Proceedings of the Latin America and Caribbean Mercury Storage Project Inception Workshop
22-23 April 2009
Montevideo, Uruguay

EXECUTIVE SUMMARY

BACKGROUND:

The workshop was aimed at reducing the eventual supply of mercury to the biosphere by initiating a regional process that will support the sequestration of excess mercury in the Latin American and Caribbean (LAC) Region. The activity is part of the Norwegian funded mercury storage project being implemented by UNEP Chemicals, in response to Governing Council (GC) decision 24/3 IV that established mercury supply reduction as a global priority, and urged governments to gather information on the options and solutions for the long-term storage of mercury instead of allowing this mercury to be sold in the global marketplace. GC 25/5 decision likewise called to continue and enhance capacity for mercury storage, concurrently with the work of the intergovernmental negotiation committee (INC) to elaborate a global legally binding instrument.

The workshop was conducted by UNEP Chemicals in collaboration with the Basel Convention Coordinating Centre for Capacity Building and Transfer of Technology (BCCR) hosted by Uruguay. It was attended[1] by

- 21 representatives from 19 Governments (Ministries of Environment, Health, and International Cooperation from Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Honduras, Mexico, Nicaragua, Panama, Peru, Surinam, Trinidad and Tobago, Uruguay, Venezuela)
- 2 representatives from the Basel Convention Regional Centers (BCRC)- Argentina, Trinidad and Tobago
- 10 representatives from 6 Non governmental organizations dealing with the sound management of chemicals- Associsao de Combateaos Poluentes Brazil (ACPO), Asociación Argentina de Médicos por el Medio Ambiente (AAMMA), Centro de Análisis y Acción en Tóxicos y sus Alternativas (CAATA), Fundación Natura-Ecuador, Health Care Without Harm, Zero Pollution Alliance
- 3 representatives from 2 Intergovernmental organizations –UNIDO Regional Office in Uruguay, UNITAR Office in Geneva
- 7 resource speakers – Mercury Policy Project (MPP) , Concorde East West Sprl, US Environment Protection Agency, US Department of Defense (Defense National Stockpile Center), GRS Germany, K+ S Germany, World Chlorine Council
- 2 UNEP Regional Office for Latin America and the Caribbean (ROLAC) and Montevideo staff.
- 2 UNEP DTIE Chemicals Branch staff

Specific Objectives of the Workshop were to:

[1] See annex 1 for detailed list of participants

1. Review an expert report on the anticipated quantity of mercury in the LAC region that will require sequestration, and share information about sequestration efforts in other countries and regions.
2. Discuss the options and issues to be considered for long term safe storage of excess mercury and make recommendations on the next steps following the workshop such as an options analysis and an in depth feasibility study.
3. Organize a regional support structure such as an Advisory Committee (to be represented by an Executive Committee) that will consider the development of regional options for the sequestration of mercury such as a regional terminal storage facility for mercury, and facilitate the development of national policies consistent with the development of such a facility.

OPENING SESSION:

The session opened with a statement by Ms. Silvia Aguinaga, former head of the Uruguay BCCR and representing the Uruguay Ministry of Environment. She expressed her government's support to countries in the Region and to UNEP for efforts such as this workshop aimed at reducing mercury pollution, emphasizing the need for global coordinated action.

The welcome remarks were given by Ms. Mara Murillo, Deputy Director and Acting Regional Director of the UNEP ROLAC. First she thanked the government of Uruguay for hosting this activity and for collaborating on this project. She underscored the fact that mercury is toxic and that, despite work on mercury reduction since 2001 as mandated by UNEP Governing Council 21, levels of mercury pollution may be far from declining and still on the rise. The latest 2008 UNEP Atmospheric Report reveals that in 2005, Latin America mercury emissions and releases come from coal combustion, small scale gold mining, metals mining, and the production/use of mercury containing products. To address this regional issue, UNEP ROLAC is committed to provide technical assistance to countries in the region in the INC process that will start in 2010. It stands ready to assist in the upcoming negotiations. UNEP ROLAC is likewise willing to assist countries within the region to implement the "interim activities" to reduce mercury pollution under the UNEP Global Mercury Partnership. She urged government representatives to initiate and/or continue with country based projects concerning mercury control and management.

The opening remarks were given by Mr. Per M. Bakken, Head of UNEP DTIE Chemicals Branch, based in Geneva. He thanked UNEP ROLAC and the government of Uruguay for the support extended to UNEP Chemicals' related activities in the region. He presented the highlights of GC 25/5 decision where a breakthrough decision was made by governments to launch an INC process to elaborate a legally binding instrument on mercury by 2013. He emphasized the interim activities to be done concurrently with the negotiation, including activities related to mercury supply in particular curbing primary mining and enhancing capacities for storage of excess mercury. While efforts are underway to address excess mercury supply in the US and the EU (i.e., export ban legislation, storage facilities), countries in the LAC region need to be aware and examine options to address the excess mercury supply in the region. He challenged participants to attain the objectives set forth in the 2 day workshop.

An overview of the workshop was given by Ms. Desiree M. Narvaez, UNEP mercury storage project coordinator and convener of the inception workshop. She outlined the workshop process of lecture presentation and working group discussions. She emphasized cooperation in the spirit of transparency and openness regarding mercury storage options and issues.

