

# Workshop on mercury management in the Latin American and Caribbean Region

BRASILIA 21 - 22 MAY 2012



## SUMMARY REPORT OF THE WORKSHOP ON MERCURY MANAGEMENT IN THE LATIN AMERICAN AND CARIBBEAN REGION, 21-22 May Brasilia (Brazil)

The workshop on mercury management in the Latin American and Caribbean (LAC) region, planned within the framework of activities proposed for the Supply and Storage Partnership Area of the Global Mercury Partnership (UNEP), was organized by the Government of Spain (Ministry of Agriculture, Food and Environmental Affairs, MAGRAMA, and the National Technological Centre for Mercury Decontamination, CTNDM), with the valuable collaboration of the Governments of Brazil and Uruguay.

The workshop was held in Brasilia (Brazil), days 21-22 May 2012 in the Conference Centre of the National Hotel.

### 1. Workshop objectives:

1<sup>st</sup> Address the situation and challenges in managing mercury in the Latin American and Caribbean Region (LAC), analyzing possible environmentally sound solutions.

2<sup>nd</sup> Involve institutions and industries from LAC and other regions in the workshop to allow them to share their knowledge and views on the mercury management issue, especially those industrial sectors identified as mercury supply sources.

The workshop also served, as a tool to disseminate information and to exchange initiatives and real experiences that have been undertaken both in public and private sectors.

### 2. Participants:

- Representatives of the United Nations Environment Programme (UNEP), Division of Technology, Industry and Economics (DTIE): Timothy Kasten, Head of the Chemicals Branch, and David Piper, Deputy Head.
- Governmental representatives of the following countries: Antigua and Barbuda, Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Peru, Saints Kitts and Nevis, Santa Lucia, San Vicente y Grenadines, Spain, Suriname, Uruguay and Venezuela.

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- Other participants: Ambilamp, Apliquim Brasil Recycle, Barrick Gold Technology Centre, CAATA (IPEN), Basel Convention Coordinating Centre. Stockholm Convention Regional Centre for Latin America and the Caribbean Region, Choice/World Alliance For Mercury Free Dentistry, Coalition for SafeMinds, International Society of Doctors for the Environment (ISDE), National Technological Centre for Mercury Decontamination (CTNDM) Natural Resources Defense Council, Taxisphera\_APROMAC coalition, Universidad de Brasilia, World Chlorine Council, Zero Mercury Working Group.

### 3. Agenda Proceedings:

The workshop started with opening statements and welcome from the host country governmental representative Ms. Sergia de Oliveira (Brazil), who thanked participants for attending the workshop, followed by similar words of welcome from governmental representatives of Spain and Uruguay, as co-leaders of the Supply and Storage Partnership Area of the Global Mercury Partnership.

David Piper, Deputy Head of the Chemicals Branch (DTIE, UNEP), closed the opening act by wishing fruitful working days and highlighting the positive contribution the workshop could have in the later LAC regional consultation meeting, to prepare the fourth session of the Intergovernmental Negotiating Committee (INC-4), scheduled from June 27 to July 2, 2012 in Punta del Este, Uruguay.

### Day 1/ Agenda Items:

#### “European Union (EU) legislation on mercury”

Speaker: Mr. Oscar González Sánchez, Ministry of Agriculture, Food and Environmental Affairs, MAGRAMA (Spain).

Mr. González presented in detail the EU legislation on mercury, focusing his speech on the regulation of export, storage and disposal of metallic mercury and its compounds.

The speaker reported on the legal framework applicable to mercury as hazardous waste that must be managed in a sound manner following the guidelines established within the EU for classification, treatment operations, authorized landfills and trans-boundary shipment.

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He finally described in detail the specific binding requirements currently established in the EU legislation for metallic mercury and its compounds, referring also their original motivations, as well as the foreseen regulatory developments in the future.

## “Mercury in the chlor-alkali industry”

Speaker: Mr. Afonso Martim Penna, World Chlorine Council (Brazil)

The presentation provided a global overview of the situation of chlorine-alkali plants in regions and countries in Europe and North America, Argentina, Brazil, India, Mexico, Russia and Uruguay, with a special focus on the Latin American and Caribbean Region.

