of mercury.	Government	As necessary		
3. Public work and procurement	Review and update the government procurement guidelines	Government			
4. Information measures	Establish inventory of best available technologies for alternatives to mercury.	Government and industry			
	Improve the PRTR release inventory.	Government and industry	2008: first updated inventory.		
	Introduce labeling for mercury containing products	Government	Done for electronic appliances. Further consider other products (lamps, medical devices, etc)		

	Enhance information exchange between businesses on the mercury content in products	Industry			
	Develop public awareness material	Government, local government, industry and NGOs			
5. Voluntary measures	Participate in phasing out of mercury use in button cell batteries.	Industry	Phase out by 2011		
	Strengthen the recycling of batteries and fluorescent lamps	Local governments and industry		Recycling rate	
6. International co-operation	Assist in environmental, human and product monitoring.	Government and academia			
	Extend the battery/lamp recycling initiatives in East Asia.	Industry			
	Establish an expert group on best available technology	UNEP and governments			
	Develop and disseminate a guideline on mercury waste	Basel Convention Secretariat and governments	Sep 2007: Preliminary guideline End 2008: Pilot project		
	Co-ordinate the use and release inventory	UNEP and governments	2007: pilot project		

Mercury Reduction Action Plan: Mongolia

Management Option	Proposed Activities	Responsible Person(s)	Target Dates	Performance Indications	Resource
1. Policy/legal and administrative measures	- develop trade regulations including imports	Ministry of Natural and Environment (MNE)	2008		
2. Operational measures			2008-2009		
- inventory and assessment	- build use inventory - restrictions and ban of use	MNE with international cooperation			
- Awareness raising information education	- enhance training and education for public and industry	MNE with international cooperation			
- Engineering and technological requirements	- set environmental standards - identify best available technology and best practices				
- Institutional Agreements and Monitoring	- strengthen national capacity - strengthen environmental monitoring impacts from gold mining	MNE			
3. Voluntary measures by industry	- develop voluntary agreement between government and industry	MNE and Industry			
- labelling					
4.					

ACTION PLANS : SOUTHEAST ASIA

GROUP: Myanmar, Malaysia, Philippines, Singapore, Basel Convention Secretariat, HCWH, and BAN

National Scenarios:

Malaysia

- Baseline study on Hg releases. Initial results that Hg is within limits. However, in mercury containing products in households is still a problem, there is no system in place for households. No labeling in terms of Hg content of lights. Malaysia environmental monitoring on Hg levels on the environment.

Singapore

- Need to explore the availability of alternatives.

Myanmar

- Lack of capacity to develop and conduct baseline study on Hg.

Philippines

- Philippine Health Department has initiated a survey on Hg containing devices and prices in health care facilities.
- Philippines developing a labeling requirement for chemicals (includes Hg).
- Proposal banning of lamp wastes in landfill
- Proceeded with an inventory of energy efficient lamps.

Malaysia, Philippines and Myanmar – Second- hand electronics (computer, television, etc.) are being imported into the countries.

Whole Region - Mercury-containing wastes, specifically e-waste, being transmitted from developing countries to OECD countries then back to developing countries in the guise of second-hand products/ or refurbishment purposes (Trans-shipment point)

Reduction of Mercury in Products Action Plan

Implementation Strategy

General Objectives

Proposed Activities	Responsible Person/s	Target Dates
A. Hg Containing Product vs. Hg Containing Wastes 1. More active (stronger) participation of developing countries at the World Customs Organization (WCO) for a more precise classification of harmonized systems code for used products and wastes, in particular Hg containing products.	Customs and Environment Agencies of SEA Countries	Next Scheduled Meeting
2. Regional workshop (under Basel Convention regional center in Jakarta) to discuss / hold workshop with the participation of Customs and Environmental Authorities to deal with the issue of classifying and distinguishing waste/non-waste with special focus on Hg in End-of-life equipments.	BCRC Jakarta/ UNEP	Timeline 2008
B. Regional and International Synergies 1. Elevate the issue of Hg containing products at the ASEAN level, and facilitate in including the Hg reduction issue in the agenda of the next ASEAN meeting, as appropriate. RP/A: ;	UNEP and ASEAN Secretariat	asap/2008
2. Explore synergies with other established conventions/protocols, e.g. Basel, Stockholm, Rotterdam, particularly in their regular regional meetings.	UNEP/ Convention Secretariats	Sept. 2007 – Basel OEWG
C. Disclosure/Registration 1. Adopt a registration and notification system similar to the EU Restriction in Hazardous Substances in EE products, including Hg containing products.	UNEP Ad Hoc Committees;	ASAP
2. Develop or use existing regional or international standards for testing and determination of Hg	National	Next meeting

