Storing and Disposing Excess Mercury in South America

Advancing National Initiatives in Argentina and Uruguay

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Final report of the
"Mercury Storage and Disposal Two Countries Project in Latin America"

UNEP CHEMICALS

This report was prepared by Gustavo Solórzano, consultant, under contract with UNEP Chemicals, with all reasonable care and diligence. While the author has greatly benefited from valuable contributions and comments from a number of colleagues, he accepts complete responsibility for the accuracy of the final product. Nevertheless, third parties who rely on information contained in this document, or their own interpretation thereof, do so at their own risk.

Executive summary

Studies dealing with mercury supply and mercury waste management have been conducted in recent years in different regions of the world by the Chemicals Branch of the United Nations Environment Programme's (UNEP) Division of Technology, Industry and Economics (DTIE), including the Asia-Pacific and Latin America and the Caribbean regions. The storage of mercury and mercury-containing waste emerges as a crucial issue in these studies, since in many developing countries there are no favorable conditions for the effective and economically viable long-term storage of mercury. This situation has also been mentioned at various events, such as the meeting of the Executive Committee of the LAC Mercury Storage Project (21-22 October 2010, Santiago, Chile), and the second session of the Intergovernmental Negotiating Committee on Mercury (INC 2; 24-28 January 2011, Chiba, Japan). Delegates attending the Santiago meeting also expressed the need to develop temporary or interim facilities to store elemental mercury and to manage mercury-containing waste.

In order to find solutions to the mercury storage problem, Argentina and Uruguay were selected for the "Mercury Storage and Disposal Two Countries Project in Latin America" as a follow-up to the above-mentioned projects. The methodology followed in this project is based on the "Suggested framework for decision making for the safe management of surplus mercury", an important output of the workshop organized by the Integrating Knowledge to Inform Mercury Policy (IKIMP) Initiative held on October 2009 at the University of Oxford in the UK. Following this methodology, the project included the following steps to be taken in each of the two countries: 1) Survey and analysis of possible temporary storage locations within the country; 2) Review of the regulatory framework; 3) Establishment of a decision-making process; 4) Technology status/Assessing basic management options; and 5) Developing a national storage and waste management action plan. Data from previous sectoral mercury release inventories was likewise an important input to project development. Although options like stabilization, distillation and landfilling are briefly referred to in this document, this project focuses mainly on above-ground temporary storage in an existing facility selected for each of the two countries from amongst a number of potential sites.

RESULTS

Argentina

The health sector is the largest source for releases of mercury waste in the country (2.050 Kg/year), followed by the chlor-alkali plants (1.777 Kg/year) and light bulbs (468 Kg/year). Argentina reported four potential facilities for temporary in-country storage (security landfills for hazardous waste disposal); two of these four facilities are also authorized for mercury waste treatment. Both facilities offer a chemical treatment consisting of a sulphur-based stabilization technique applied to mercury waste.

As regards the regulatory framework in Argentina, a total of nineteen national instruments (laws, regulations, decrees and resolutions) are in place, one of which is currently not operational. At the regional level, three relevant instruments adopted under MERCOSUR (two framework agreement and one action plan) can be identified. As regards the international sphere, Argentina has adopted national laws implementing both the Basel and the Rotterdam Convention. Provincial regulatory instruments were also referred to in a general manner, in relation to the import of hazardous waste into their territories. Only five Argentine provinces (Chaco, Corrientes, Córdoba, Mendoza and Santa Fe) allow the importation of hazardous waste.

A National Working Group (NWG) comprised of representatives from the public sector, chlor-alkali industry, laboratories, civil society organizations (CSOs), and others was formed as part of the decision making process. The NWG met and worked together on different issues, including the first draft of Argentina's National Action Plan (NAP). As regards technology status and management options, mercury waste generators in Argentina can send their waste for stabilization and final disposal in security landfills. Currently there is no in-country distillation (retorting) treatment option. Nevertheless a technical proposal developed at the National Institute for Industrial Technology (INTI) is being considered for the permanent (underground) storage of mercury and mercury waste, initially developed in 2007 for the permanent storage of radioactive waste.

A draft NAP has been proposed, in which five sub-objectives have been prioritized: 1) Strengthen national capacities for strategy definition; 2) strengthen information availability on mercury sources; 3) assess state-of-the art options for elemental mercury storage; 4) assess alternatives for mercury waste storage/final disposal in Argentina; and 5) regularly review/update the regulatory framework. General guidelines and four to six actions have been formulated for achieving each of the five sub-objectives.

Uruguay

In 2010 total mercury releases to the environment were estimated at a minimum of 2.201 Kg. and a maximum of 3.616 Kg. The chlor-alkali sector was the most significant category, with 1.140 Kg/year, followed by dental amalgam with 550 Kg/year. The range for electrical switches is between 66.9 Kg and 836 Kg/year. Mercury thermometers accounted for 185 Kg/year.

A total of sixteen potential sites were listed for the temporary storage of mercury waste, including a chlor-alkali plant, cement kilns, an oil refinery, non-coal-fired power plants, hazardous/medical waste incinerators, landfills, and others. Two of these sites were identified as apparently best suited to the above-mentioned purpose: the chlor-alkali plant and an industrial waste landfill.

Twenty-five regulatory instruments were identified during the legal framework review. Departmental guidelines complement nineteen national instruments, two of which also apply at the municipal level. At the regional level, two framework agreement and one

action plan are relevant, all of which were adopted under MERCOSUR. With regard to the international level, Uruguay has implemented the Basel and Rotterdam Conventions via national laws. However particular regulations for hazardous waste and substances are still incipient and non-specific in Uruguay.

In Uruguay the stakeholders group involved in mercury issues participated in different activities related to informing, training and discussion. This group is characterized by its wide participation, including representatives from national and local governments, academia, professional associations, public service utilities, chambers of commerce and industry, private waste treatment companies and civil society organizations. The group met and worked on various issues, such as defining control measures for facilities using mercury, and the drafting of the National Action Plan.

Relative to the project, Uruguay focused more on technology status and management options particularly exploring retorting as well as stabilization as treatment options for mercury waste arising from the two main sources: the chlor-alkali sector (mercury-containing waste such as sludge) and mercury added products. The only facility currently in operation to treat mercury containing waste is a lamp crusher. No security landfills for hazardous waste are currently in operation in Uruguay.

Uruguay's draft NAP was developed by identifying the various major mercury waste streams in the country, which originate from three sources: 1) industrial processes (chlor-alkali plants), 2) end-of-life products (lamps, batteries, thermometers, etc.), and 3) others. A summary matrix was developed, featuring the following items: mercury waste source, type of mercury waste, lines of action, performance indicators/goals, deadline, resources needed, and institutions responsible.