1. Situation Analysis: Mercury Flows in Latin America and the Caribbean (LAC):

The "Assessment Report of Excess Mercury Supply in Latin America and the Caribbean, 2010-2050" was presented by Peter Maxson, consultant from Concorde East West Sprl. He presented mercury supply and consumption in 2005 and projections for 2050. In 2005, sources of mercury supply come from mercury mining and/or processing of mine tailings (about 30 tonnes), decommissioned chlor alkali facilities (unknown quantity), by product mercury from zinc smelting, by product mercury from gold smelting (about 150 tonnes) and recycled mercury from products (3% of 140-215) . The evolution of LAC mercury supply from 2010-2050 would come from mercury mining and/or processing of mine tailings (30-40 tonnes/yr, decreasing as regional demand decreases), decommissioned chlor alkali facilities (1,480 tonnes of mercury from decommissioned mercury cells becomes available during 2010-25), by product mercury from zinc smelting (80 tonnes/yr by 2015 and 120 tonnes/yr by 2020), by product mercury from gold (150 tonnes increasing to 200 tonnes/yr by 2015) and recycled mercury from products (10% of consumption by 2020 and 25% by 2040). In terms of mercury consumption in 2005, small scale gold mining accounted for 150-300 tonnes in South America, 15-30 tonnes in Central America and the Caribbean and a total of 165-330 tonnes in the entire LAC region. Other areas of mercury consumption in decreasing order were from dental application, chlor alkali production, measuring and control devices, batteries, lamps, electric and electronic devices, and other applications. Assumptions for future mercury consumption from 2010 to 2050 would be in artisanal small scale gold mining (50% reduction over 10 years then declining after that of 5% per year,) in chlor alkali production (assume no new plants will be constructed, phase out between 2010 and 2022), batteries (75% reduction by 2015 and phase out by 2025), dental uses (15% reduction by 2015 and phase out by 2050) measuring and control devices (60% reduction by 2015, and phase out fever thermometers and sphygmomanometers by 2017, and phase out of remaining demand by 2025) lamps (20% reduction by 2015 and 80% by 2050), electrical and electronic devices (55% reduction by 2015, and phase out by 2050), other applications (25% reduction by 2020, and another 50% by 2050).

Two scenarios were presented: base case scenario and minimum storage scenario. Assumptions under the base case scenario include the LAC region as a single closed region, only regional sources and uses of mercury are considered, there are no exports from or imports to the region, Mexico continues to produce a modest amount of mercury from small mines and tailings, there is gradual increase in mercury recovered as a by product from regional gold and other mining operations, there is gradual increase of mercury recovery by major non-ferrous metal smelters. Under the "base case" scenario, it is estimated that the LAC region will have a rough supply and demand equilibrium by 2013, with an accumulated excess of more than 8,000 tonnes of mercury from 2013- 2050. However, it might be reasonable to assume that by product mercury from industrial gold mining will stay in the region. In a minimum storage scenario, assumptions would be the same as in a base case scenario except an additional assumption would be that 150 tonnes per year by product mercury from gold mining is exported to the US is stored in the LAC region or in the US, and that less mercury is recovered from zinc smelting than previously assumed. Under the "minimum storage" scenario, LAC regional supply-demand equilibrium is reached at about 2019. There will be accumulated excess of about 200 tonnes of mercury from 2019-2050 plus perhaps additional 5000 tonnes by-product of industrial gold mining. Observations made were: When mercury is stored, users think about product/process alternatives, suppliers think about diverse sources, mercury price increases, and everyone thinks about ways to use less mercury. In order to influence mercury demand, measures could include product legislation and/or supply reduction. In order to reduce supply, storage of mercury should be initiated to affect price and availability, thereby encouraging reduced demand. For many sectors, both managing supply and demand can work. Some sectors may be more responsive to "supply management" particularly if the activity may not be legal, it is difficult to enforce legislation, or if the activity is highly decentralized such as small scale gold mining.

Issues and action points:

- The delegate from CAATA (Mexico NGO) expressed surprise in relation to the assumption that LAC was considered in the study as a "close system". He said that with this assumption, it means that no exports or imports to Asia for instance were considered. He said that he was aware that China was interested in mercury coming from Mexico and that the Chinese have already visited Querétaro mines. He referred back to LAC region as a close region and he came to the conclusion that LAC can be self sufficient in relation to demand and supply of mercury. He mentioned that Rotterdam Convention is a tool that cannot be ignored. There was a recommendation that those countries that are not fully aware of this instrument should take note of how it works and should use it.

  Mr. Maxson made a point of clarification regarding Rotterdam Convention and elemental mercury. He said that Rotterdam Convention is not regulating elemental mercury and mercury is currently being freely traded around the world. In terms of looking at LAC as a close system, exports and imports should be looked more carefully, because there is enough information showing movements of elemental mercury from and out of the region.

- Mr. Peter Maxson mentioned that the GC25 decision established an INC to start negotiations on a legally binding instrument and in a parallel track to enhance voluntary measures. There was also a question related to elemental mercury price, where it was mentioned that there was a change in 2004, when the Spanish mine was closed, noting a four time price increase between 2004 and 2005. This changed the behavior of mercury users, but there is no clue of how high prices can change the consumption pattern.

