



## **Project Results Workshop**

### **“Mercury Storage and Disposal in Mexico and Panama”**



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## 1. Introduction

The international community recognizes that identifying solutions for the environmentally sound storage of mercury is a major priority. In many parts of the world, mercury supply is exceeding demand, as a result of mounting pressure for substituting mercury-free alternatives. This excess supply must be managed and stored in an appropriate manner that prevents its reintroduction to the global market. In the Latin American region, storage of mercury in underground facilities is not a viable near-term solution, whereas proper above-ground storage constitutes a better alternative for environmentally sound management of surplus mercury. Effectively meeting this challenge requires specialized expertise and the appropriate infrastructure. Moreover, technical standards for environmentally sound management, as well as the relevant institutional capacities, need to be enhanced.

The importance of mercury storage was acknowledged at the second session of the Intergovernmental Negotiating Committee on Mercury (INC2) on 24-28 January 2011, in Chiba, Japan. At that meeting, there was broad agreement by participants that the problem of mercury storage was extremely important and was intrinsically related to the problem of supply and demand. The delegates expressed the need to establish plans for short-term temporary storage, while long-term plans and policies were being developed. At INC3, representatives from the Latin American and Caribbean (LAC) region voiced their concern regarding the lack of information on developing countries' capacity to effectively and economically store mercury over the long term.

The present study is a follow-up to the "Reducing Mercury Supply and Investigating Safe Long-term Storage Solution" project, funded by Norway in 2009, also known as the "UNEP Mercury Storage Project" – part of the ongoing process of providing technical assistance to countries in seeking environmentally sound long-term methods of storing elemental mercury, a priority goal for governments.

The project is patterned after the mercury storage and disposal project initiated in Uruguay and Argentina in June 2011. Given the success of that effort, a decision was made to replicate the project in Mexico and Panama, bringing to bear the experience gained in the prior project.

## 2. Workshop Objectives

- Provide participants with information on the results of the mercury storage and disposal project carried out in Mexico and Panama.
- Present the draft National Action Plan on mercury storage and disposal in each country, demonstrating that the plan is applicable and viable on a nation-wide basis.

## 3. Workshop Proceedings

### 3.1. Opening Session

Arturo Gavilán, Director of Research on Chemical Substances and Ecotoxicological Risks at the National Institute for Ecology and Climate Change (Instituto Nacional de Ecología y Cambio Climático, or INECC), welcomed the workshop participants, and introduced the members of the presidium: Dolores Barrientos Alemán, United Nations Environment Programme (UNEP) Representative for Mexico, Luis Eduardo de Avila Rueda, Director General of Integral Management of Hazardous Materials and Activities, of Mexico's Secretariat of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales, or SEMARNAT), and Desiree Narváez, UNEP Programme Officer for Mercury and Other Metals. Each of these members made brief introductory remarks, emphasizing the importance of binational collaboration with Panama and thanking those involved in developing this project. In addition, all cited, and stressed the importance of, the history of mercury management at the international level.

Dr. Gavilán provided an overview of INECC's participation in – and international cooperation on – these issues, and cited the importance of the information and results generated in recent years, based on studies regarding the safe management of mercury.

### 3.2. Presentations

#### Day 1

#### 3.2.1. Project Mandate

In this portion of the meeting, Dr. Desiree Narváez presented a general outline of the Global Mercury Partnership, which has more than 200 official members and an advisory group, with UNEP serving as the group's coordinator. She also remarked that, since 2001, there have been international efforts to improve mercury management, resulting, in 2013, in agreement by various governments on the text of the Minamata Convention. The speaker included a detailed description of the natural and intentional sources of mercury, as set forth in the latest Global Mercury Assessment report. She commented on the estimates of sector-specific emissions, as well as on worldwide mercury use and consumption. Dr. Narváez emphasized the need to understand the life cycle of mercury and, based on its properties, to provide for appropriate storage and management of mercury waste. She provided several examples of international technologies for stabilizing mercury. Moreover, she indicated that Article 10 of the Convention deals with the environmentally sound temporary storage of mercury, expressing the hope that the present project will bolster compliance with the articles related to management of mercury waste (Articles 10 and 11).

Next, the speaker presented some of the major results of the Argentina and Uruguay experiences. Lastly, she detailed the expected results of the Mexico and Panama project.

**Remarks:**

Alejandro Merín, of Química Wimer, asked about the demand for mercury products for which there is no existing substitute, and posed the question of what mercury-management policies would apply in circumstances where there are no specifically designated mercury disposal sites. Dr. Narváez replied that the Convention takes into account certain exceptions for products that do not have mercury-free substitutes. She also stated that, particularly in the case of primary mining, eliminating the use of mercury was the goal in countries that are signatories to the Convention.

Questions were also raised as to whether there were studies on mercury costs, fluctuations in its market value, and its originating sources. In reply, Dr. Narváez stated that such data were indeed available, and that the cost of mercury had increased due to the scarcity of available supply, and offered to share this information with the Mexican government. As an example, she mentioned that there are data on the economic ramifications of water pollution caused by the use of mercury amalgams.

José Castro indicated some figures on the price of mercury obtained from mining, citing the approximate figure of US\$100/kg.