Safe handling and mercury storage practices in such installations were also described, as well as the Solvay Indupa technology conversion project, consisting of dismantling and removal of liquid mercury from 101 cells of the chlor-alkali plants.

The chlor-alkali sector is searching for permanent storage solutions for mercury and Mr. Martim Penna showed several alternatives currently under consideration (stabilization technologies).

## “Gold mining as potential producer of mercury”

Speaker: Mr. Jorge Chavez Blancas, Barrick Gold Technology Centre (Chile).

The speaker explained how mercury is naturally present in gold containing ores. This mercury quantity depends on the composition of each ore. Mercury merges with the gold and silver in the entire cyanidation recovery process and is separated by distillation from precipitated solids.

The presentation provided an overview of the extraction process, handling, packaging, transportation, inspection, safety and health measures for the workforce, as well as the environmental measures for mercury i.e. soil and water monitoring and control emissions.

Two types of mercury products are produced by this sector: elemental mercury that is currently placed in the market, and mercury from activated carbon filters containing mercury.

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Finally, Mr. Chávez informed that the gold mining industry is considering and assessing technological options for the chemical stabilization of metallic mercury as a way to solve its final disposal.

## **“Management end-of-life mercury-containing products, I”**

Speaker: Mr. Alberto Rodriguez, Operations Director, AMBILAMP (Spain)

The Ambilamp Association is the Integrated Management System of end-of-life mercury-containing lamps. It is also the Spanish reference in this sector and brings together the main manufactures and importers.

The Association presented this type of waste management system, organized by manufacturers and importers of lamps at European level, which allows the recovery of these end-of-life products. The logistic approach for the recovering of disused lamps, the treatment process and the destination of final subproducts, were also described.

It was highlighted that thanks to the whole process small quantities of liquid mercury can be recovered to ensure their later safe environmental management by other companies and institutions such as the National Technological Centre for Mercury Decontamination (stabilization technology).

Lastly, Mr. Rodríguez presented the communication and environmental awareness activities developed by AMBILAMP over the recent years.

## **“Managing end-of-life mercury-containing products, II”**

Speaker: Mr. Eduardo Sebben, Apliquim Brasil Recicle (Brasil)

Apliquim Brasil Recicle is a Brazilian company specialized in mercury waste treatment, and fluorescent lamps decontamination and recycling, leader in its market segment after the merging of two companies with over 25 years of experience.

Apliquim Brasil Recicle currently serves over 3,000 customers across the country and is the only Brazilian company able to perform full used fluorescent lamps decontamination, and mercury recovery in its elementary liquid state.

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Methods employed for used lamp recovery and treatment technologies, existing infrastructures in Brazil along with the main legal and environmental challenges facing the management and treatment of such waste, were presented. Mr. Sebben emphasized the need for specific legislation regarding its management since only 5% of used lamps follow a recovery treatment.

## “Mercury management and human health issues”

Speaker: Ms. Lilian Corra International Society of Doctors for the Environment, ISDE (Argentina)

Ms. Corra began her presentation by stressing the importance of an appropriate consideration of the health elements in the negotiating process of the future Mercury Convention and the need of greater health presence in the structure of the text.

The following issues were raised:

- Presence of mercury in health centres and deficient capacity and facilities to ensure the safe management of waste containing mercury in developing countries.
- The need to maintain research and collection of information about health effects of dental amalgams and vaccines containing mercury; alternatives must be accurately assessed to ensure that mercury is not replaced by other hazardous substances.
- The importance of reducing mercury exposure of the population and the environment, highlighting the role of WHO to ensure an effective implementation of the future Convention.
- The key role of monitoring activities, the use of biomarkers and the need to strengthen the technical capacity of laboratories in developing countries.

## “Background of mercury in Spain. National Technological Centre for Mercury Decontamination”

Speaker: Ms. Ana Garcia Gonzalez, Ministry of Agriculture, Food and Environmental Affairs, MAGRAMA, (Spain).