- A BCCR advisor referred to LAC as a close system and mentioned in particular the import of products containing mercury, for instance lamps and asked why this was not taken into account. Mr. Maxson expressed that in terms of making a case and looking into supply and demand issue, considering all sorts of imports and exports of products make the equation more difficult, and so far large exports are largely from decommissioned chlor-alkali plants and by-products of mining. He expressed also that the ways to control uses of mercury in products are so many and diffuse and there are different collection systems and recycling options, therefore in his opinion, at the moment, huge sources are the first to concentrate in the region. Products will not be ignored, but focus will start with products having higher amounts, that will have a higher impact and more immediate effects.

- The delegate from the World Chlorine Council (WCC) asked why the study did not consider mercury from natural gas and if it is because it is not a major source noting that for Brazil, at least, this is a major source of mercury. The consultant replied that there is not enough information regarding the trace level of mercury in natural gas coming from this region. He mentioned that it can be an important source and it might need to be considered.

- The representative from AAMMA, mentioned that emissions of mercury from fuel is an important source and in LAC it needs to be considered as a major source. She mentioned that it is very interesting to take into consideration imports from countries that have banned "use". She specifically said that the Spain mine is collecting mercury from EU region and then using it in products and selling it to LAC. She said that even though products might not be a major source, it is an area where immediate actions can be taken,

especially to inform governments and decision makers of the alternatives to products. Furthermore she said that when referring to mercury and either chlor-alkali or mining, we should bear in mind that we are referring to only one source of release (i.e., mercury), and it should not be that difficult to cope with.

- Mr Maxson confirmed that after the Spain mine closed, it continued to accept and store mercury, and this is one of the reasons why the EU realized that it was important to have an export ban (2011) to prevent these huge quantities of mercury coming from the chlor-alkali industry to go to other parts of the world. In the meantime, it is still possible for the companies to sell mercury to other regions before the 2011 ban. Therefore it is essential to trace mercury and know where it is going.

- The representative of Nicaragua expressed that their main problem is related to small scale gold mining and that industrial mining is regulated in her country. But the artisanal gold mining is done in several parts of the country and it represents a problem. She mentioned that they need alternative technologies for artisanal and small scale gold mining (ASGM). She said that also the issue of mercury containing products is of concern to her government.

  Mr. Maxson expressed that artisanal gold mining is not his area of expertise, but he has heard from experts that there exists different procedures for dealing with this issue like cleaner production techniques, and even though mercury is used, exposure is reduced and mercury is used more efficiently. USEPA is supporting several countries in the ASGM area.

- The representative of Brazil made some comments, especially in relation to the document. She referred to Brazil data, and she said that as there is no data available, assumptions were made and she was concerned about the information contained about Brazil in the assessment document. The artisanal gold mining is a common practice in Brazil, but mercury is not allowed for amalgamation. She also mentioned that this is related to illegal activities and the Ministry of Mining in Brazil, does not have accurate information on the use of mercury in ASGM. For other uses, like chlor-alkali, it is easier to quantify and accurate data can be obtained. Regarding exports, Brazil is Party to Basel Convention, and prior informed notification procedures are required for exporting wastes from Brazil, but also a specific permission is required. She also referred to the section that states that all the mercury coming from the closure of chlor-alkali industries will get into the market. Coming from government, she does not have that information.

  Regarding the last point made by Brazil, Mr. Maxson expressed that the assumption he made in relation to the decommissioning of chlor-alkali industries was a general one for all LAC countries and was basis in order to make a projection. He assumed that international pressure would lead to mercury cells phase out within a certain period of time, and mercury would be available and might not be allowed to be exported but it is a source that needs to be considered for the long term safe storage.

- The representative of Colombia mentioned that he belongs to the Ministry of Environment in his country and that they have a strategy to reduce mercury in artisanal gold mining, which is their current priority. He added that they are not facing only economical or technological issues but cultural ones. They have been working in pilot projects, with support of different governments like Germany, and he mentioned one in particular where they worked with 36 small enterprises and reduced 80% the use of mercury and 36% the use of cyanides, and enhanced their skills and competence by 79 %.

At the moment 3 out of 36 have phased out mercury. They made estimations: to extract 1 kg of gold they need from 1 to 2 kg of mercury. In relation to the prices of gold which is getting more expensive, the mercury reduction strategy needs to go further and consider this economic aspect.

2. Options for Mercury Storage – USA Approach

Information on "Managing Excess Mercury in the USA" was presented by Michael Bender of the Mercury Policy Project/Zero Mercury Working Group (MPP/ZMWG). In the USA, mercury supply comes from US government stockpiles and from civilian sources. Sales in US government stockpiles were halted since mid 1990s. Civilian sources are from by product generation from industrial gold mining (currently about 100-125 metric tonnes annually), from recycling of wastes and products (currently about 80-100 metric tonnes annually), decommissioning of mercury chlor alkali plants, and imports of calomel and mercury. Net exports from the USA were still quite significant in 2008 (750 metric tonnes source: USGS Mineral Commodity Summaries) and could be due to the following factors: increased attention to mercury emissions from industrial gold mining, increasing mandates to recycle mercury products, significant reduction in chlor alkali plants, and decreased demand due to phase out of mercury use in product manufacturing. Most of US mercury was exported to countries where there is significant ASM activity or traders which then ship mercury to ASM locations. The USEPA estimates 7,500-10,000 metric tonnes (MT) of mercury from civilian sources that will require storage over the next 40 years (based on expert's opinion since USEPA does not require reporting of mercury supply, trade, and demand). An interagency task force was created by the federal government, and was tasked to obtain information and review policy options. This process was overtaken by the enactment of the Mercury Export Ban of 2008 which prohibits sale into commerce of government mercury stockpile effective immediately and likewise prohibits the export of elemental mercury by January 1, 2013. After one year of enactment, the EPA will report to Congress on the need to extend coverage of the export ban on mercury compounds. Some limited exemption from the export ban is allowed, but with stringent requirements such as submission of petition to EPA and proof that export is consistent with international obligations. Petitions are likewise limited to 3 years and to 10 MT. The US Export Ban provides for the establishment of a government owned site that can be used for long term management of mercury from civilian sources and the government is authorized to charge a fee for this service. The price will be set sometime in 2012. Any facility must be licensed under the hazardous waste law.