**3.2.2. Project methodology and activities, and challenges encountered****Mexico**

Dr. Mario Yarto, a project consultant for Mexico, opened the discussion, explaining that the project is modeled on the Argentina and Uruguay experiences. He mentioned that the work was carried out in two phases, over a total of five months. The first phase consisted of conducting a thorough review of available legal instruments and identifying potential temporary storage sites. The second phase included a review of records of mercury waste streams and releases in the country, as well as an examination of the literature related to potential storage sites. The speaker commented that the report proposes the elements of an action plan on mercury storage and disposal in Mexico. He added that preliminary results of the project would be detailed during the workshop, and that one of the final tasks would be to finalize the English version so that the text would be available for review in other countries.

In terms of the constraints encountered, Dr. Yarto mentioned that, in the case of some of the chapters, such as the one on disposal sites, the relevant sectors did not respond in time to include the appropriate information, and that some of the reference documents contained uncertainties on the data they provided. He indicated that the project serves as a basic input for promoting mercury management in the country, and emphasized the need to identify existing challenges and information gaps.

**Remarks:**

Fernando Bejarano, of the Centre for Analysis and Action on Toxic Substances and Their Alternatives (Centro de Análisis y Acción sobre Tóxicos y sus Alternativas, or CAATA), noted that in

order to issue any commentary, particularly regarding disposal sites, the report needed to first be completed, and inquired as to the date on which it would be finalized. Arturo Gavilán responded that a series of steps was needed to produce a report that could be shared with the rest of the working group. He also called for cooperation in sharing the information required to complete the study, pointing out that, at previous meetings, comments were made based on information that had not been updated or that was incomplete.

### **Panama**

Augusto Mendoza, project consultant for Panama, remarked on the steps being taken for rolling out the project in Panama. He indicated that a working plan was prepared summarizing the activities and establishing various groups, each of which held meetings during the course of the project. Data were also compiled and processed to determine which information could have a bearing on mercury issues. Subsequently, a validation process was carried out by the working groups themselves. Mr. Mendoza stated that visits were conducted at a number of sites that handled mercury. An inventory was made of mercury releases, and attempts were made to prepare an action plan on the storage and disposal of mercury and mercury-containing waste, along with preparation of a preliminary and final report. The speaker emphasized that Panama was attempting to bring together work from a previous Risk Plan with work on the present proposed plan. Mr. Mendoza stated that the challenges encountered were similar to those cited in the case of Mexico, namely, the difficulty of obtaining information and the low level of participation by members.

### **Remarks:**

Fernando Bejarano, of CAATA, requested more information on the Mercury Risk Plan, to which the representative from Panama's Ministry of Health replied that the country's use of mercury is very low compared to that of Mexico, and that the focus is not on industry but, rather, on preventing certain practices in mercury management. The Plan was carried out by means of a workshop and a national inventory.

Dr. Desiree Narváez raised a question about the issue of obtaining information, to which María Inés Esquivel, from the Ministry of Health, responded that requests had been submitted to the relevant entities, but that they had not provided the information in an official form, but only via telephone. Much of the information was obtained from the websites.

### **3.2.3. Project Results: Legal Framework**

#### **Mexico**

Dr. Mario Yarto cited Mexico's regulatory framework as one of the results of the project. First, he spoke of the international context, mentioning the forums – such as UNEP, the Organisation for Economic Co-operation and Development (OECD), the Rotterdam Convention, etc. – dedicated to hazardous chemicals. He elaborated on these instruments and/or collaborations, alluding to their importance in relation to mercury issues and international trade in mercury products. In particular, with regard to the Rotterdam Convention, he commented that the Federal Commission for the

Protection Against Sanitary Risk (known by its Spanish acronym COFEPRIS) has provisions regulating the importation and exportation of certain types of substances. In addition, there is the General Law on Ecological Balance and Environmental Protection (Ley General del Equilibrio Ecológico y la Protección al Ambiente, or LGEEPA) and the General Law for the Prevention and Integral Management of Hazardous Waste (Ley General para la Prevención y Gestión Integral de los Residuos, or LGPGIR), which provide a framework for managing waste. The speaker indicated that, according to the LGPGIR, hazardous waste falls within the federal government's authority. Mexico has a series of official rules specifically related to waste management. Article 31 of the LGPGIR cites mercury-containing waste, such as batteries and fluorescent lamps, which are subject to specific handling requirements. Dr. Yarto mentioned that there are 15 lists of firms authorized by SEMARNAT to handle hazardous waste. He pointed out that there is a comprehensive legal framework in place – though certain gaps in the system have been identified – and that there is a range of general laws and regulations that strengthen the management of mercury in Mexico.

**Remarks:**

It was pointed out that the period of consultation for rules on hazardous waste management plans had just concluded, with publication soon to follow.

Dr. María Eugenia Rodríguez, of the Secretariat of Health, asked whether the official rules are consistent with international conventions, given that many of them were published before the signing of these conventions. Group participants commented that in the five-year review, all updates are taken into account, and that it would probably be necessary to revise the date on which the updating of these rules is carried out. SEMARNAT confirmed the need to update the rules.

**Panama**

Augusto Mendoza indicated that there is no regional policy on the management of hazardous chemicals; however, there is, he pointed out, a Regional Agreement on the Cross-border Movement of Hazardous Waste (Law No. 13). At the national level, there are general environmental laws (e.g., Law 41 of 1994) setting forth various policies related to waste management and hazardous waste. The speaker also noted that, while there is no framework for the integral management of hazardous waste, an initiative is currently in the evaluation stage. One of the outcomes of the workshop will be the implementation of organic and common laws and regulations, as well as national and regional conventions. The collected regulatory information was validated and, with the assistance of the international consultant, an analysis of the instruments and their scope of application was carried out. Mr. Mendoza pointed out that there is no regulation on the registry and transfer of pollutants – this being the major gap in the legal framework – though it is possible that such a regulation will be established through the Rotterdam Convention.