ANALYSIS AND RECOMMENDATIONS

Argentina

From a technical point of view, any of the four reported sites is a potential temporary storage facility for the purpose of this project: each one of them has the advantage of currently being an authorized receptor of hazardous waste. Nevertheless it is advisable to enhance the analysis of possible storage locations in Argentina, and make a detailed assessment of the sources of mercury waste and their location in the country, the results of which will be useful in defining the best storage option.

A solid regulatory framework covering hazardous waste management exists in Argentina, although it is still necessary to advance on particular legal instruments addressing mercury waste management. The most significant characteristics of the regulatory framework are the restrictions on hazardous waste transportation between the various provinces—a condition that will undoubtedly influence the site selection process. Recommendations arising from review of the regulatory framework include the need to develop a thorough

assessment of the provincial/ municipal regulatory framework related to hazardous waste management, and moving ahead in passing appropriate legal instruments, taking into consideration the ongoing negotiations for a Global Legally Binding Instrument on Mercury.

Although certain steps have been taken regarding the decision-making process, it is still necessary to define subsequent activities and increase the involvement of all relevant stakeholders. It is recommended to involve the working group in the finalization and implementation of the NAP, as well as taking into account the items recommended in the IKIMP framework.

As regards the issue of technology status and management options, Argentina has a relatively comprehensive treatment/disposal infrastructure in place, including the option for solidification/ stabilization of mercury waste (an option not yet available in most of the GRULAC countries). Nevertheless current regulations may inhibit the domestic transfer of wastes to facilities within the country.

INTI's proposal offers interesting potential as an underground storage option. Further assessment of this proposed technology is recommended to determine its potential for the permanent storage of mercury and mercury waste.

The National Action Plan is still in an early stage. It is recommended to carry on with its development, involving other participants who will be responsible along with those authorities already engaged.

Uruguay

Uruguay encountered two options for potential temporary storage facilities within its territory, with each one having both advantages and disadvantages. In order to select the best option, it is recommended that additional and more specific information be obtained regarding each of the two potential sites. It is also necessary to contact the owners/operators of the potential sites and inquire as to the possibility of these becoming storage facilities.

The lack of particular legal instruments in operation in Uruguay to address hazardous waste management might be an obstacle to finding an adequate solution to the mercury waste management problem. In this case it would be recommended to proceed with the preparation and adoption of the Waste Act, examine the draft and determine if the provisions take all necessary elements into account.

Similar to Argentina, Uruguay is fairly advanced in the decision-making process, this could still be strengthened. It is recommended to engage the working group participants in line with their responsibilities in the drawing up of the NAP, and also to take the items recommended into consideration in the IKIMP framework described.

In terms of technical options, Uruguay currently lacks the necessary infrastructure for hazardous waste treatment/disposal, including for mercury waste. This offers an opportunity to invest in creating the necessary infrastructure to treat mercury waste (end-of-life products) within an as-yet unexploited market. For the mercury containing waste, such as chlor-alkali waste, the development of a more comprehensive analysis is recommended in order to find the right alternative for its disposal.

Uruguay's NAP is also at an early stage of its development, with several activities being outlined. At this stage it is recommended to incorporate additional activities in the NAP dealing with general issues such as regulatory instruments, awareness raising, communication, and others.

CONCLUSIONS

The project provided a pre-selection of potential sites for the temporary storage of mercury waste in both countries. Four waste management facilities in Argentina have been identified as potential sites, one of them having the decisive advantage of being located in a Province that allows the import of mercury waste. In Uruguay, two sites with a large potential of becoming a temporary mercury waste storage facility were selected, one of which has experience in activities related to mercury waste.

Each country has established a solid basis from which it can develop a comprehensive National Action Plan for the environmentally sound management of elemental mercury and mercury waste. Nonetheless, it is important to stress the need to move ahead in the development of these Plans, engaging the stakeholders involved in each of the activities designed for the action plans.

Both countries improved their knowledge and understanding of both the existing legislative framework and those regulatory instruments that are still missing and that are necessary to attain environmentally sound management of mercury and mercury waste.

Finally, the possibility of replicating this project in other countries in the GRULAC region should be considered. Such follow-up projects could build upon the experiences gained and lessons learned during the implementation of this project.

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ACRONYMS

CSO	Civil Society Organizations
DEFRA	(United Kingdom's) Department for Environment, Food and Rural Affairs
DINAMA	(Uruguay's) Dirección Nacional de Medio Ambiente
DTIE	Division of Technology, Industry and Economics
EU	European Union
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
IKIMP	Integrating Knowledge to Inform Mercury Policy
INC	Intergovernmental Negotiating Committee
INTI	(Argentina's) Instituto Nacional de Tecnología Industrial
LAC	Latin America and Caribbean
LATU	Laboratorio Tecnológico del Uruguay
LBI	Legally Binding Instrument
MVOTMA	Ministerio de Vivienda Ordenamiento Territorial y Medio Ambiente
NAP	National Action Plan
NGO	Non-Governmental Organization
NWG	National Working Group
PTR	Propuesta Técnica de Reglamentación para la gestión de los residuos industriales, agroindustriales y de servicios
PRTR	Pollutant Release and Transfer Register
UNEP	United Nations Environment Programme
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

In March 2009, the Chemicals Branch of the United Nations Environment Programme's (UNEP) Division of Technology, Industry and Economics (DTIE) implemented two Mercury Storage Projects; one in the Latin American and Caribbean (LAC) and the other in the Asia-Pacific region. These were part of the Norway-funded project "Reducing Mercury Supply and Investigating Safe Long Term Storage Solutions". The projects were aimed at reducing the release of mercury into the environment by reducing mercury supply, and finding environmentally sound storage solutions. Regional processes were initiated in order to support the sequestration of excess mercury, thereby preventing its re-entry into the global marketplace.

The first stage of this project was to estimate mercury surplus from various sources. For the Latin America and Caribbean region, the assessment report "Excess mercury supply in Latin America and the Caribbean, 2010-2050", was prepared by consultant Peter Maxson and presented at the Inception Workshop that took place in Montevideo, Uruguay, on 23-24 April 2009. It was revealed that supply is likely to exceed demand in the region soon, possibly even before 2015. The report therefore highlighted the urgent need for adequate regional mercury storage capacities. Taking these findings into consideration, the participants of the workshop agreed to proceed with an options analysis and feasibility study which would form the basis for deciding on the preferred storage options[1]. As a consequence, the study "Options Analysis and Feasibility Study for the Long Term Storage of Mercury in the Latin America and Caribbean" was prepared by the Laboratorio Tecnológico del Uruguay (LATU) in 2010. The study provided information on various options which countries may wish to consider in the environmentally sound storage of excess mercury in the region[2]. Among others, the study concluded that underground storage is currently not feasible. Instead, it is recommended to store mercury in above-ground engineered warehouses. This is the most viable option from both a technical and a financial point of view. Moreover, the exports option in combination with temporary aboveground storage was recommended as a short-term solution for countries with very small excess mercury. In either case, accompanying national and regional legislation is crucial.