The "US Work on Surplus Mercury" was presented by Lynn Vendinello of the USEPA. Work on mercury supply and storage in the United States started with concerns and interests shown by the states and local governments which consequently organized the "Quicksilver Caucus". This promoted public and private collection programs for bulk elemental mercury and discarded mercury containing products in order to prevent its mercury resale into the market. With preference for safe long term storage of surplus mercury, the federal government through the EPA committed to address privately held surplus mercury in 2006 and started a multi stakeholder process involving other federal agencies. Several debates ensued which finally ended with the US Export Ban of Mercury in 2008. The law tasks the US Department of Energy to set up a facility with standards and fees with the EPA assisting on standards and conduct studies for Congress. An EPA study on primary mercury mining is also currently underway.

Storage method for US government mercury stockpiles was presented by Dennis Lynch of the US Defense National Stockpile Center (DNSC). Commodity grade elemental mercury is being stored in its elemental form in 3 liter flasks and placed in warehouse facilities. Currently, there are 4,436 metric tones stockpiled 3 warehouses, safely stored for over 50 years. DNSC sold more than 50,000 flasks of mercury but was suspended in 1994 due to concerns raised by

members of congress and the USEPA: The DNSC has a mercury stockpile stewardship program that has services of the Oak Ridge National Laboratory, with a great knowledge base of mercury. Its research produced quality recommendations for the safe storage of elemental mercury for up to 40 years. Since 2001, DNSC initiated an environmental impact statement and was finalized in 2004 which determined that there is no effective mercury treatment available, thus identified preferred alternative, long term storage. In 2004, a decision was reached on the consolidation of mercury in one site, and in 2006, the Hawthorne Army Depot (Nevada) was chosen as the consolidation site. Facility upgrades were made in order to meet DNSC mercury storage standards (installation of electrical service, lighting, fire detection, security systems, flooring, and ramps). Risk analysis, regular inspection and environmental monitoring are currently being done. Mercury is stored in its elemental form and mercury compound is retorted back to its elemental form. Transport to Hawthorne site must comply with the US Department of Transportation requirements for shipment of hazardous materials. Capital cost at the Hawthorne Army Depot is estimated at 17,450,000 USD, while maintenance/recurring costs is approximately at 547,904 USD x acceleration at 3.5%/yr.

Issues and action points:

- The representative of Brazil asked about the difference between the "civilian" versus "government" mercury. Ms. Vendinello clarified that in order to distinguish one from the other depends to a large extent on who buys or who sells the mercury. It was clarified that "government mercury" refers to that owned by the US federal government. Once the government takes ownership of the mercury, then it is federally owned.

- Another representative asked about the material the flasks is made. Mr. Lynch answered that it is made of mild steel, is inert and does not react with mercury.

- The representative of Chile asked about the responsibility of those who imported products containing mercury. She wanted to know if the concept of extent responsibility is applicable to USA. Those who import products are not liable, responsibility belongs to the local government and they have to collect and correctly dispose of them. Government pays for it. It was mentioned that certain states have the manufacturer's responsibility, but it is not a federal requirement.

  Also it was said that mercury is considered a commodity, so it is not covered as a waste. If it were a waste, it has specific requirements and not allowed in a landfill or recycling would apply.

- The delegate from Argentina asked what the difficulties were to select the Nevada site, not the technical issues but the social and political process that allow the storage facility to be established there. Mr. Lynch responded that during the environmental impact assessment, public meetings were required. When having the public meetings (2003-2004) they found no resistance from people. They published in local papers the information and also it is published in the public register where concerns and other issues can be said and they will be addressed by the government. There is also a certain period for raising issues and for responding. What happened in Nevada was that after being aware of mercury issues, it was declared as a chemical of concern and then more requirements were needed. In this case, it was not a new facility; it was an already existing safe, governmental facility.

- The Director of Basel BRCR in Argentina said that as a lawyer she could identify three types of responsibilities. The first one is the "storage responsibility", the "manufacturer

extent responsibility", "responsibility in case of incident". Are these three types identified in the USA? Is there something like the Super Fund applicable to mercury?

Ms. Vendinello explained that the storage is of elemental mercury 99.95 or 99.99 % and not of products containing mercury. Regarding who is liable, it would depend on different things. Government is responsible for the safety and for storing it correctly, but there is an issue of ownership and if it is of the government or of the person that brings the mercury. They are still discussing if in the future it would be possible for the person that brought the mercury to take it back. Lawyers have no answers so far and there is still the discussion if it is a commodity or a product.

Mr. Lynch said that regarding incidents or emergencies, they have a preparedness and response plan in case of damage. They inspect the facility every month; they inspect not only flasks, but floor, roof, air and so on. Also they monitor the personal equipments used for inspections. Regarding legal liability, a permit is required.