**Remarks:**

José Castro inquired regarding the development of standards for storage. In response, it was noted that resolutions issued by Panama provide guidelines for constructing and operating disposal sites.

Dr. Arturo Gavilán asked whether, after the analysis was carried out, the legal framework was deemed to be sufficient, or whether it would require any additions. The response given was that what was important was the implementation of existing laws, and that it was not believed to be necessary to add any provisions to the regulatory framework in order to have a comprehensive framework for managing mercury waste.

A question was also raised on the contemplated time period for storing mercury waste. In response, it was stated that although the storage was temporary, no set time period had been determined. Currently, the firm involved establishes the length of time the site is to be in operation, but as yet there is no regulation in that regard.

### **3.2.4. Project Results: Inventory of Waste Streams**

#### **Panama**

Augusto Mendoza commented on the Inventory of Waste Streams, mentioning that Panama is a service provider, but is neither a primary nor secondary producer of mercury; thus, all mercury enters the country through imports. A list was presented showing sources of mercury releases that had been identified, organized according to the Toolkit for Identification and Quantification of Mercury published by UNEP in 2011. The speaker indicated that the information used to update the inventory was obtained primarily from websites such as that of Customs. Results of updates to the national inventory of mercury releases in Panama were also presented, indicating that the major source of mercury was batteries, which end up in informal dumps or controlled landfills. In the health sector, mercury follows a similar route after the end of the useful life of the mercury-containing equipment. In the mining sector, no mercury amalgamation process is used.

#### **Remarks:**

Gustavo Solórzano, international consultant for both projects, asked whether an increase in waste streams had been observed in the recent inventory update. Mr. Mendoza responded that there had indeed been an increase, particularly in the production of cement, due to increased construction activity, though there was also an overall increase across all categories.

Gustavo Solórzano further inquired whether there were problems in duplication of data regarding the final destination of discarded batteries, given the possibility of double counting. In response, Mr. Mendoza stated that, in analyzing import information provided by Customs, this issue was taken into account, but that certain details on disposal in dumps might warrant further review by consultants. He also indicated that there are no differentiated tariffs for mercury-containing vs. non-mercury-containing batteries.

José Castro asked whether processes for producing gold use mercury amalgamation, to which the reply was that in broad terms the answer was no, but that artisanal mining did use this process, though such information was not included in the inventory since it was impossible to corroborate the relevant data.



Tonatiuh García, of the Mexican Battery Association (Asociación Mexicana de Pilas, or AMEXPILAS) commented that although the UNEP method considered that batteries have a 0.25% mercury content, this figure is obsolete, and that more recent research indicates that the mercury content is lower. He also remarked that Panama should take this more-current information into account in generating its results.

## **Mexico**

Dr. Mario Yarto commented on this issue with regard to Mexico, which cites the information sources used, such as the Inventory of Mercury Releases, the Registry of Emissions and Transfer of Contaminants, and documents prepared by the CCA. With regard to the Inventory of Mercury Releases, the speaker remarked that the document was prepared using data reported in 2004. According to this document, 448 metric tons of mercury were released, of which approximately 40% were transferred to the soil, with an additional 40% being released as waste and 10% released into the air. He also mentioned that there is informal primary mercury mining in Mexico, as well as secondary production of mercury recovered from mine tailings. According to non-official records, in 2011 primary mercury production amounted to 121.5 tons, this being the main source of supply. According to RETC data, 4-7 tons per year of mercury are transferred for final disposal or recycling. This material comes from industrial processes, including mining, in addition to the mercury present in various products, which are disposed of primarily in sanitary landfills or informal dumps. Lastly, the speaker commented that the Inventory reports a large quantity of mercury (82 tons) from batteries – representing more than 95% of the total from consumer products. Mercury-containing products at the end of their useful life could represent the most important sector in dealing with the issue of disposal and storage.

## **Remarks:**

The group was in agreement that there needs to be an updating of information from the different industrial sectors such as the paint and battery sectors. Both the consultants and the INECC commented that the RETC still has records of a firm that continues to use mercury compounds in paints, but that it has proved impossible to establish direct contact with the firm.

Gustavo Solórzano remarked that although there had been no update to the Inventory, as had occurred in Panama, current, updated databases had been consulted, confirming that certain trends reflect a continuation of the trends seen in data from 2004.

In this regard, José Castro pointed out that there was ambiguity in the tariff records on some products, such as paint. He also stated that those carrying out small- and medium-scale artisanal mining do not belong to any association.

Jesús López, of SEMARNAT, emphasized the need to have updated inventories. He also raised the question of whether mercury emanating from the closure of chlor-alkali plants should be treated as a waste product or as a commercial product. In response, Dr. Yarto expressed the opinion that this should be considered as a waste product. José Castro stated that sludge from the chlor-alkali industry is confined to authorized sites. In this connection, Octavio Valdivia representative of Grupo Cydsa, which operates a chlor-alkali plant, confirmed the opinion expressed, but disagreed

as to the appropriateness of treating mercury as waste, arguing that its level of purity warranted treatment as a product.

It was also remarked that the Inventory did not reflect the contribution of the health sector, which should be regarded as a major generator of mercury. In response, it was pointed out that the Inventory did indeed take this sector into account.