[1] Options Analysis and Feasibility Study for the Long Term Storage of Mercury in Latin America and the Caribbean. Laboratorio Tecnológico del Uruguay (LATU). Montevideo, 2010

[2] http://www.unep.org/hazardoussubstances/Mercury/PrioritiesforAction/SupplyandStorage/Activities/LACMercuryStorageProject/tabid/3554/Default.aspx

Again funded by Norway, the 'Mercury Storage and Disposal Two Countries Project in Latin America' is a follow up to these projects. It provides capacity-building for storage, aiming to protect human health and the environment from the release of mercury and its compounds. Responding to the priorities identified by governments, it is part of the continuing effort to provide technical assistance to countries in search for environmentally-sound long-term storage solutions for elemental mercury. Thus, the project builds on decision 25/5 of the Governing Council: In paragraph 34, the Council "...requests the Executive Director, coordinating as appropriate with Governments, intergovernmental organizations, stakeholders and the Global Mercury Partnership, subject to the availability of resources and concurrently with the work of the intergovernmental negotiating committee, to continue and enhance, as part of the international action on mercury, the existing work, in the following areas: (a) Enhancing capacity for mercury storage; (b) Reducing the supply of mercury ...".

At the second meeting of the executive committee of the LAC Mercury Storage Project (21-22 October 2010, Santiago, Chile), representatives expressed the need to develop temporary or interim facilities to store elemental mercury – mostly coming from chlor-alkali plants and occurring as by-product of non-ferrous smelting – and to manage mercury containing waste such as that coming from end-of-life mercury added products. A few months later, the importance of mercury storage was re-affirmed at the second session of the Intergovernmental Negotiating Committee (INC 2) on mercury (24-28 January 2011, Chiba, Japan) where many representatives articulated that the issue of storage was extremely important. Moreover, the LAC region expressed concern over insufficient information on the capacity of many developing countries for the effective and economically viable long term storage of mercury. The UNEP Mercury Storage Project in the LAC region estimated that excess or surplus elemental mercury might amount to approximately 8.300 tons between 2015 and 2050.

Subsequently, in 2011, Argentina and Uruguay were selected for this project from within the GRULAC region, drawing on their previous waste management projects implemented by the Secretariat of the Basel Convention and supported by the USEPA. The project, called "Minimización y Manejo Ambientalmente seguro de desechos conteniendo mercurio que afectan a poblaciones expuestas de varios sectores económicos, incluyendo al sector salud, en varios países de América Latina y el Caribe", resulted in sector specific (partial) inventories of mercury waste and waste management practices. It was realized in collaboration with the Secretariat of the Basel Convention, the Basel Convention Regional Centre for the South American Region in Argentina, and the Basel Convention

Coordinating Centre for Training and Technology Transfer for Latin America and the Caribbean region in Uruguay.

Project methodology

A workshop to explore scientific and engineering issues associated with the Safe Storage and Disposal of Redundant Mercury was held at St Anne's College, University of Oxford on the 13th and 14th of October, 2009. The workshop was organized by the Integrating Knowledge to Inform Mercury Policy (IKIMP) Initiative[3] and sponsored by the United Kingdom's Department for Environment, Food and Rural Affairs (DEFRA). It featured over 40 experts from 7 different countries, representing public bodies, non-governmental organizations, consultancies, industry, academia and independent research institutions.

The Workshop was established to build on existing meetings related to this topic, including the UNEP regional storage group meetings in Bangkok and Montevideo, held in 2008 and 2009 respectively. Primarily focusing on scientific and technical issues, the event was followed by a sub-group discussion on the safe management of surplus mercury worldwide. An important output of this Initiative was the "Suggested framework for decision making for the safe management of surplus mercury". This document has been used as a reference point for the methodology established in the 'two countries project'. The suggested framework consists of four steps: 'Initial actions', 'Assessment of basic management options', 'Selecting between technical concepts' and 'Enabling implementation'. Each step features a number of possible elements of a national or regional decision process that addresses the management of surplus mercury.

Regarding this project's methodology, consideration of IKIMP's framework for decision-making constituted the first step. On this basis, a framework for conducting an inventory of storage facilities and the relevant legislative framework was prepared as a practical tool to help the two participating countries in reaching the project objectives. This framework consists of two separate tools, each designed as a matrix. Application of the first obtains a weighted list of possible temporary storage locations in the country, as well as an inventory of current mercury and/or hazardous waste treatment facilities. These could serve as interim storage facilities for elemental mercury/mercury waste (see Annex A).

The second tool was designed to gain an overview of existing local, national, regional and international legislation/regulatory measures that may be relevant vis-à-vis the storage

[3] www.mercurynetwork.org.uk/

and disposal of mercury in each country, and to detect any potential need for additional regulatory instruments. Taking into account the findings resulting from the application of these tools as well as additional information, such as the results of the sectoral mercury releases inventories and the regulatory framework review, recommendations for the drafting of a national action plan were elaborated for each country. This was done in cooperation with stakeholders in a national working group (see Annex B).

According to the IKIMP's suggested framework for decision making for the safe management of surplus mercury, the basic management options are "temporary storage and disposal in an underground repository". Basic management options in GRULAC countries were thoroughly analyzed in the "Options Analysis and Feasibility Study for the Long Term Storage of Mercury in Latin America and the Caribbean"[4] study. The study concluded that "[*u]nderground facilities are an unlikely solution in the short term for most countries in the LAC region, and that an above-ground engineered warehouse can be also a short-term solution for mercury storage in the LAC region".* Therefore, although options like stabilization and landfills are briefly referred to in this document, this project focuses mainly on above-ground temporary storage in an existing facility selected from a number of potential sites for each of the two countries.

[4] *Options Analysis and Feasibility Study for the Long Term Storage of Mercury in Latin America and the Caribbean*. Laboratorio Tecnológico del Uruguay (LATU). Montevideo, 2010. http://www.unep.org/hazardoussubstances/Portals/9/Mercury/Documents/supplystorage/Final_Draft_LAC%20Hg%20Options_Chile.pdf

2. COUNTRY RESULTS

The following sections include a synthesis of the results obtained for Argentina and Uruguay, corresponding to each of the activities conducted in these countries and having as a reference the IKIMP's suggested framework.

2.1 Argentina

2.1.1 Survey and analysis of possible temporary storage locations in the country

An important step in finding a potential storage location for mercury and mercury waste consists in determining the amount of waste that is generated in each of the two countries. This can be estimated via the application of an inventory. The choice of an adequate storage location is partially governed by the volume of waste produced as well as the amount of elemental mercury extracted from the waste.

As mentioned, Argentina conducted a sectoral inventory, applying UNEP's *Toolkit for Identification and Quantification of Mercury Releases*. Table 2.1 shows the results of this inventory, corresponding to releases of **mercury waste** (general waste category) from each of the sectors included in the table.