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The history of mercury in Spain dates back to Roman times with the beginning of mercury mining operations in Almaden (Ciudad Real). The end of the mining activity came in 2001, while the metallurgical activity ceased in 2003 and the remaining commercial activity of mercury stopped before on the 15<sup>th</sup> of March, 2011.

This situation has provided with a deep knowledge and a unique technical expertise on mercury and, recently, a significant socio-economic impact in the Almaden area. With this in mind, the National Technology Centre for Decontamination of Mercury (NTCDM) was created in 2009 by initiative and funding of the Ministry of Agriculture, Food and Environmental Affairs. Spain with all the resources of the CTNDM joined, in September 2011, the Global Mercury Partnership (UNEP) and together with Uruguay co-leads the Supply and Storage Area.

The main objective of CTNDM is to research and develop technologies for the environmentally sound management of mercury throughout its life cycle, while providing technical assistance and technology transfer. It was highlighted that the technologies developed by the CTNDM are based on solid research works carried out in collaboration with the National Centre for Metallurgical Research (CENIM).

## “A case study of mercury remediation in a mining/industrial area”

Speaker: Mr. Javier Carrasco, National Technological Centre for Mercury Decontamination, NTCMD (Spain)

This presentation introduced a case of remediation performed in the external area of Almaden mines (Ciudad Real, Spain), and also the subsequent monitoring programme.

The dump site of Almaden mines allocated a vast amount of wastes generated by mining and metallurgical activities and their mercury content were generally high. Mr. Carrasco informed that impacts to the environment took place over centuries but it was not possible to discriminate these impacts from those coming from background concentrations, also very high in the area.

The restoration activity, known as “AZOGUE PROJECT (Quicksilver Project),” was undertaken between 2005 and 2008. The works consisted of hugely remodelling the area, sealant actions, stabilizing of slopes, landscape integration activities, as well as thermal and hydrologic isolation. A monitoring programme of mercury levels was performed from the very beginning, with very satisfactory results that can be followed at: <http://www.ctndm.es/proyectos/1.php>

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## Round table discussion.

Following the presentations of the first day, a round table discussion was organized further elaborating on the prominent topics raised throughout the day:

1. Legislation: export ban on mercury in the EU, considerations regarding imports of mercury and mercury waste, as well as regulations of the permanent and temporary storage.
2. Future management of secondary mercury. The discussion revolves around the need to define solid, practical and clear laws/rules applicable in the long-term.
3. Tools for the improvement of waste management systems, and also for items containing mercury at the end of their useful life.
4. Technical and analytic capacity necessary for applying the regulations related to mercury.
5. Uncertainty about possibilities for the main sectors present, the gold mining industry and the chlor-alkali industry, to assume the costs for the implementation of measures of the future mercury agreement.

The discussions gave rise to the following main conclusions:

It is clearly seen that the current specific legislation regarding trade of mercury is focused, at this moment, mainly upon measures for banning the export and not the import.

Studies carried out by UNEP estimate that, on a global scale, about 46,000 tonnes of metallic mercury will be generated throughout the next 40 years. These quantities are moderate and most of them are located in advanced industrial sectors that have the know-how for their management.

The legislation should be clear and should provide legal certainty, thus allowing the sectors to make secure investments that will result in activities, which are not only more effective, but environmentally friendly as well.

The representative of the gold mining industry recognized that the sector could, in principle, assume the costs to implement the mercury management measures which will derive from the future agreement; in turn, the representative of the chlor-alkali sector affirmed that they would have capacity to assume the measures of the future agreement, however he stated that besides the costs, appropriate time limits would have to be considered and discussed with the sector.

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On the other hand, both sectors requested that, when drafting national and international regulations regarding mercury, the countries should invite the industrial sectors involved so that the future legislation can be sustainable and applicable.

Based on comments of the participants it was identified that, currently, the Latin America and the Caribbean region appears to have less resources for waste management and, more specifically, tools and technologies for processing and for the final disposal of wastes containing mercury.