- Another participant was concerned about the high costs of storing. He asked how much it costs to store 1 tonne of mercury. What happens to the civilian mercury? Do you think that all those having mercury will be giving it away / exporting it before 2012?

  Ms. Vendinello said that the costs are not fully assessed. She said that an owner does not have to sell it to the facility, it can be stored indefinitely.

- The representative of Ecuador, asked about the cost of inspection, the capacity of the storage facility, the capacity that is being used now and if the USA has thought of turning elemental mercury into less toxic compounds.

  Mr. Lynch answered that they did not have inspections costs on hand, but they do have separate costs for the different activities of the storage. Regarding the floor capacity, each building is 10.000 square feet and they have 14 buildings. Regarding the transformation of mercury, they are looking into treatment technologies, but so far no selection because of standards for sending mercury to landfill or others.

- A participant mentioned that LAC countries are consumers of mercury products and it is very important to correctly understand the implications of using them and how to dispose them correctly.

- The representative from Barbados asked if the USA has considered seeing mercury as a waste. He does not know of anywhere in Barbados or in the Caribbean who can spend in this kind of storage, therefore it might be better to consider it as a waste.

  Mr. Bender said that they are looking to large commodities of products that can be used first. So in a ranking priority, they decided to store the mercury like from decommissioned chlor-alkali facilities. At least they are doing above ground storage until another option is available. He expressed that it is a national or regional decision to make. They have started with the biggest problems, large quantities, hundreds of tonnes of mercury.

  Ms. Vendinello said that they preferred to store mercury and not to dispose it as a waste is because this is a safe way of managing mercury.

3. Options for Mercury Storage- EU Approach

"Legislation and Technical Aspects of Regulations on Waste Containing Mercury in Europe and Germany" was presented by Dr. Thomas Brasser of GRS, a non profit expert and research organization in Germany. Regulation (EC) no. 1102/2008 on banning of exports of metallic mercury and safe storage of metallic mercury (to include mercury compound and mixtures) aims at preventing surplus mercury from reentering the global market. Amount currently at stake is 13,000 tonnes of metallic mercury (mostly from closed chlor alkali plants, cleaning of natural gas, non ferrous mining and smelting operations, extracted from cinnabar ore) with the remaining EU demand for mercury at legal uses at 580 tonnes per year (for dental amalgam, some types of batteries, energy saving light bulbs, electronic equipment). The EU export ban which is complemented by storage obligation has the following highlights:

- Art.1-1 Export of metallic mercury is prohibited from 15 March 2011
- Art. 1-3 Mixing of metallic mercury is prohibited from 15 March 2011
- Art. 2 Metallic mercury that is no longer used or gained from operations has to be considered waste and to be disposed of from 15 March 2011
- Art. 3 Metallic mercury as waste to be stored in salt mines or in deep underground, hard rock formations providing equivalent level of safety
- Art. 8 By 1 January 2010, examination of need for extending the export ban to other mercury compounds, need for import ban, and consideration of safe disposal options.

The EU regulation allows only a few storage options:

- Temporary or permanently in salt mines or in deep underground hard rock formations
- Temporary only in above ground facilities
- Purpose of allowing temporary storage is not to jeopardize efforts to find alternative solutions to storage, e.g. solidification

Council Directive 1999/31/EC of 26 April 1999, a key piece of legislation in the field of Waste disposal has stringent operational and technical requirements to prevent possible negative effects on the environment. Landfills must not be operated without the appropriate permit by the competent authority. The application for permit must contain all relevant information about the waste and the permit will only be granted if authority is satisfied with all elements. The same directive states that liquid waste will not be accepted in a landfill, but now is derogation for metallic mercury.

The Council Decision of 19 December 2002 (2003/33/EC) establishes the criteria and procedures for acceptance of waste at landfills. It defines the criteria (type of waste, geological barrier, cavities, engineered structure, and technical aspects) for underground storage, the importance of geological barrier, site specific assessment of risk and an integrated performance analysis of waste at landfills. All provisions of landfill directive as well as criteria and procedures apply to a storage facility of metallic mercury.

Further legislative steps by the EU include: development of specific criteria, tailor made to the characteristics of metallic mercury since some of the existing criteria are likely to be unsuitable for a liquid substance like metallic mercury. This would require development of specific provisions for the containment of the substance, thus the European commission is launching a study that will deliver the basic elements of the criteria. The study will also look into the state of the art solidification and pretreatment of metallic mercury before storage. The additional criteria scheduled to be adopted in 2010 by means of a Commission decision will be available in March 2011 which is the date of storage obligation.

The current practice of hazardous waste disposal in Germany is to use underground disposal sites (rock salt) and is operated commercially. The ultimate objective of underground

storage is isolation of waste from the biosphere. The site specific assessment of risk requires identification of the hazard, the receptors, the pathways by which substances from the waste may reach the biosphere, and the assessment of impact of substances that may reach the biosphere. The EC decision also calls for an integrated performance assessment analysis.

Metallic Mercury is stable under the condition of repositories in salt formations. The high vapor pressure of metallic mercury poses high demands on the handling and ventilation. Conversion to mercury sulfides (cinnabarite) is feasible in order to prevent impurities. Specific waste acceptance criteria need to be determined.