Sector	Kg Hg/year	Year
Health	2.050	2010
Chlor alkali	1.776	2010
Lamps	468	2011
Oil	214	2010
Energy	36	2010
Total	**4.531**	

Table 2.1 Mercury releases as waste in Argentina

Source: *Proyecto "Almacenamiento y disposición ambientalmente adecuados de mercurio elemental y sus residuos en la República Argentina".* June 2012

It is interesting to note that the health sector is the largest source of mercury waste in Argentina.

Argentina focused its survey and analysis of possible temporary storage locations on current waste treatment facilities only. It did not consider other potential sites such as chlor-alkali plants, metal smelters, mines, etc. Consequently, four sites were reported as potential facilities for the temporary storage of mercury waste in the country.

There are four security landfills in Argentina currently in operation and authorized for the final disposal of hazardous waste, including mercury waste (three in the Province of Buenos Aires, and one in the Province of Córdoba). Two of these are further authorized to treat hazardous waste with physicochemical processes (stabilization/solidification). Mercury waste from chlor-alkali plants and waste products from different sources (such as lamps, thermometers, sphygmomanometers, etc.) are accepted at these sites, and disposed of after chemical stabilization. Both the Federal and Provincial authorities have granted these four hazardous waste management facilities the necessary permits. Figure 2.1 shows their location.

Figure 2.1 Hazardous waste infrastructure in Argentina considered in this project.
Source: adapted from *Proyecto "Almacenamiento y disposición ambientalmente adecuados de mercurio elemental y sus residuos en la República Argentina".* June 2012

No qualifications for selected parameters – such as land use, type of aquifer beneath the site, proximity to a geologic fault, seismic zone, etc. – have been assigned to any of the four sites. It is therefore not possible to use these criteria for the purpose of comparison. Yet, only one of the sites is located in a Province (Córdoba) allowing the import of hazardous waste into its territory. The Province of Buenos Aires does not allow the import of hazardous waste into its territory.

The possibility of becoming a potential site for the purposes of this project has not been discussed with the respective owners/operators. This is an activity that should be envisaged in the national action plan.

2.1.2 Review of regulatory framework

Although there is a lack of legal instruments directly addressing mercury waste management, several instruments exist in Argentina that include references to mercury issues, including the setting of maximum levels for releases into the environment (air, water), water quality criteria, and others.

As regards the regulatory framework in Argentina, an important number of legal instruments can be listed, dealing with hazardous waste, energy production, transport, occupational hygiene and safety, water quality, maximum limits for mercury contents, liquid effluents, pesticides, and international/regional agreements and conventions. In total, nineteen national instruments (laws, regulations, decrees and resolutions) are in place, one of which is currently not operational. At the regional level, three relevant instruments adopted under MERCOSUR (two framework agreement and one action plan) can be identified. As regards the international sphere, Argentina has adopted national laws implementing both the Basel and the Rotterdam Convention. Also, provincial regulatory instruments were referred to in a general manner concerning the import of hazardous waste into their territories. In this regard, only five Argentinian provinces (Chaco, Corrientes, Córdoba, Mendoza and Santa Fe), allow the import of hazardous waste. Figure 2.2 shows these provinces.

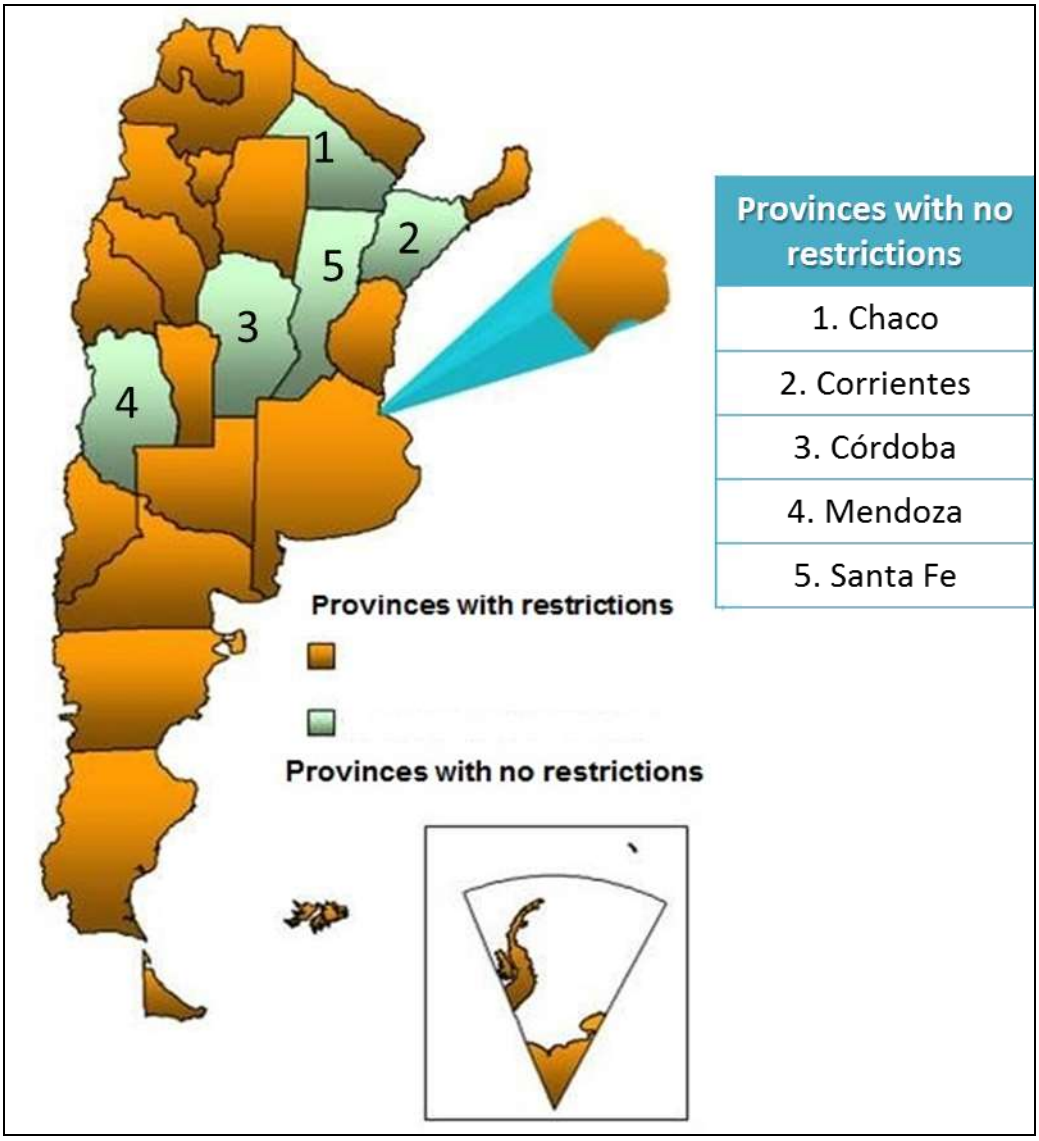

Figure 2.2 Provinces in Argentina with restrictions to import hazardous waste.
Source: adapted from *Proyecto "Almacenamiento y disposición ambientalmente adecuados de mercurio elemental y sus residuos en la República Argentina".* June 2012

The regulatory instruments directly or indirectly related to mercury waste in Argentina were included in a schematic form in the tool (matrix) that was presented at the Project's Inception Workshop in Montevideo in June 2011. Table 2.2 provides an overview of the regulatory framework.