The risks and impacts of mercury on the human health and the environment should be recognized, and capacity to establish control and monitoring systems should be developed.

## Day 2 / Agenda Items

### "Binational Project (Argentina-Uruguay) for mercury storage: results"

This Binational Project has been carried out based upon the recommendations made in the meeting of the Executive Board of the LAC Mercury Storage Project, (October 2010, Santiago de Chile), the United Nations Environment Programme (UNEP), through the Chemical Branch of the Division of Technology, Industry and Economics (DTIE) and the Focal Point of the Basel Convention for Latin America and the Caribbean located in Uruguay (CCCB).

The aim of this project is to achieve the following objectives:

- Revision of the national and regional policy and regulatory framework in each country.
- Inventory of current processing facilities for mercury and/or hazardous waste and the management practices.
- Evaluation of management options for mercury and technology development.
- Identification of potential sites for the storage of mercury.
- Implementation of a National Plan for environmentally safe management of excess mercury in each country.

Speaker: Dr. Gabriela Medina, Focal Point of the Basel Convention. Stockholm Convention Regional Centre for Latin America and Caribbean (Uruguay).



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Ms. Medina started her presentation talking about different inventories of mercury releases in the industrial sector, in the health sector (Pilot) and in products, as well as a "National inventory of mercury releases", a project of "Rational Management of Products with Mercury" and the "Feasibility Study and Analysis of Options for the long-term Storage of Mercury in Latin America and the Caribbean, UNEP – LATU (Uruguay) 2010".

As regards the legislative framework, it became clear that Uruguay is at a critical moment in which a specific legislation for waste is being developed. Within the regional framework, it was pointed out that, the internalization of the Basel Convention in the countries of the Region, has resulted in banning the entry of hazardous waste, making each country responsible for processing its own waste, including the related costs.

It was emphasised that currently there is no available infrastructure for processing mercury wastes. The potential sites for future storage: the existing plant of chlor-alkali and the "CIU Safety backfill dump project" (Agreement of Chamber of Industry of Uruguay, City Government of Montevideo and DINAMA), do not have special provisions for mercury wastes.

Speaker: Dr. Pablo Issaly, Chemical Substance and Product Unit, Secretariat of Environment and Sustainable Development (SAyDS) Presidency of the Cabinet of Ministers (Argentina).

Mr. Issaly presented the project for the Environmentally Adequate Storage and Disposal of Elemental Mercury and its Wastes in the Republic of Argentina, describing the actions implemented and the Work Plan for the Storage and Disposal of Mercury in Argentina (2012-2014).

He also gave a report regarding the national and regional legal framework (MERCOSUR), results of the mercury release estimates in different sectors (health, energy, industrial processes and consumer goods), and the infrastructure for processing existing mercury wastes in Argentina.

The presentation concluded with a "Proposal for Mercury Storage" based on the concept of engineered containment barriers, utilising concrete as containment material (INTI – CNEA Agreement).

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## "Stabilization technologies for mercury and mercury containing waste"

Speaker: Dr. María Jesús Romero, National Technological Centre for Mercury Decontamination, CTNDM (Spain).

Ms. Romero presented the metallic mercury stabilization technology developed by the German company DELA GmbH. The information issued by the company, describes that in its technology, metallic mercury together with elemental sulphur are transformed into mercury sulphide in a vacuum mixer.

The information specifies that the technology, which is patented, is applicable to metallic mercury with a minimum degree of purity of 99.9%.

The end product is stable red cinnabar in powder state, with leaching values for Hg that are lower than the limit value established by the European legislation as criteria for acceptance at landfills of inert waste. The end product is said to be free of mercury emissions and non-reacted sulphur.

The presentation showed the stabilization plant, the only one that currently functions at industrial level and the process undertaken from the removal of mercury at the facilities of origin, transport, stabilization and, as red cinnabar, the packaging in bags that are placed in special barrels for transport and final disposal at salt mines in Germany.