Dr. Desiree Narváez asked whether the 2004 inventory had been validated, and whether a trend toward greater generation of mercury had been observed. In response, it was remarked that a comparison of the 2004 data and data obtained recently had indeed shown an increase, although this had not yet been validated.

### **3.2.5. Project Results: Possible Temporary Storage Sites**

#### **Mexico**

There was further discussion of possible temporary storage sites, following up on Dr. Mario Yarto's presentation regarding current facilities for the treatment, collection and disposal of mercury waste. The review was based on data from SEMARNAT on firms authorized to manage hazardous waste, including a breakdown according to category. Category 5, which comprises firms that are authorized to treat hazardous waste, included a company – specialising in the treatment of solutions contaminated with mercury waste – with a capacity of 200,000 tons, and another specialising in batteries and lamps with a capacity of 42,680 tons. It was emphasized that this capacity includes the treatment of other substances in addition to mercury waste. Category 7 includes two firms in the north of the country that are authorized to store hazardous waste and that have total storage capacity of 1,375,836 tons, although in this case, too, the specific capacity applying to mercury waste is unclear. In the absence of detailed data, Dr. Yarto commented that requests for specific information had been made, but that no response had been received. As to companies authorized to store hazardous waste for which the maximum storage time is six months, these represent 1,851 tons of capacity – though, once again, information on the quantity of mercury-containing waste within this figure is lacking. It should be noted that all of these firms are authorized to handle not only mercury-containing waste, but also a broad range of other hazardous waste.

#### **Remarks:**

José Castro asked whether it is fair to conclude from these data that the existing mercury storage capacity is adequate. Dr. Yarto replied that the temporary storage capacity is indeed adequate, and that there is no need to build a new site.

Gustavo Solórzano remarked that only existing facilities were mentioned in the presentation, and he therefore wondered whether additional options had been explored, such as the chlor-alkali plants themselves, mines, salt domes, etc. The response confirmed that those options had not been explored.

Fernando Bejarano asked what institutional procedure would be appropriate to improve treatment technology, and whether there had been direct dialogue with the relevant companies. The response was that a request had indeed been made, and that it is through workshops such as the present one that efforts are taking place to enhance communications, along with personal meetings with companies.

## **Panama**

Among the sites identified for temporary mercury storage, Mr. Mendoza listed the bunkers built by the United States government as an option for the storage of elemental mercury. For storage of mercury-containing waste, three options were presented: the Cerro Patacón controlled landfill, which is currently used for the final disposal of municipal solid waste and certain hazardous waste; the EMAS controlled landfill, which is used for the final disposal of municipal solid waste; and the site of the Technological University of Panama, where a disposal facility could be built for mercury waste. Ecologic, S.A., which currently provides collection and treatment of fluorescent lamps, was mentioned as an option for treatment of mercury-contaminated waste, as well as for the temporary storage of mercury-containing batteries. In conclusion, Mr. Mendoza mentioned that little collection of elemental mercury is expected, and that Panama needs one place to store elemental mercury and another for mercury-containing waste. He also commented that if Panama decided to participate in agreements such as the Minamata Convention, it would be necessary to promote the creation of sites for mercury and improve existing ones.

### **Remarks:**

Dr. Desiree Narváez remarked that the proposal to use military bunkers for mercury storage is interesting, and recommended performing a risk analysis.

Gustavo Solórzano asked about the age of the bunkers. The response was that they date from the Second World War, and that they are structurally very strong. He also asked whether the goal of having two mercury storage sites would entail additional formalities. Dr. María Inés Esquivel, of the Panamanian Ministry of Health, replied that this would not be a problem, and stressed that the objective of separating the sites is to make the handling safer. If the agreement is signed, there would be a different level of obligation for mercury storage; current considerations only address the present situation, related health risks, and possible solutions that might be politically acceptable.

The question of necessary security measures to make the bunkers usable was raised, as well as the issue of the physical state of waste in Panama. Augusto Mendoza replied that most of the mercury comes from medical equipment, and that it is currently stored in glass jars in laboratories.

### **3.2.6. The decision-making process**

#### **Panama**

Augusto Mendoza continued with the presentation on the decision-making process, commenting on a draft document regarding the formation of an institutional committee on chemicals. He also mentioned that there is no standard governing the decision-making mechanism. He presented a table showing the different actors involved, including governmental institutions, private enterprises, civic organizations and non-governmental organizations, and remarked on their respective areas of interest, competencies and responsibilities. He stressed the role of the National Environmental Authority, as well as the roles of the Customs Authority, the private sector, and civil society, indicating that there needs to be broad participation by the various stakeholders.

**Remarks:**

Dr. Desiree Narváez asked about how the activities are coordinated. Dr. María Inés Esquivel, of the Panamanian Ministry of Health, explained that chemical substance issues are dealt with on an interinstitutional basis, although there are times when administrative decisions can be made outside of that framework.

**Mexico**

Martha Ramírez, representing Mexico, discussed the roles and involvement of the different actors, as well as the dialogue process and the way in which the target for mercury management had been agreed. She mentioned that there was a meeting on 20 May to create a working group with the various stakeholders (government, industry, academia, non-governmental organizations, experts). The background of the project was presented on that occasion, along with the regulatory framework applicable to hazardous waste, the project information generated to date, and the contents of the Minamata Convention. The views of the industrial sector were sought, and there was a roundtable for questions on the different aspects of the issue to be dealt with, including mercury generation, disposal and management. In concluding the presentation, MSc Ramírez detailed the points discussed at that meeting, as well as the agreements reached.