Level	Instrument	A. Environmental standards	Hygiene, labour security	B. Mercury/products-wastes/processes									C. Facilities				
		Water, air, soil, biota	*Work related risks*	*Operators inventory*	*Import / export*	*Trade*	*PRTR*	*Treatment / recycling*	*Transport*	*Storage*	*Final Disposal*	*Elimination*	*Releases*	*Land Use*	*Authorisation*	*Inspection*	*EIA / Risk*
Inter-national	**Basel Convention** Adopted by Law 23.922 (1991)				✓												
	Rotterdam Convention Adopted by Law 25.278 (2000)				✓												
Regional	**Framework agreement on the Environment of Mercosur**																
	Agreement on Mercosur's Environmental Management Policy for Special Wastes and Extended Producer Responsibility Signed 2006, not yet entered into force; measures to minimize amount and hazardousness of wastes generated; mercury lamps, thermometers etc.																
	Mercosur Action Plan for Chemical Substances and Products Approved in 2006, revised in 2008; derived from SAICM; features ten areas of work/substances, including mercury and management of contaminated sites																
National	**National Constution Art. 41**				✓												
	Law 18.284 (1969) Code on Foodstuffs Mercury Content in Water	✓															
	Law 19.587 (1972) Use, handling, safe disposal of hazardous material in workplace		✓														
	Law 24.051 (1992) Hazardous Substances			✓		✓		✓	✓	✓	✓	✓			✓	✓	✓
	Law 24.449 (1994) Transport of Hazardous Materials/Substances and complementary regulations								✓								
	Law 25.675 (2002) General Environmental Law																✓
	Law 25.612 (2002) Minimum standards on management of industrial waste (*not operational*)								✓	✓	✓						
	Law 26.184 (2006) Portable Electrical Energy Act; prohibits batteries exceeding certain limit of mercury content											✓					
	Decree 2.126 (1971) Water standards	✓															
	Decree 831 (1993) Covers management of hazardous substances, incl. Mercury	✓		✓		✓		✓	✓	✓	✓	✓				✓	✓
	Resolution 80 (1971) Prohibits use of mercury chloride in tobacco											✓					
	Resolution 314 (1992) Mercury limits in discharge, sewage, water etc.												✓				
	Resolution 750 (2000) Prohibits mercury use in pesticides											✓					
	Resolution 743 (2003) National Inventory for the Prevention of Major Industrial Accidents			✓													
	Resolution 839 (2005) Action Plan on Risks at the Workplace; mercury in hospitals defined as priority		✓														
	Resolution 1 (2008) Limits for mercury content wastewater discharges into Rio Matanza-Riachuelo												✓				
	Resolution 139 (2009) Health sector: hospitals obliged to purchase mercury-free equipment											✓					
	Resolution 274 (2010) Prohibits manufacture, import, sale of Hg sphygmomanometers				✓												
	Resolution 21 and 27 (2012) Defines maximum concentrations of metals and metalloids in paints											✓					

Table 2.2: Regulatory framework in Argentina

Source: Compiled from *Final Project Report Argentina*

2.1.3 Establishing a decision-making process

As an important step in mapping out the decision-making process, Argentina selected and invited a number of stakeholders involved in the project and assembled a National Working Group (NWG). Representatives from the public sector, chlor-alkali industry, laboratories, NGOs and others took part in the activities of the working group (Annex C includes the lists of stakeholders for both Argentina and Uruguay). Some participants represented entities or facilities that could be considered as potential sites for the storage of mercury waste.

The NWG met twice to discuss issues related to the project, i.e. its objectives, potential sites for mercury waste storage, the current negotiations for a Global Legally Binding Instrument on mercury, and other points of interest related to some of the sectors represented in the group, such as a chlor-alkali plant and a laboratory currently producing thiomersal (which contains ethylmercury, used as a preservative in vaccines). Establishment of the working group rendered some tangible benefits: For instance, opportunities to reuse mercury generated as a by-product in other processes were explored.

A first draft National Action Plan (NAP) for the environmentally sound management of mercury and mercury wastes has been initiated by the working group. This NAP is described in section 2.1.5. The NWG members will continue to meet periodically in order to advance regarding the corresponding NAP activities.

2.1.4 Technology status/Assessing basic management options

The legal framework in Argentina has incorporated specific instruments on hazardous waste since 1991. The current infrastructure in Argentina for hazardous waste treatment/disposal includes four facilities authorized to receive mercury waste for the purpose of treatment and final disposal. As mentioned in 2.1.1, national and local authorities in Argentina have granted four hazardous waste management facilities with the necessary permits for the disposal (landfilling) of hazardous waste. Two of these four facilities are also authorized to stabilize mercury waste by means of a *poli-sulphide* process. Owners/operators must follow a strict procedure (based on tests such as the Toxicity Characteristic Leaching Procedure, a USEPA testing protocol) to prove that their treatment methods are environmentally sound. Only stabilized mercury waste produced by chlor-alkali plants and waste products from different sources (such as lamps, thermometers, sphygmomanometers, etc.) can be disposed of at the four certified security landfills.

As regards an alternative method for specific mercury waste options, Argentina considered a technical proposal developed at the National Institute for Industrial Technology (INTI). The proposal was initially developed in 2007 for the permanent storage of radioactive waste, as a result of an agreement signed between INTI and the National Commission for Atomic Energy in 2004. INTI engineers adapted this proposal to explore the possibility of storing mercury waste in Argentina. The proposal foresees a permanent underground storage structure based on the use of steel reinforced concrete cells in which drums containing solidified waste are stored (Figure 2.3). The cells are buried, meaning that there are several barriers avoiding the waste's contact with the biosphere. Prototypes of this technical proporsal have previously been built when considering the storage of radioactive waste.

Figure 2.3 INTI's Prototype container originally designed for radioactive waste

Source: *Proyecto "Almacenamiento y disposición ambientalmente adecuados de mercurio elemental y sus residuos en la República Argentina".* June 2012

2.1.5 Developing a national storage and waste management action plan

Argentina has developed a preliminary national action plan (NAP) based on one general objective and five specific sub-objectives. These sub-objectives are:

1. Strengthen national capacities for strategy definition.
2. Strengthen information availability on mercury sources.
3. Assess state-of-the art options for elemental mercury storage.
4. Assess alternatives for mercury waste storage/final disposal in Argentina.
5. Permanently review/update the regulatory framework.