The technology and operation of the Underground Waste Disposal was presented by Mr. Alexander Baart of the K + S group of companies. There are currently 2 underground disposal plants in Germany operated by K+S : the Herfa Neurode and the Zielitz with respective technical capacities of 200,000 and 40,000 metric tonnes/year. The following are prerequisites for underground waste disposal: a disused excavated area remote from the mineral extraction part, mine where the waste is stored must be dry and free of water, mined cavities remain open and have no backfill obligation, mined cavities have to be stable and must remain accessible even for a long time, and storage areas have to be sealed off from water bearing layers. A site safety assessment must be in place to include technical planning, hydro-geological data, geological data, waste data, environmental impact assessment, and risk assessment. Safety measures include installing steel bolts into the top rock to reinforce it, as well as deployment of rock anchors. Natural barriers include salt, clay, bunter stone, while artificial barriers include the packaging, brick walls, field dams, waste repository zone dams and the watertight filling of the shafts. Among the various chemicals waste, mercury is one acceptable type of waste. Operation takes into account the country/generator's notification process and regulatory measures.

Issues and action points:

- On the need for pretreatment such as stabilization: The technology of stabilizing liquid mercury with sulfur is under investigation
- On storage costs: According to today's required standards, the fee would be 260 €/t, excluding packing, transport and VAT (presently 19 %, which can be recovered from the German State)
- Concern about monitoring of the covered shaft and the possible accessibility of stored wastes: The wastes deposited are encapsulated in the rock salt mass. A multiple barrier system assures that hazardous substances emanating from deposited waste are sustainably kept from leaking into the biosphere. Should operation of the underground deposit cease one day, the shafts - as the sole connections between the storage chambers and the environment – will be sealed by appropriate solid materials, and a hydraulically secure closing of the mine will be undertaken. The filling of the shafts is the final and most important barrier, as it blocks the only connection to the wastes underground, thereby the stored waste will be reliably cut off from the biosphere for good.

4. Basel Convention- Applicable provisions

Relevant Basel Convention (BC) provisions on the environmentally sound management (ESM) of mercury waste were presented by Ms. Jacqueline Alvarez, Director of BCCR Uruguay. Mercury waste is covered under Annexes I, VIII and III (waste that is poisonous, toxic, and ecotoxic) of the Basel Convention. To achieve the goal of protecting human health and the environment from the adverse effects of hazardous waste, the mechanism employed by the Basel Convention is through the control of transboundary movement and the ESM of hazardous waste. Relevant BC provisions include waste minimization at source, disposal and ensuring the

availability of disposal facilities in the country where waste is generated, allowing exports only if the state does not have the technical capacity to dispose on ESM, an authorization system for persons handling hazardous wastes, and establishing requirements for packaging, labeling and transport in conformity with international rules, standards and practices. The Secretariat of the Basel Convention together with UNEP Chemicals are working on a draft technical guidelines on ESM of mercury waste which was adopted by the BC 9th Conference of Parties. In order to contribute to the finalization of the guidelines, increase awareness and exchange information on the ESM of hazardous waste, country based projects are being implemented by the Secretariat of the Basel Convention and the USEPA (supported by the Office of Prevention of Pollution and Toxics) together with BCRC Uruguay. This is being implemented in Costa Rica, Argentina, and in Uruguay, with a component on the establishment of national interim storage facilities for mercury waste and waste containing mercury such as in health care facilities.

Issues and action points:

- The representative of Health Care without Harm was interested in knowing about the best environmental practices to dispose of products containing mercury, such as thermometers and other hospital devices.

  Mr. Baart, mentioned that they are receiving in their facilities medical care products, instruments with mercury. They are receiving mercury wastes from Austria, Scandinavian countries, as well as from Switzerland.

- Mr. Baart responded to a question that the conditions of the salt mines are measured and the humidity is very low, temperature is 24 – 25°C practically all year. He said that in salt mines there is need for air movements and shifts in and out. The temperature is not the felt temperature because there are air currents. He also mentioned that the place where wastes are being disposed are the safest and geological more stable places in the mine. They do not decide this; the German authorities are the ones making the assessments and decisions.

- There was a question about LAC and if there is any place similar to the mine salts that can be used to dispose of wastes. Temporary storage is already in place, but no definite solutions. It was mentioned that this is part of the mercury storage project.

- There was a suggestion to work together with the projects on fluorescent lamps and the mercury in health care. It is likely that the ways of disposing them is similar.

  The BCCR Director mentioned that one of the objectives of the Center is to enhance the existing initiatives and cooperate among the different stakeholders including agencies. This is being done.

5. Country Experience- Presentations from Health Care Without Harm, Chile, Honduras

Dr. Maria Della Rodolfa, representative of Health Care without Harm, presented the activities they are doing in Argentina and showed with data the success in phasing out products containing mercury in several hospitals. She mentioned that they are also working with other countries within the region. She said that the most important point is to work within the health sector in the understanding of good practices, in awareness raising, in the

fact that mercury generates hazardous wastes which need special treatment. She also mentioned the need of coordinated work and the establishment of working networks.

Ms. Lilian Veas from Chile gave a thorough overview of the activities they have been doing in relation to mercury in Chile and in particular to the inventory project, which is aimed at reducing risks of mercury as a contribution to the Global Mercury Partnership on Waste. She referred to the institutions that participated of the project, emphasizing the need of coordination among them. She shared the objectives of the project, the methodology (inventory, identification of potentially contaminated sites, mercury risk management plan) and showed a range of data on the total quantity of mercury in Chile per year and per source, giving maximums and minimums. During her presentation, Ms. Veas also referred to the advances in the management of mercury in Chile and the 2009 challenge of having a Directive approved. She presented short, medium and long term measures, explaining for each of the measure, the related objectives and strategic actions. Finally, other related mercury projects were presented, in particular one related to lamps and another to mercury phase out in hospitals.