**Remarks:**

Fernando Bejarano commented on the feasibility of replacing mercury-containing products, specifically in the health sector. He also asked whether the updating of the inventory will be conducted with CCA support, to which MSc Ramírez responded that this has not yet been authorised.

Mr. Merín, of Química Wimer, inquired about information on the numbers of thermometers used in schools and homes. In response, José Castro detailed a method for estimating these numbers, though he noted the inherent uncertainty of the method.

Fernando Bejarano commented on the need to advise consumers regarding the handling of thermometers and other equipment, and on the costs entailed in improper handling.

Mayabel García, of the Secretariat of Health, explained that federal procurements follow guidelines on the non-acquisition of mercury-containing products, but that similar mechanisms at the state level have not yet been implemented.

Miguel Ángel Espinosa, of the Secretariat of Finance, remarked that it would be good to involve his institution, given its role in seeking funding through other types of mechanisms, such as the GEF.

Dr. Desiree Narváez spoke on the importance of the effort being made in these meetings to comply with the Minamata Convention.

### **3.2.7. Basel Convention Technical Guidelines on the Environmentally Sound Management of Mercury-Containing Waste**

Shifting to another agenda item, the meeting turned to a presentation, by Gustavo Solórzano, on the technical guidelines of the Basel Convention. It was noted that the Minamata Convention will be governed by the Basel guidelines, which include sections on the handling, sorting, collection, packaging, labelling, transport and storage of hazardous waste. MSc Solórzano commented on the different types of waste: elemental mercury, waste from mercury-containing products, and waste contaminated with mercury, and gave examples of each. He explained that the appropriate translation of the Spanish, “manejo ambientalmente racional,” is “environmentally sound management” – a matter of not harming the environment or adversely affecting health. A highly important approach in environmentally sound management is the concept of the life cycle, and the reincorporation of material in the user chain. He also explained that the most common sources of mercury and mercury-containing waste involve the extraction and use of fuels, primary and secondary production of metals, etc. Among the important tools provided by these guidelines are inventories facilitating the identification, quantification and description of different types of waste. He commented that periodically updated inventories provide information on changes over time as a result of measures that have been adopted. Included in environmentally sound management is the separate collection of mercury-containing waste. MSc Solórzano stated that both Mexico and Panama are far from meeting this criterion. He also mentioned collection, criteria for storing mercury-containing waste, and environmentally sound disposal. In this connection, he cited a number of technologies for the recovery of mercury and mercury compounds, as well as methods to stabilise or solidify elemental mercury. He remarked on specially designed landfills and on geological formations for environmentally sound disposal. Finally, he commented on the remediation of contaminated sites.

#### **Remarks:**

José Castro commented on the international market situation, which is reflected differently in different countries. As to action, he said that it is necessary to supplement technical information (the guidelines) with information on costs, once a plan has been defined – a point on which MSc Solórzano expressed agreement.

Jesús López noted that the Basel Convention does not specify a concentration that qualifies a given waste as hazardous, and asked the opinion of MSc Solórzano on the process involving a six-

month maximum storage by the parties generating the waste, following which the waste is to be sent for treatment. By way of example, Minister Solórzano responded that Panama is not considering temporary storage options, and that although hospitals at times comply, at least partially, with this guideline, they do not send the waste for disposal within the specified six months. In response to Mr. López's first comment, he said that it is true that the guidelines do not specify a threshold above which a waste is to be considered hazardous. Minister Bejarano added to this response, indicating that Article 11 includes a commitment to establishing such thresholds.

Dr. Mario Yarto asked whether there are countries that have used the guidelines presented by Minister Solórzano. Dr. Desiree Narváez stated that Conference of the Parties countries have indeed used the guidelines, and that Chile is an example, in Latin America, of such a country.

### **Conclusion of day 1**

For the final portion of day one, Dr. Arturo Gavilán gave a brief summary and some thoughts on the issue. He commented on the progress made in the course of the day, from a general level to specific information and needs, adding that the figures presented by Dr. Narváez provided a very clear sense of the mercury situation at the global and regional levels. He stressed that these workshops seek to promote consensual action, in order to address the situation at a national level. He remarked that interinstitutional work is needed, and that there are opportunities for including other entities, such as the Secretariat of Finance and Public Credit and the Secretariat of Education, as a means of enhancing the group's efforts.

Finally, he expressed special thanks to UNEP-Mexico for all of the facilities it provided for the workshop.

## **DAY 2**

On day two, the activities began with the presentations overseen by Augusto Mendoza, Panamanian government consultant.

### **3.2.8. Assessment of the basic options for mercury management**

#### **Panama**

According to the assessment of the available options for mercury management, the conclusion reached in Panama was that the best place for temporary storage of elemental mercury is the bunkers built by the United States government, which cover an area of at least 100 square meters. As to waste contaminated with mercury, the conclusion was that the best option is to send the waste to private facilities specialising in treatment, or to dispose of it in sanitary landfills. At the same time, the possibility has not been ruled out that, once the Minamata Convention is signed, a standard will be established requiring that the mercury be returned to its point of origin.