General guidelines and four to six actions have been formulated in order to attain each of the five sub-objectives. The NAP guidelines have been summarized in a table which includes components/sub-objectives, performance indicators, timeframe, necessary resources, and the responsible person/institution. All activities included in this Plan are scheduled to be developed within a two-year timeframe. These activities and related information are summarized in Table 2.3.

ACTIVITIES/PRODUCT	INDICATOR	SCHEDULE	NECESSARY RESOURCES	RESPONSIBLE PERSONS / INSTITUTIONS
1) Multi-Institutional Coordination: Strengthen national capacities in order to determine the strategy for storage and disposal of mercury and mercury-containing waste in the relevant sectors. Design an awareness-raising and promotion strategy.	National working group created. Activities conducted.	*2 years, 2/3 meetings per year*	Human and financial	National enforcing authorities from the sector, CSOs*, sector chambers as well as academic and professional sectors **Civil Society Organizations*
2) Release Inventory: Improve information about mercury sources in the country in order to quantify releases to the various media.	Inventory developed with UNEP Toolkit Level 2	*2014, subject to the availability of funds*	Human, information and financial (international donor agencies such as GEF, UNEP, UNDP, IDB, IBRD or WB)	National enforcing authorities from the sector
3) Technological alternatives: Analyze the state-of-the-art in terms of technical alternatives available for the storage of elementary mercury	Selection carried out	*1½ years*	Human, financial and information	National and provincial enforcing authorities from the sector
4) Storage alternatives: Analyze other potential alternatives for storage and disposal in the country	Options subject to local regulations: temporary storage with the generator and/or operator, INTI technology	*1½ years*	Human, financial and information	National and provincial enforcing authorities from the sector

5) Legislation/regulation: Permanently review the general and/or specific regulatory framework in place vis-à-vis mercury and mercury-containing waste	Developed and/or approved regulations	*2 years*	Human, financial and information	National enforcing authorities from the sector; Basel Regional Center for South America

Table 2.3 Argentina´s National Action Plan

Source: *Proyecto "Almacenamiento y disposición ambientalmente adecuados de mercurio elemental y sus residuos en la República Argentina".* June 2012

2.2 Uruguay

The most significant results of this study obtained for Uruguay are reported as follows for each of the five concepts under analysis.

2.2.1 Survey and analysis of possible temporary storage locations in the country

Uruguay has applied UNEP's *Toolkit for Identification and Quantification of Mercury Releases* to determine the amount of mercury releases from specific sectors and sources. Table 2.4 shows mercury releases in Uruguay for the sectors that have been included in the inventory.

Sector	Maximum estimated (kg Hg/year)	Minimum estimated (kg Hg/year)
Other coal uses	0,12	
Natural gas - extraction, refining and use	0,01	
Mineral oils - extraction, refining and use	31,2	
Biomass fired power and heat production	17,6	
Gold extraction and initial processing by methods other than mercury amalgamation	29,5	
Cement production	86,6	15,7
Pulp and paper production	59,6	13,9
Production of lime and light weight aggregates	4,6	1,9
Chlor-alkali production with mercury-technology	**1140**	
Thermometers with mercury	**185**	57,5
Electrical switches and relays with mercury	**836**	66,9
Light sources with mercury	59,2	9,8
Batteries with mercury	70,8	

Polyurethane with mercury catalysts	167	33,4
Pharmaceuticals for human and veterinary uses	15,1	
Dental mercury-amalgam fillings	**550**	
Manometers and gauges	138	116,5
Laboratory chemicals and equipment	11,9	
Production of recycled ferrous metals	3,2	
Incineration of medical waste	17,4	3,5
Informal waste incineration	60,3	
Crematoria	13,1	3,3
Cemeteries	119	29,8

Table 2.4 Mercury releases in Uruguay (2010)

Source: *Proyecto de Almacenamiento y Disposición de Mercurio Binacional Argentina – Uruguay. 2012*

To compile its inventory, Uruguay used the maximum-minimum approach, except for sectors with solid reference data such as the chlor-alkali sector or dental amalgam. For 2010, total mercury releases to the environment were estimated to amount to a minimum of 2.201 kg and a maximum of 3.616 kg. The chlor-alkali sector was the most significant category with 1.140 kg/year, followed by dental amalgams with 550 kg/year. The range for electrical switches lay between 66.9kg and 836 kg/year. Mercury thermometers accounted for 185 kg/year. This data allows for the elaboration of mercury waste storage needs specific to the country. Further work is necessary to refine these estimates and to reduce the range.

The Uruguayan Navy has reported the use of mercury in hermetic devices at some of their lighthouses, but these facilities were not reported in the national inventory.

A list of potential sites for the temporary storage of mercury waste in Uruguay has been obtained using the matrix tool proposed at the Project Inception Workshop in Montevideo (June 2011). For Uruguay, a total of sixteen potential sites was listed, and particular information for each site has been provided, including main activity, address, land use, type of soil, and hydrogeological characteristics. The sub-sectors that were examined for possible site options are: mercury use in processes, mercury use in products, energy consumption and fuel production, and metals and raw materials. These sectors were represented by a chlor-alkali plant, cement kilns, an oil refinery, non-coal fired power plants, hazardous/medical waste incinerators, sanitary landfills, and others.

Figures 2.4 and 2.4-bis show the location of all sites considered in Uruguay as potential sites for the temporary storage of mercury and mercury waste.

Qualifications were assigned to each of the sixteen sites and a preliminary evaluation was made in order to identify the two sites apparently most suited for the temporary storage of mercury waste. In the site selection process, Uruguay reported that there are no significant seismic zones or geologic faults in its territory. Also, none of the sixteen facilities is located in areas prone to flooding. Regarding land uses, land planning instruments are currently in a developing stage in most Uruguayan *departamentos*. A non-numeric qualification method (descriptive) was therefore used for this selection concept. Other assessment parameters in the tool matrix, such as location, local aquifer, soil and site ownership, defined important differences among the potential sites. On the other hand, Uruguay considered current handling of mercury/hazardous wastes as highly relevant in the site selection process.

This analysis filtered out two sites as the most appropriate for temporarily storing mercury. One of these is the chlor-alkali plant mentioned above. The facility has been storing mercury waste within its premises for more than ten years and has accumulated around 2.000 metric tons of mercury waste. Although this plant is not a mercury waste treatment plant, it has occasionally received mercury waste (end-of-life products) from external generators, and has used the recovered mercury in its process.

The second potential site in Uruguay is the industrial waste landfill expected to be built in 2012. The facility will feature a security cell for hazardous waste. This is a three-party project, involving the national and local governments, and the industry chamber (private sector). It is interesting to note that, subject to authorization by the national authorities, the mercury waste accumulated at the chlor-alkali plant is designated to be transferred to the security cell for disposal.

Figure 2.4 Location of potential sites in Uruguay.