Speaker: Dr. Manuel Ramos, National Technological Centre for Mercury Decontamination, CTNDM (Spain)

The research activities regarding technologies for mercury management started with the MERSADE/EU/*Life* project, Mercury Safety Deposit (2006-2010), which included the design of a container for the safe temporary storage of metallic mercury (prototype 50 t/50 years) as well as the development of a stabilization technique for metallic mercury that incorporates an additional safe step for the mercury sulphide micro-encapsulation.

The National Technological Centre for Mercury Decontamination has continued the research activities, which entails among others, the improvement of the stabilization process with a final product free of aggregates, and the application of this technology on wastes containing mercury other than metallic mercury.

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The technology, which is patented, firstly transforms metallic mercury and elemental sulphur into mercury sulphide that, in a second phase, is micro-encapsulated in a sulphur polymer matrix, which in fact provides an additional barrier for preventing mercury to be released into the environment.

The technology is directly applicable to metallic mercury, of purity even lower than 99.0%, and to waste with lower content of mercury, such as powder from fluorescent lamps or that derived from zinc metallurgy. In all the aforementioned cases, the end product is a compact, safe, manageable and resistant solid such as concrete, with leaching values for Hg that are lower than the limit value established by the European legislation as criteria for acceptance at landfills of inert waste.

The large-scale engineering project, which is currently under construction, has capacity for processing 2.5 tonnes of product (either metallic mercury and/or wastes with mercury). The plant is foreseen to be completed in 2013.

Works are also being carried out on the design of plants on a smaller scale for "in situ" applications.

#### 4. Conclusions of the workshop :

At the end of these presentations, a review of the development and results of the workshop was carried out, which resulted in the following conclusions:

The presentations mainly dealt with practical difficulties and potential solutions related to the storage of mercury and processing alternatives.

It was recognized the fact that small scale projects have allowed to collect important information relevant for decision-making and that small-scale activities, such as workshops, enable the dissemination of initiatives at regional level, thus facilitating their consideration for possible application at national level.

It is important to highlight the broad and diverse participation in the workshop: representatives from governments, UNEP, NGOs, research and technological centres of chemical conventions, as well as representatives of key industrial sectors for mercury, such as the gold mining industry and the chlor-alkali sector. To know in depth all around the mercury issue and to be able to present balanced and realistic solutions is crucial to have all the different perspectives in the discussions and involve all the relevant stakeholders.

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It was recognized that the mercury waste management should be carried out at the place where it is generated, given the fact that its transport would increase exposure and risk for greater numbers of workers as well as population. Adhering to the principles of self-sufficiency and proximity in the waste management, among others, is the preferable option from the health point of view.

Stabilization is one of the possible ways used for solving the management of metallic mercury, given that, being liquid, it is the one that presents more difficulties, technical uncertainties and risks; metallic mercury is transformed by stabilization into another less risky and less hazardous mercury chemical variety facilitating with it the search for an adequate environmentally sound storage that complies with all the safety conditions for its final disposal.

It has been pointed out that a specific, clear and applicable legislation is needed, including adequate control mechanisms: analytical capacities for determining mercury in different human and environmental samples, as well as all the necessary technologies for collecting, managing and processing mercury, including the safe final disposal.

## 5. Closure of the workshop

There were final words of acknowledgement and appreciation to all participants from Fernando Lugris (Uruguay), Chairman of the Intergovernmental Negotiating Committee (CIN), David Piper (UNEP) and from Sergia de Oliveira, representative of the host Government (Brazil).

Finally, Ana García González, representative of the Spanish Ministry for Agriculture, Food and Environmental Affairs, thanked all attendants for their positive participation on the workshop; she particularly appreciated inputs of the representatives of the Governments of Brazil and Uruguay, the UNEP representatives, the Chairman of the CIN, the speakers with their brilliant presentations and, especially, the National Technological Centre for Mercury Decontamination (CTNDM) of Spain, because without its deep knowledge about the mercury world, it would not have been possible to organize and develop this workshop.

She declared the workshop over and expressed her best wishes of success for the regional consultation meeting.

The event ended with a photo of all the participants in the workshop.