content in products.	Standardization Bodies	
3. National standardization bodies to raise item no. 2 before the ISO standardization committee. Same as 2.	Same	Same
4. Disclosure of Hg content in products through labeling.	??	??
D. Phase-out 1. Propose a gradual phase-out on the use of Hg containing fever thermometer, and other Hg containing products. (Noting that in special cases such as countries facing the threat of avian flu and SARS, an immediate phase-out may not be possible).	Individual Countries/ WHO/UNEP	??
E. Funding Mechanism and Capacity Building 1. Explore and develop funding mechanism similar to the Montreal Protocol on Ozone Depleting Substances.	UNEP Chemicals/ GEF/ International Financial Institutions	Asap
2. Creation of a regional clearing house/database functioning as one-stop information center for Hg, such as Hg alternatives/substitutes, economic studies, etc.	UNEP Chemicals	As soon as funding is available
3. Expand the pilot project on UNEP Toolkit to include all Southeast Asian countries.	UNEP Chemicals	Asap

National Actions Recommendations:

A. Procurement

- Set and implement green procurement policies within governments, and to encourage industries/private sectors to follow.

B. Information Dissemination

- Ensure that the UNEP toolkit and other awareness raising materials are properly translated into the various dialects or ethnic languages existing in the particular country.

C. Infrastructure

- Evaluate the possibility of establishing Advance Hg Recovery Fees or similar mechanisms that can be used to fund collection, treatment, and environmentally sound management of Hg wastes and product containing wastes.

D. Create incentives for Hg Free products/Alternatives/Substitutes

E. Ratify pertinent Conventions and decisions, including the Basel Convention, Basel Ban Amendment, etc.

-END-

Reduction of Mercury in Products Action Plan : Myanmar Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	* Create new legislation specifically for Hg; * creating new team specific for Hg.	Lead by the Environmental Agency in cooperation with the others.	2007-2009	1. approval of the legislation; 2. starting the implementation	Technical and financial support
2. Operational measures -Inventory and Assessment - Awareness raising Information education - Engineering & technological requirements Institutional Arrangements/Monitoring	* establish inventory & assessment team; * conducting training for the team * designing awareness programme for all concerned people, agencies,...etc; * creation sub page within the existing website for Hg; * strengthening capacity building.	Environmental Agency	2007-2009	* inventory results; * database; * workshops, lectures, boosters, ...etc * good trained staffs; * monitoring programme; * Sampling and analyzing programme.	Technical and financial support
3. Voluntary measures by industry - labeling	Putting the composition of the product and its concentration.	Industry, Chambers of Commerce and industry Environmental Agency	2009	Products with labels	-
4.					

ACTION PLANS : WEST ASIA

Reduction of Mercury in Products Action Plan : West Asia Implementation Strategy, General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	* Create new legislation specifically for Hg; * creating new team specific for Hg.	Lead by the Environmental Agency in cooperation with the others.	2007-2009	1. approval of the legislation; 2. starting the implementation	Technical and financial support
2. Operational measures -Inventory and Assessment - Awareness raising Information education - Engineering & technological requirements Institutional Arrangements/Monitoring	* establish inventory & assessment team; * conducting training for the team * designing awareness programme for all concerned people, agencies,...etc; * creation sub page within the existing website for Hg; * strengthening capacity building.	Environmental Agency	2007-2009	* inventory results; * database; * workshops, lectures, boosters, ...etc * good trained staffs; * monitoring programme; * Sampling and analyzing programme.	Technical and financial support
3. Voluntary measures by industry - labeling	Putting the composition of the product and its concentration.	Industry, Chambers of Commerce and industry Environmental Agency	2009	Products with labels	-
4.					