Ms. Indira Katania Sierra from Honduras presented the project being developed by the General Hospital San Felipe aimed at reducing mercury at the facility. She gave a quick overview of the main sources of mercury at hospitals (surgery, odontology, laboratory and pharmacy) and in particular, overall objective of the project. She mentioned that the strategies for identification, management, final disposal and training have been elements used within the Healthy Hospitals Environment Programme in Honduras. She showed the inventory that was undertaken under the project and mentioned that they have started analyzing options for temporary disposal of mercury products and wastes. Most importantly, Ms. Sierra highlighted that they are now having a non-mercury product policy within the hospital and that they have received new equipments free of mercury, compliments of the Japanese government.

6. UNEP Mercury Storage Project in the Latin America and Caribbean (LAC) Region

The UNEP project "Reduction of Mercury Supply and Investigation of Storage Solutions was presented by Desiree M. Narvaez of UNEP Chemicals, being implemented in the Asia Pacific and in the LAC region. Components of the LAC mercury storage project include

a) Quantification of excess elemental mercury supply in the LAC region from 2010- 2050, projected to come mostly from artisanal mining, closed chlor alkali facilities, end of life mercury containing products, non ferrous metal mining such as from zinc smelting, industrial gold mining, and others

b) Identification of criteria to be scoped in the options to be analyzed in addressing excess elemental mercury. Criteria include technological requirements such as site-specific and storage requirements, need for pretreatment, transport to the facility, public health and safety, environmental concerns, political and social acceptability, financial costs, manpower, legal and regulatory requirements

c) Creation of a regional support structure/advisory committee to be represented by an Executive Committee

d) Conduct of feasibility studies and analysis of the options aimed at providing Governments an informed choice on which option to take

e) Based on preferred option, a call for specific proposals with possible funding source will be identified. More information about the project is available at http://www.chem.unep.ch/mercury/storage/main_page.htm

Issues and action points

- It was mentioned that EU has the export ban and that LAC could follow the same kind of rationale and establish export ban to those products that contain mercury and have alternatives. It was said that the results of this inception workshop are going to the INC for consideration.

  For background information, the export ban in the USA and the EU took several years and it is not expected to pass laws immediately in other regions, but the fact of having this workshop and the INC in the coming year, will definitely speed the process.

- A participant mentioned that in her country, a permit is needed to import mercury. Suriname has legislation in place, but they often see mercury getting into her country from Guyana. Therefore she mentioned that enforcement and customs control is essential.

- There were several questions regarding the following steps of the project, about the feasibility study, the Executive Committee and its role. These questions were addressed by the representative of UNEP Chemicals.

- There was a question about the role of industry and the requirements to become a partner. The answer related to the UNEP Global Mercury Partnership.

7. Small Group Discussions:

Participants were grouped according to similar geography, culture, and political structure, though possibly with wide economic diversity (South America, Central America, and the Caribbean). Discussion results are summarized in Annex II.

8. Creation of a Regional Support Structure

A regional advisory body was recognized to provide advisory role to the UNEP LAC Mercury Storage Project. This advisory body comprised of the participating countries in the region, would be represented by an Executive Committee. Nominations to the Executive Committee members include for South America-Brazil, Chile, Peru; for Central America-Mexico, Panama; for the Caribbean- Barbados, Dominican Republic, as well as from non-governmental organizations, namely, ACPO-Zero Mercury Working Group, Asociacion Argentina de Medicos por el Medio Ambiente and the World Chlorine Council. Participants to the workshop agreed on the following terms of reference for the LAC storage Execom:

- An Executive Committee (Execom) composed of 10 members is established to serve the Latin America and the Caribbean Mercury Storage Project.
- The Executive committee will have a political and technical character and will coordinate/facilitate actions with the different stakeholders of the region.
- The Executive committee will be comprised of 7 members representatives of governments (3 from South America, 2 from Central America, and 2 for the Caribbean), and 3 NGOs of Latin America and the Caribbean region
- The Executive committee will select a chair

- The functions and duties of the Latin America and the Caribbean Mercury Storage Project Execom will include the following:

  - To complement the document "Assessment report: Excess mercury supply in Latin America and the Caribbean, 2010-2050" with other existing information
  - To explore options and issues in addressing excess mercury supply in Latin America and the Caribbean taking into consideration, inter alia, social and political acceptability, technical and environmental factors, public health, infrastructure, regulatory requirements, financial costs and site selection
  - To review and validate terms of reference for carrying out feasibility studies that will deal with different options to face the mercury surplus issue in the Latin America and the Caribbean region after consulting with the participating governments
  - To review and validate the project reports.
  - To communicate project issues and concerns to governments and stakeholders in the Latin America and the Caribbean region, and to convene meetings as needed to facilitate the assessment and follow-up of the options identified for the issue
  - To facilitate regional consultations and promote the participation of governments distributing all documents before its validation

- The Executive committee will meet at least once every 2 months by conference calls and a least once a year in person
- Reports of the meetings of the Executive committee will be made available at http://www.chem.unep.ch/mercury/storage/main_page.htm

9. UNEP Global Mercury Partnership

The UNEP Global Mercury Partnership (GMP) was initiated in 2005 through UNEP GC 23 to address global concerns about mercury pollution. Partnership was strengthened through a strong GC 24 Mandate in 2007. UNEP facilitated funding from donors to assist developing countries and countries with economies in transition in efforts to reduce mercury pollution. An Overarching Framework for the UNEP Global Mercury Partnership was launched in June 2008 and a Partnership Advisory Group established to provide oversight and promote synergies. Currently, there are 27 official Partners. The UNEP GMP is considered the vehicle for immediate actions in the delivery of UNEP GC Decision 25/5.