Source: adapted from *Proyecto de Almacenamiento y Disposición de Mercurio Binacional Argentina – Uruguay. 2012*

A. San Gregorio Mine B. Alur S.A. C. UPM S.A.
D. Olecar S.A. E. Efice S.A. F. Las Rosas Sanitary landfill

Figure 2.4-bis. Location of potential sites in Montevideo-San José

G: ANCAP, La Teja Refinery
H: ANCAP, La Tablada
I: UTE, Batlle power plant
J: Aborgama
K: Gerdau Laisa
L: UTE, Punta del Tigre power plant

2.2.2 Review of regulatory framework

A second result of this study is the review of the Uruguayan regulatory framework, investigating the availability of legal instruments related to the project objectives. For this purpose, the tool (matrix) proposed at the Inception Workshop in Montevideo has been applied.

Twenty-five regulatory instruments were identified during the legal framework review. Departmental guidelines complement nineteen national instruments, two of which also apply at the municipal level. At the regional level, two framework agreements and one action plan are relevant, all of which were adopted under MERCOSUR. With regard to the international level, Uruguay has implemented the Basel and Rotterdam Conventions via national laws. For each of these levels, the instruments address environmental standards, municipal and medical waste, and facilities. Most of the instruments are applicable at the national level, with only one instrument for each of the other three levels. An overview of the regulatory framework is provided in Table 2.5.

Level	Instrument	A. Environmental standards	B. Mercury/products-wastes/processes									C. Facilities				
		Water, air, soil, biota	*Sources inventory*	*Import / export*	*Trade*	*PRTR*	*Treatment / recycling*	*Transport*	*Storage*	*Final Disposal*	*Elimination*	*Releases*	*Land Use*	*Authorization*	*Inspection*	*EIA / Risk*
Inter-national	**Basel Convention** Implemented by Law 16.221 (1991)			✓												
	Rotterdam Convention Implemented by Law 17.593 (2002)			✓												
Regional	**Framework agreement on the Environment of Mercosur**															
	Agreement on Mercosur's Environmental Management Policy for Special Wastes and Extended Producer Responsibility Signed 2006, not yet entered into force; measures to minimize amount and hazardousness of wastes generated; mercury lamps, thermometers etc.															
	Mercosur Action Plan for Chemical Substances and Products Approved in 2006, revised in 2008; derived from SAICM; features ten areas of work/substances, including mercury and management of contaminated sites															
National	**Law 9.515 (1935)** Municipal responsibilities in urban and domestic waste management									✓						
	Law 18.308 (1988) Land-use and sustainable development												✓			
	Law 16.112 (1990) Establishment of MVOTMA, responsible for implementation of the national environmental policy, determined by executive power															
	Law 16.466 (1994) Environmental Impact Assessment; environmental permits for storing hazardous substances						✓		✓	✓	✓			✓		✓
	Law 17.220 (1999) Prohibition on import of hazardous wastes			✓												
	Law 17.283 (2000) General law on protection of the environment; DINAMA in charge of chemical substances and wastes, including hazardous ones															
	Law 17.296 (2001) MVOTMA's and municipal responsibilities vis-à-vis location of urban and industrial waste facilities												✓			
	Law 17.930 (2005) Modifies Art. 3 of Law 17.220 (1999)			✓												
	General Waste Law *In preparation*															
	Decree 253 (1979) Norms against contamination of waters; limits for mercury; industrial effluents	✓										✓				
	Decree 560 (2003) Road transport of hazardous goods							✓								
	Decree 349 (2005) Environmental Impact Assessment and environmental permits; hazardous substances operators need prior authorization		✓				✓		✓	✓	✓					
	Decree 307 (2008) Minimum provisions for protection of workers' health; introduces GHS						✓									
	Decree 586 (2009) Transport of medical wastes must be authorized acc. to provisions						✓	✓	✓	✓	✓	✓				
	MGAP Resolution (1988) Mercury Products for Agricultural Use				✓											
	Air Management Proposal Guidelines on emissions from stationary sources	✓														
	Air Management Proposal Guidelines on air quality; defines maximum acceptable standards for pollutants	✓														
	Waste Management Proposal (PTR) Guidelines on sound management of industrial wastes and services ; leachate limits for Hg						✓	✓	✓	✓	✓					
	Registration of waste operators at DINAMA						✓									
Local	**Departmental guidelines on land-use**												✓			

Table 2.5: Regulatory framework of Uruguay

Source: Compiled from *Final Country Report Uruguay*

Nevertheless, Uruguay lacks a formal standard or any other regulatory instrument creating an obligation to treat the hazardous waste generated in the country. The particular regulations for hazardous waste and substances are still incipient and non-specific. Hence, there is a need to advance in this field through the elaboration of the necessary regulatory instruments at all levels of government. Both the "Technical Regulatory Proposal for management of industrial, agro industrial and services integrated waste management" (elaborated in 2003) and the Waste Act project (initiated in August 2011) are still pending.

Finally, it is important to say that Uruguay has been working towards the environmental sound management of electric and electronic waste. In addition, there is a pending proposal to integrate regulations for mercury waste along with this waste stream.

2.2.3 Establishing a decision-making process

A first task under this step of the process was to define the most important stakeholders involved in mercury waste management to be considered as participants in the project. Twenty-six institutions representing thirty-nine subsectors were identified and invited to participate in different activities related to informing, training and discussing. A representative for each of the sub-sectors was appointed. The majority of the representatives had previously been involved in mercury related activities in the country, mainly in the process of elaborating the different mercury releases inventories and in the recent mercury-related projects in Uruguay referred to in the introduction to this report.

The institutions represented in the Uruguayan stakeholders group, characterized by its wide participation, were from the national government (environment, health, energy, industry, mining, agriculture, fisheries, navy, and customs), local governments (three *Intendencias*), academia, professional associations (Uruguayan Engineers Association, Uruguayan Geological Society), power utilities, commerce and industrial chambers, private waste treatment companies, and Civil Society Organisations (CSO).

One of the group's activities was to define control measures for facilities using mercury where neither treatment infrastructure nor specific regulations on waste mercury were in place. Reports were presented to the national environmental authority (DINAMA), including a review of mercury waste related aspects, comparing international legislation (USA, EU) with the Uruguayan regulations currently being elaborated. Two outcomes of this activity are the following documents:

- Considerations for the Waste Proposal related to mercury contaminated waste: mainly lamps and sludge from chlor-alkali sector.
- Bases for the modifications to the PTR (Technical Regulatory Proposal) related to mercury contaminated waste.

2.2.4 Technology status/Assessing basic management options

As reported in Table 2.2.1, Uruguay developed several independent sector-specific mercury releases inventories. The main purpose of this was to be capable of assessing the current situation in terms of basic management options. Mercury releases inventories in the waste category provided information that was particularly useful for defining technical and management needs. Specific numbers were obtained for some waste streams, for example thermometers and lamps. It should be noted in this context that a number of institutions (hospitals, LATU, supermarkets), are storing certain amounts of this waste until a sound environmental solution is available. Although lamps are not a significant category in the releases inventory, there are currently two authorized facilities to treat waste fluorescent lamps in Uruguay: a lamp crusher and a wet recovery process with cement solidification. The latter is not in operation yet.