ACTION PLANS : PACIFIC ISLANDS

Pacific Island Presentation on Mercury

Introduction:

- This presentation was prepared by Nauru, Tuvalu and Kiribati to highlight the Problems on Mercury Products in the Pacific Islands

Summary:

- In the early to mid- 1990s, the Australian Government have recognized the need for improved chemicals management in the Pacific Region
- In cooperation with the South Pacific Regional Environmental Program (SPREP) the Australian Agency for International Development (AusAID) they have already undertaken a feasibility study of potential waste management projects in the region.
- AusAID then developed and funded a project to collect from 13 Pacific Island Countries (PIC) (Fiji, Cook Islands, Federated States of Micronesia (FSM), Nauru, Kiribati, Tuvalu, Marshall Islands, Niue, Palua, Samoa, Solomon Island, Tonga, and Vanuatu mostly on chemicals that are listed under Stockholm Convention on POPs but not covering Mercury
- The chemicals were to be destroyed at a facility 40 kilometers north of Brisbane, the capital state of Queensland, in Australia
- The transport of these chemicals for destruction in Australia was considered necessary because PICs do not have adequate safe disposal technologies, facilities, infrastructures and available land area for this process

Country Situation:

- In most of the Pacific Islands, Mercury Products are often imported from Australia and New Zealand
- We are more of a recipient than a producer
- Knowledge and Identification on Mercury and the impacts within the Pacific Islands is limited

Common Capacity gaps:

- Lack of data, knowledge, and awareness on Mercury containing Products
- Lack of disposal skills in handling, managing and treating Mercury in an environmental safe sufficient manner
- Lack of appropriate disposal infrastructure
- For the Pacific Countries the issues on Mercury will be more on management products rather than production

Management Option:

- To review and amend the current draft Environmental law to include specific Mercury management provision
- Conduct relevant personnel and agencies to be involved in the monitoring program
- Determine appropriate administrative framework for the management of Mercury at the national level
- Initiate actions to promote the separation and disposal of Mercury
- Identify potential disposal sites for immediate action
- Implement recommendations of the review particularly with respect to regulating the importation of mercury products

Operational Measures, Inventory and Assessment:

- Secure financial resource to develop Project Document for Project Proposal
- Strengthen the human and environmental monitoring capacity of relevant agencies and organization within the country
- Public awareness of the human health and environment impacts of Mercury
- Public awareness of National Implementation Plan for Mercury management

Performance Indicators:

- National policy to be approved by Cabinet or Parliament
- Illegal Importations of non-consented mercury to be stopped
- The extent of trained personnel or key stakeholders participation on clean up activities on contaminated sites for Mercury
- Planned workshops conducted with relevant stakeholders participation

Responsible Person:

- In the Pacific Islands the responsibility will rely mostly on Ministries among the Government, NGOs, and other relevant stakeholders

Resource Needed:

- In the Pacific Islands, financial assistance and technical assistance will be the more resource needed to address the Mercury problems

Conclusion:

- Because we in the Pacific are users of products containing Hg and the limited financial capacity and knowledge, we sincerely request the assistance from developed countries to provide the necessary assistance in order to tackle the global action on reduction and safe disposal of Mercury

Draft Kiribati Action Plan to Reducing Mercury in Products Action Plan

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	1. reviewing of environment legislation to specifically address management of Hg products 2. developing of policy regulating mercury products imports and promoting the use of Hg free products 3. partnership between Ministry of Environment, Ministry of Health and Ministry of Education to reducing use of Hg products	1. Ministry of Environment and AG's Office 2. Ministry of Environment and Ministry of Health Ministry of Environment, Ministry of Health and Ministry of Education	2015 2010 2009	- number of consultations - development of amendment Bill - policy in place - number of enforcement trainings of the legislation - formation of interagency network on Hg elimination - adoption of action plan to reducing Hg products	UNEP GEF UNEP SAICM Multilateral funding
2. Operational measures -Inventory and Assessment - Awareness raising Information education - Engineering & technological requirements Institutional Arrangements/Monitoring	1. capacity building in terms of trainings to health, schools and other key sectors involved in the use of Hg products 2. conducting inventory of Hg products present on island 3. awareness on source separation, clean up, safe disposal and 4. promoting of medical Hg products alternatives 5. building capacity on data collection, analysis and use of information in decision making 6. monitoring controls on use of Hg disposals 7. shifting in Hg products in Health to Hg free products starting with thermometers 8. strengthening of capacity of relevant agencies in environmental and human monitoring of levels of Hg 9. establishing mechanisms in safe disposal of Hg products	1. Ministry of Environment, Ministry of Health and Ministry of Education 2. Ministry of Environment 3. Ministry of Environment, Ministry of Health, Ministry of Education Ministry Environment, Ministry of Health Ministry of Environment Ministry of Environment and Ministry of Health Ministry of Environment and National Laboratory Unit	2009 2010 2009 2008 2010 2010 2015 2012 2009	- development of guidelines and fact sheets by WHO on handling of Hg products - draft inventory produced - number of awareness campaigns on Hg health effects - number of trainings in capacity building for health and schools on Hg - number of consultation workshops with businesses, NGOs and government ministries - number of capacity building training to relevant agencies on data collection and analysis - number of Hg free medical products -	WHO SAICM/UNEP GEF UNEP Chemicals GEF SAICM
3. Voluntary measures by industry - labeling	Kiribati does not produce Hg products. The issue is the need for support for building capacity in terms of the sound management of Hg products, including clean up of Hg contamination, safe disposal and human and environment monitoring of Hg levels				
4.					