### **3.2.9. Proposals for the National Action Plan on Mercury Storage and Disposal**

## Panama

In this presentation, Mr. Mendoza mentioned that Panama has a policy on the handling of hazardous waste, but that it has not been implemented. He also said that there is an absence of legal instruments to compel parties generating mercury-containing waste to deliver such waste to certain firms where most of the substance can be recovered. There is also a need to create legal incentives for equipment junkyards to deliver mercury-containing waste. He also mentioned that Panama has firms interested in waste management, and that the Ministry of Health is responsible for identifying them. In Panama, he added, the tariff rates must be made more specific, in order to provide more reliable information on mercury-containing imports entering the country. Finally, he noted that this project only identified potential sites for the temporary storage of mercury and mercury-containing waste, and that it is up to the authorities to define which sites will be used.

### Remarks:

Mr. Merín, of Química Wimer, said that since Panama, as a country, is more involved in marketing than in industrial production, he questions how the transport of mercury-containing products can be intercepted, and how the health sector can control the use of medical equipment containing mercury. He also noted that no government in Latin America incorporates recycling in product cost. In response, Mr. Pérez, of the Panamanian Environmental Authority, explained that the proposal is that Panama exerts more effective control on the products transiting through the country, but that it not inhibits their transport, since this constitutes the country's second largest source of revenue.

Fernando Bejarano expressed support for Panama's proposal to expand the responsibility of producers, commenting on the need to create synergies to fight the problem, and stating that the solution is not to build engineering works, but rather to implement regulatory changes. He stated that part of the problem is how to ensure that the cost of treating mercury-containing waste is included in the price of the product, and proposed that a table with the Basel guidelines be prepared, in order to assist in evaluating the various management options.

Jesús López, of SEMARNAT, recommended the scheme for a hazardous waste management plan, explaining that this placed a responsibility on those generating the waste, with the aim of establishing a chain of control to recover the waste and assure its proper management.

José Castro commented that one component of the action plan could be for the Customs authority to monitor mercury-containing products as they enter the country.

Augusto Mendoza noted that Panama has no law prohibiting the importation of mercury-containing products, and that having more control over the products entering the country will facilitate knowing where these imports end up. He also stated that Panama lacks a specific regulatory framework for hazardous waste, but that a bill on this issue is currently being considered by the Legislative Assembly.

Jordi Pon, of UNEP's Regional Office for Latin America and the Caribbean, suggested that the consultant add one more column to the table he presented on the evaluation of management

options, to explain why each of the options was accepted or rejected. He also commented that what was presented would be the basis for the National Action Plan.

Gustavo Solórzano suggested that elemental mercury and mercury-containing waste could be stored at the same site, since the country generates only a small quantity of waste. He also stressed that Panama does not have the technology to separate elemental mercury from waste.

Yeni Ayala, of the Federal District Government's Secretariat of Health, emphasized that before working on actions involving waste collection, sorting, etc., it is important to consider whether the infrastructure needed to store the waste is in place.

Mr. Merín, of Química Wimer, remarked that there are sites for storing mercury-containing waste in Mexico, but that information on the firms authorized to receive this type of waste must be publicised. He expressed doubts about the strategy for ensuring that mercury-containing products will be returned to their producer at the end of their useful lifetime.

### **Mexico**

In this portion of the workshop, Dr. Yarto summarized the information presented by Mexico in the course of the meeting, emphasizing the need to assess whether the sites authorized for storing mercury meet the relevant criteria. It was emphasized that the evaluation of potential geological sites for the storage of hazardous waste, as well as the identification of more sites, is a task still in progress. He commented on the need for political support, since ultimately it is the politicians who make the decisions and allocate the resources for the project. He also suggested forming a national committee with a non-voluntary governmental mandate, though this would require discussion by senior officials. It was also pointed out that in designing an action plan it is important to identify the risks that would be generated if the plan's goals are not met, and the need to develop a plan to mitigate those risks. Dr. Yarto pointed out that one of the main tasks is updating the inventory, and that a working group could be formed to carry this out. Issues for each working group were proposed, and, in conclusion, it was stressed that Mexico needs more time to carry out a technical and economic evaluation of the various management options.

### **Remarks:**

Jesús López, of SEMARNAT, mentioned that Article 11 of the Minamata Convention permits exporting waste if the country does not have the necessary infrastructure to deal with it. However, he noted that Mexico permits such exportation only for recycling or reuse. Thus, he questioned how the problems of storing waste in the country could be solved. He noted that elemental mercury can be exported. Dr. Yarto responded that there should be an analysis of the relationship between Mexican legislation and the provisions of the Minamata Convention.

Paloma García, of the Mexican Chamber of Mines, remarked that in constructing the National Action Plan, it will be necessary to consult the legal division of SEMARNAT to ascertain the extent to which the firms generating mercury-containing waste are in compliance. She noted that the Basel Convention guidelines were taken into account in the General Law on Waste.



Octavio Valdivia, of the CYDSA group, said that if the mercury from the chloro-alkali industry is redefined as waste, its monetary value would change, and it would be considered a contaminant. He underlined that financial support is needed to implement the change to mercury-free technology. Dr. Mario Yarto indicated that the agreements contemplate the formation of a fund to achieve the relevant objectives.

Dr. Desiree Narváez pointed out the need to identify the individuals who are to be responsible for each specific task in the project.

Dr. Arturo Gavilán remarked that the specific considerations presented by Dr. Yarto should include the position that Mexico will take regarding the signing of the Minamata Convention, which could constitute an initial step. He also noted that it must be taken into account that the demand for mercury means that primary production will occur, and that if the country's economic needs call for continuation of such production, some method must be found to put a halt to informal production activities.