The overall goal of the UNEP GMP is to protect human health and the global environment from the release of mercury and its compounds by minimizing and, where feasible, ultimately eliminating global, anthropogenic mercury releases to air, water and land. Partnership activities are currently underway in the following partnership areas (with the respective partnership leads): artisanal/small-scale gold mining (UNIDO); coal combustion (International Energy Agency Coal Centre); chlor-alkali sector (USEPA); reduction in products (USEPA); fate and transport (Italy); waste combustion (Japan). The partnership areas establish specific goals and actions to address needs, have business plans that outline their workplans, and contribute to the overall goal of the UNEP GMP. Membership varies according to interest. A Partner supports the overall goal of the Partnership, commits to contribute resources or expertise towards the development and implementation of partnership activities, and networks with other organizations/agencies/ individuals.

Mercury supply and storage is currently identified as a potential partnership area. The first Partnership Advisory Group meeting which took place in Geneva last March 31 to April 3

made strong recommendations to formalize the Mercury Supply –Storage Partnership. The Zero Mercury Working Group offered to be the lead in this partnership area in the interim, while anticipating a government to take on the leadership role. A draft business plan was proposed by UNEP in 2008 is currently being updated and will be circulated to potential partners. The supply and storage partnership could be the vehicle for immediate actions in this area particularly by assisting with information sharing and communication as well as collaborate on funding. More information can be obtained from http://www.chem.unep.ch/mercury/partnerships/new_partnership.htm

WORKSHOP CONCLUSIONS:

The Workshop provided information on mercury supply and consumption in 2005 and projections for 2050 in the Latin America and the Caribbean region. While most participating countries do not have mercury national action plans in place, they confirmed that initiating storage activities in the region could contribute to demand reduction. It was recognized that Governments in the region would be open to the option of storage. The workshop also provided an understanding of the management options available such as the US above ground facility / warehouse and the EU underground storage facility/salt mines. Export to an EU facility was also considered an option. Furthermore, insight was gained into the US and EU legislative process and the available legislation that supports the infrastructure. One major concern that countries in the region expressed is the need to deal with end of life mercury containing products. There would be a need to come up with extraction technologies for elemental mercury and/or technologies to convert mercury compounds into its elemental form. There was also expressed need to have interim national storage facilities such as in health facilities for end of life mercury containing products in the health care sector. The SBC- USEPA project on the environmentally sound management of mercury waste can have implications on this long term mercury storage project.

Among the criteria to be considered in the selection of management options, participants were mostly concerned with the social and political acceptability of the infrastructure, as well as on political stability. Of equal priority is the issue of public health and safety as well as environmental impact. Concerns were also raised on ownership of the mercury surplus and the choice to have a centralized facility or national small facilities and will be raised as part of the feasibility study. Operating and maintenance costs for the facility were also a major consideration. Moreover, site specific requirements such as the regional geology, hydrology and susceptibility to natural disasters are a major concern. The "polluter pays principle" was invoked as the guiding principle in storage activities. There was agreement that a global treaty embodying concrete policies for terminal storage will ensure consistent and sustained national government policy.

The workshop provided the impetus for activities under the UNEP LAC Mercury Storage Project, being implemented by UNEP Chemicals, with financial support from the Government of Norway. A Regional Advisory Body represented by an Executive Committee (Execom) was created. Member nominations included representatives from South America-Brazil, Chile, Peru; for Central America- Mexico, Panama; for the Caribbean- Barbados, Dominican Republic, as well as from non-governmental organizations, namely, ACPO-Zero Mercury Working Group, Asociacion Argentina de Medicos por el Medio Ambiente and the World Chlorine Council. The Execom was tasked to complement the Assessment Report on LAC excess mercury, catalyze regional action, facilitate consultations in the sequestration of excess mercury in the LAC region, review options, communicate issues, and recommend appropriate legislation.

Using the criteria and the scope of issues identified in the workshop, the next step of the project is the call for proposals for an options analysis and feasibility studies. Academic institutions and non government organizations preferably in the Latin America and Caribbean region will be explored. Results of the options analysis and feasibility studies will be presented to regional stakeholders 10 months after the inception workshop.

Anticipating sustainability of mercury storage activities, the UNEP Global Mercury Partnership is envisioned as a possible mechanism for sustained efforts. The Zero Mercury Working Group (ZMWG) is the interim lead of the Supply-Storage Partnership, while waiting for a government lead. A draft business plan on the UNEP Mercury Supply and Storage Partnership area was initially drafted by UNEP and will be circulated by the ZMWG to potential partners.

Overall, the workshop is one concrete step in the GC 25/5 call to continue as part of international action of mercury, the existing work such as enhancing capacity for mercury storage. The UNEP Mercury Storage Project will be implemented concurrently with the INC process in the lead to a global mercury treaty in 2013.