Reduction of Mercury in Products Action Plan: Nauru Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	1. To review and amend the current draft Environmental law to include specific Mercury management provision 2. Train border control officers to effectively apply monitoring protocols regulating mercury importation 3. Conduct relevant training for relevant personnel and agencies to be involved in the monitoring program 3. Determine appropriate administrative framework for the Management of Mercury 4. Initiate actions to promote the separation and disposal of Mercury 5. Conduct public Awareness activities for capacity building to promote standards amongst importers of motor vehicles and the general public 5. Identify potential disposal sites 6. Implement recommendations of the review particularly with respect to regulating the importation of mercury product	1. Ministry of Commerce, Industry & Resources, Ministry of Justice, Ministry of Health, Ministry of Education, RONPHOS Corporation and Rehabilitation Corporation		1. National Policy to be approved by Cabinet 2. Illegal Importations of non-consented mercury to be stopped 3. Number of border control officers trained in the use protocols	1. Financial assistance, Technical Assistance from NOGs, Industry and External Organization that deals with Mercury
2. Operational measures - Inventory and Assessment - Awareness raising	1. Secure financial resource to develop Project Document for Project Proposal 2. Strengthen local capacity for border control on Mercury	1. Ministry of Commerce, Industry & Resources, Ministry of Health,		1. The extent of trained personnel or key stakeholders participation	1. Financial Assistance and Technical Assistance from external

Information education - Engineering & technological requirements Institutional Arrangements/ Monitoring	products 2. Strengthen the environmental monitoring capacity of relevant agencies and organization within country 3. Train staff in the safe handling and disposal of Mercury 4. Promote Public awareness of the disposal sites and of clean-up activities requiring public knowledge, participation and support 5. Public Awareness of contaminated sites 6. Public Awareness of the environment and human health impacts of Mercury 7. Public Awareness of legal mechanisms and institutional arrangement 8. Public Awareness of the National Implementation Plan for Mercury management	Ministry of Justice, Ministry of Education, RONPHOS Corporation and Rehabilitation Corporation in collaboration with other Stakeholders		on clean-up activities on contaminated sites for Mercury 2. Planned workshop conducted with relevant stakeholders participation	organization
3. Voluntary measures by industry - labeling					
4.					

Reduction of Mercury in Products Action Plan : Tuvalu Implementation Strategy

General Objectives

Management Options	Proposed Activities	Responsible Person/s	Target Dates	Performance Indicators	Resources Needed
1. Policy/legal and administrative measures	Insertion (if approved) of the management of Hg in the draft Environment Bill	Department of Environment and the Attorney General's Office	Environment: Priorities and Strategies 2005–2015 • Develop and implement an urban and waste management plan for Funafuti. Adopt from Kakeega II 2010	Cabinet to approve the proposal.	Officials from Environment, Hg in products workshops and meeting participants to relay the message to Cabinet
2. Operational measures -Inventory and Assessment - Awareness raising - Information education - Engineering & technological requirements Institutional Arrangements/Monitoring	Secure financial resources. - PDFA to GEF Due to the lack of human resource on Hg hotspot identification - Follow by a medium size project. - liaise with other funding agents	Department of Environment and Ministry of Planning	2011	Full commitment of government, NGOs and relevant stakeholders in addressing the issue so that it is acceptable to financial donors	- Financial assistance - Trained personnel on the proper handling and identification of Hg. - Relevant Regional Organization USP, SPREP and others.
3. Voluntary measures by industry - labeling	Participation on the various training by well trained personnel's on Hg Identify products containing Hg and store them in a safe place away from people Lead the ground work as model for the people	All the Importers and mainly the users of Hg containing product. NGOs and	2012	Government to support the initiatives by private sectors on their effort to address products containing Hg.	NGOs and Private sector