### **3.2.10. Project summary and analysis**

Gustavo Solórzano presented a summary of the work carried out by the two countries, examining each item in the results presented by the Mexican and Panamanian consultants: regulatory framework, inventory of waste flows, temporary storage sites, decision-making process, evaluation of basic options, and national action plan. He also made a number of suggestions for each country to consider in the final report.

#### **Remarks:**

Jesús López, of SEMARNAT, commented that the report must be brought to the attention of senior officials, so as to stimulate their participation, and to provide them with a strategy. He also asked whether the incinerators for the treatment of hospital waste in Panama are designed to include mercury waste. MSc Solórzano replied that there are no national specifications for the incineration of this type of waste.

Fernando Bejarano, of CAATA, suggested that if the working groups are formed, the National Consultative Committee should be invited to participate. He also pointed out that, on some other occasions, groups have formed but have then failed to function.

Dr. María Eugenia Rodríguez, of the Secretariat of Health, stressed that no area of the project is dealing with research on mercury contamination in water, fish, soils, etc., and that only waste storage is being considered as a solution. She also pointed out that the health of workers handling mercury is not being addressed.

José Castro expressed support for the comment on creating working groups to achieve specified objectives. He recommended that a macro group be formed. He also pointed out that his figures on mercury waste as a mining by-product only provide a rough idea of the quantity being generated. He noted that the Mexican Chamber of Mines asserts that none of its members use mercury in gold mining, and does not report on mercury contained in the by-products that its

members generate. He believes, therefore, that further analysis on these issues needs to be carried out in collaboration with the Chamber. With regard to the law prohibiting mercury exports from the United States, he stated that a large amount of mercury waste could enter Mexico as a result of the interest in calomel.

### **3.3. Roundtable – Planning for each country’s next steps**

The participants were divided into groups, by country, to discuss the suggestions made by MSc Gustavo Solórzano, to be considered in connection with the project’s final report.

#### **Mexico**

- **Regulatory framework**

The conclusions included a statement that there is an adequately developed regulatory framework governing importation and exportation of mercury-containing waste. Moreover, there is an international framework: the Basel Convention, OECD provisions, the La Paz Agreement with the United States, etc. However, there is a need to bolster Customs inspections and strengthen the mechanisms used, so that illicit traffic is prevented. Mexico, for example, has developed a national regulation on batteries, though it is unclear whether this is the sole instrument related to the issue. There was agreement among the group on the need for more specific tariff rates for mercury. The group concluded the regulations on the disposal of liquid waste are unambiguous, with a law that clearly prohibits storing hazardous waste in liquid form and requires that they be stabilized and solidified before being stored.

The only two firms in the country specialising in storing hazardous waste stated that they have the technology needed to treat mercury-containing waste, as well as the infrastructure required to dispose of the waste. They committed themselves to providing information on this issue by the end of July.

The discussion also concluded that the concept “temporary” needs to be defined: while it means six months in Mexico’s regulations, it is construed in terms of years in the Minamata Convention. It was pointed out that there are satisfactory provisions on the disposal of mercury-containing waste at the two Mexican sites authorized to store hazardous waste. However, options for the storage of elemental mercury remain to be evaluated.

There was agreement that the next meeting of the working group will include a presentation by Jesús López of SEMARNAT, so that all of the members will have the same knowledge regarding Mexico’s legislation on hazardous waste.

It was also remarked that a plan is needed to define how mercury-containing waste produced by microgenerators is to be captured.

- **Inventory**

On this issue, it was concluded that there is a clear need to update the inventory of mercury releases. All information available, including data from the Registry of Emissions and Transfer of Contaminants, will be used. Thus, the various sectors represented in the meeting were asked to be prepared to collaborate by supplying the necessary information at the appropriate time, the goal being to create an inventory that is closer aligned with reality. There was also a proposal to create a list of the information that firms should be expected to supply.

- **Temporary storage sites**

Emphasis was placed on the importance of developing closer relations with the owners/operators of the sites for storing and treating mercury-containing waste, so as to have information on the technology they use and to ensure that the project's final report reflects the actual situation in Mexico in this regard. It was also requested that the information furnished by these firms include the costs of the process, since the action plan must take into account the resources that firms have available, if it is to be successfully implemented.

It was also stated that the storage of elemental mercury is an issue on which Mexico needs to carry out further review, to ensure compliance with the Minamata Convention; unfortunately, this is a problem that, to date, has not been solved. The group believed that SEMARNAT's presentation on the country's legislation would provide a clearer picture of viable solutions for dealing with elemental mercury, based on the existing regulatory framework.

- **Decision-making process**

Suggestions for the decision-making process included the conclusion that other institutions should be invited to join the working group. Gladys Cañete, of the Secretariat of Foreign Relations, is due to provide a list of the sectors that participated in the meetings preparatory to the Minamata Convention.

The Mexican Geological Service, represented by José Guadalupe Ibarra, proposes conducting a geological study to locate final disposal sites for hazardous waste, so that maximum information is available to assist in the decision-making process.

Mario Herreramoro, of the College of Geological Engineering, remarked that SEMARNAT has an atlas of hazardous industrial waste disposal sites, throughout the country, that meet the standards of NOM-055-SEMARNAT-2003. These standards set the requirements that sites must observe in order to function as controlled storage sites for pre-stabilized hazardous waste.

It was proposed that a meeting be held in August to finalize any unfinished aspects of the report, and to incorporate the information covered in this workshop, in addition to incorporating the information on existing regulations regarding the disposal of hazardous waste.

It was also suggested that there be a second October meeting once Mexico's position on the Minamata Convention is known, in order to define the composition of the working groups and the method for forming an expanded group to work on the National Action Plan.

## Panama

The group detailed three components of the action plan: the regulatory framework, the promotion and development of awareness on mercury management, and intersectoral partnerships. For each of these components, the corresponding objectives, current country situation, and viable management options were set forth. With regard to the regulatory framework, it was remarked that although there is already a policy on the management of hazardous waste, it has yet to be implemented. A provision was also proposed to extend responsibility to manufacturers of mercury-containing products, requiring them to collect the articles at the end of their useful life. The group also agreed that the tariff items directly relating to mercury-containing products must be made more specific.

For the “Mercury Management Promotion and Awareness Building” component, the group emphasized the need to create incentives for firms and non-governmental organizations in relation to managing mercury-containing waste. Mention was also made of the fact that the country has potential sites for temporary storage of such waste, but that, before they can be used, renovation of existing sites is necessary, while additional sites will also have to be constructed.

Lastly, for the “Intersectoral partnerships” component, the group noted that the objective is to promote public-private partnerships, in order to ensure that comprehensive mercury management plans are effectively implemented. In this context, it was remarked that the country has a cleaner-production programme, and that a culture of recycling and reuse needs to be promoted and developed.

### Remarks:

Dr. María Inés Esquivel, of Panama’s Ministry of Health, explained that the activities were not described in detail, since the plan is to cover them at a meeting scheduled with the country’s working group.

Dr. Desiree Narváez, of UNEP, commented that a risk analysis of the bunkers needs to be conducted as part of what has been discussed, and noted that this should be one of the future tasks in developing the action plan. She also explained that the working group constitutes the technical part of the project, serving to provide the tools needed for decision-makers to determine whether it is possible to comply with the Minamata Convention.

### 3.4. Closing session

Jordi Pon and Dr. Desiree Narváez expressed appreciation for the participation of all those present, and indicated their satisfaction at the group’s having successfully fulfilled the workshop’s objectives.

**ANNEX I. AGENDA**

<b>Day 1 - 3 July 2013</b>		
<b>Time</b>	<b>Topic</b>	<b>Presenter</b>
8:30	Registry of participants	
9:00—9:30	1. Opening session	Dr. Desiree Narváez/UNEP M.A.P. Dolores Barrientos/UNEP-Mexico Eduardo de Avila /SEMARNAT
9:30—10:00	2. Project mandate	Dr. Desiree Narváez UNEP Chemicals Division
10:00—10:30	3. Project methodology and activities, and challenges encountered (Mexico and Panama)	Dr. Mario Yarto/Mexico Consultant Augusto Mendoza/Panama Consultant
10:30—11:00	Coffee break	
11:00—11:40	4. Project results (Mexico and Panama) 4.a Legal framework	Dr. Mario Yarto /Mexico Consultant Augusto Mendoza/Panama Consultant
11:40—12:20	4.b Inventory of waste streams	Augusto Mendoza/Panama Consultant Dr. Mario Yarto/Mexico Consultant
12:20—13:00	4.c Possible temporary storage sites	Dr. Mario Yarto/Mexico Consultant Augusto Mendoza/Panama Consultant
13:00—14:40	Lunch	
14:40—15:20	5. Decision-making process (Mexico and Panama)	Augusto Mendoza/Panama Consultant Dr. Mario Yarto /Mexico Consultant
15:20—16:00	6. Basel Convention Technical Guidelines on Environmentally Sound Mercury Waste Management	Gustavo Solorzano/UNEP Consultant
16:00—16:30	Coffee break	
16:30—17:00	Discussion and close of day 1	Dr. Arturo Gavilán INECC

Day 2 - 4 July 2013		
Time	Topic	Presenter
9:00—9:40	7. Evaluation of basic management options (Mexico and Panama)	Augusto Mendoza/Panama Consultant Dr. Mario Yarto /Mexico Consultant
9:40—10:40	8. Proposed National Action Plans for the Mercury Storage and Disposal (Mexico and Panama)	Augusto Mendoza/Panama Consultant Dr. Mario Yarto/Mexico Consultant
10:40—11:40	9. Project summary and analysis	Gustavo Solórzano/UNEP Consultant
11:40—14:30	10. Planning for each country's next steps (1st part)	Two working groups, one for each country
14:30—16:00	Lunch	
16:00—16:30	10. Planning for each country's next steps (2nd part)	Two working groups, one for each country
16:30—17:00	Presentation of next steps	Panama Representative Mexico Representative
17:00—17:30	Conclusions	Dr. Desiree Narváez /UNEP Chemicals Division
17:30—18:00	Closing session	Dr. Arturo Gavilán/INECC

## ANNEX II. LIST OF PARTICIPANTS



Taller de Cierre del Proyecto Regional  
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 3 y 4 de julio de 2013

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### ANNEX III. PHOTOGRAPHIC RECORD



Opening Session



Presentation by Dr. Desiree Narváez of UNEP





Presentation by Augusto Mendoza, Government of Panama Consultant



Presentation by Dr. Mario Yarto, Government of Mexico Consultant





Presentation by Martha E. Ramírez of INECC



Presentation by Gustavo Solórzano, International Consultant for the Project



Dr. Arturo Gavilán, Workshop Moderator



Attendees





Attendees