In the context of this study, Uruguay placed the main focus on exploring retorting and stabilization as treatment options for mercury waste from the two main sources, namely the chlor-alkali sector (mercury waste only – elemental mercury generated after an eventual decommissioning of mercury cells would be exported as commodity mercury) and mercury added products. Uruguay concluded that distillation through retorting might constitute the most appropriate technological option for mercury waste from products, allowing the separation of elemental mercury from the other waste (glass, plastic, other metals, etc.). As for the chlor-alkali sector waste, so far the most viable envisaged solution is the temporary storage in the security landfill under controlled conditions.

Exporting of mercury containing waste for treatment abroad has also been explored, but this is an overly expensive alternative for Uruguay because of the transportation and treatment costs involved.

2.2.5. Developing a national storage and waste management action plan

Uruguay has elaborated its initial NAP by identifying the major mercury waste streams in the country. These originate at three sources:

1. Industrial processes (chlor-alkali plants)
2. End of life products (lamps, batteries, thermometers, etc.)
3. Others (lighthouses)

For each of these waste streams, a summary matrix has been developed featuring the following items: mercury waste source, type of mercury waste, action lines, performance indicator/goal, deadline, necessary resources, and responsible institutions (including other than national/local authorities).

Each of the three mercury waste streams has been subdivided according to the waste source. Regarding the chlor-alkali waste stream, waste was identified from operational processes, plant dismantling, and site remediation after dismantling. Three different sources have been identified within the products waste stream: households, industrial plants, and others (private/public institutions, shopping malls, etc.). Given that the health sector is the second largest source of mercury containing waste in Uruguay after chlor-alkali plants, special attention is given to mercury waste generated at health care facilities (thermometers, amalgams, sphygmomanometers). Consequently, a specific table for this kind of mercury wastes was included as part of Uruguay's national action plan guidelines. Laboratories have also received special attention under the NAP guidelines. As pointed out previously, the surplus mercury that would be generated at the chlor-alkali plant during an eventual switching to non-mercury technology, would not be managed as waste, but it would be exported as commodity mercury to a similar plant in the region.

These concepts are shown in Table 2.6 reflecting the NAP contents in Uruguay.

ACTIVITIES	WASTE	ACTIONS	PERFORMANCE INDICATOR	TIME-FRAME	RESOURCE REQUIRE-MENTS	RESPONSIBLE PERSONS / INSTITUTIONS
SECTOR: CHLOR-ALKALI	Waste from the mercury cell plant	**Development of the action plan regarding waste collected and generated during the remaining operation of the mercury cell plant**	Amount of waste currently collected that is treated and / or properly disposed	*2014*	Technology Funding	Environ-mental Ministry (MVOTMA); Chlor-alkali company; Security landfill (future); Mercury treatment facility (future)

	Decom-missio-ning wastes (future)	**Development of actions regarding solid waste to be generated as a result of the future decommissioning of the mercury cell plant**	Action Plan and consultation mechanisms defined	*2013*	Technical assistance	
	Environ-mental liabilities	**Performing site characterization including the sediment and biota potentially affected**	Site characterization report	*2013*	Technical assistance; Funding	MVOTMA-DINAMA; Chlor-alkali company
		Development of the action plan based on the site characterization	Remediation and / or isolation plan defined	*2014*		

Table 2.6 Uruguay's National Action Plan

Source: *Proyecto de Almacenamiento y Disposición de Mercurio Binacional Argentina – Uruguay. 2012*

Activities	WASTE	ACTIONS	PERFOR-MANCE INDICATORS	TIME-FRAME	RESOURCE REQUIREMENTS	RESPONSIBLE PERSONS / INSTITUTIONS
DOMESTIC WASTE	Lamps, thermo-meters, batteries, switches, etc.	**Development of blueprint for a retorting facility aiming primarily at waste coming from end-of-life of mercury added products**	Retort installation project developed	*2013*	Technical assistance; Inter-agency coordination	Environmental Ministry (MVOTMA); Provincial governments; Importers, distributors, traders; Waste management companies; NGOs
		Development of plan for segregation and separate collection	Plan	*2013*		
		Implementation of a pilot project in the metropolitan area	Pilot project implemented and evaluated	*2014*	Awareness raising; Inter-agency coordination; Funding; Legal development	

Industrial and other big generators	Lamps, thermo-meters, batteries, switches, etc.	**Implementation of a pilot Project for separate collection in large generators**	Pilot project implemented and evaluated	*2014*	Awareness raising; Inter-agency coordination; Funding; Legal development	Environmental Ministry (MVOTMA); Provincial governments; Industry chamber; Service and trade chamber; NGOs

Table 2.6 Uruguay's National Action Plan (cont'd)

Source: *Proyecto de Almacenamiento y Disposición de Mercurio Binacional Argentina – Uruguay. 2012*

Activities	WASTE	ACTIONS	PERFORMANCE INDICATORS	TIME-FRAME	RESOURCE REQUIRE-MENTS	RESPONSIBLE PERSONS / INSTITUTIONS
Health sector	Thermo-meters, Sphygmoma-nometers, chemical products, metallic mercury	**Surveying of mercury containing waste that may be collected in health institutions**	Survey conducted	*2013*	Awareness raising; Technical assistance; Funding; Inter-agency coordination	Environ-mental Ministry (MVOTMA); Health Ministry (MSP); Public Health Services (ASSE); Private Health Sector; University Hospital; Schools of Medicine
		Development and implementation of a pilot project for segregation and separate collection	Pilot project for segregation and separate collection performed and evaluated	*2014*		
	Thermo-meters, sphygmo-manometers	**Working towards an agreement on the regulations needed to restrict importation and use of mercury containing products**	Legal project for restricting the importation and use of mercury containing products	*2014*		
	Dental amalgams	**Surveying of the actual uses of mercury dental amalgams and evaluating possible alternatives**	Survey conducted	*2013*	Technical assistance; Funding; Inter-agency coordination; Awareness raising	Environ-mental Ministry (MVOTMA); Health Ministry (MSP); Public Health Services; (ASSE) Private Health Sector;

		Development of an action plan for their gradual replacement	Action plan developed			Universities (Schools of Medicine and Dentistry)

Table 2.6 Uruguay's National Action Plan (cont'd)

Source: *Proyecto de Almacenamiento y Disposición de Mercurio Binacional Argentina – Uruguay. 2012*

Activities	WASTE	ACTIONS	PERFOR-MANCE INDICATORS	TIME-FRAME	RESOURCE REQUIRE-MENTS	RESPONSIBLE PERSONS / INSTITUTIONS
Laboratories (not health sector)	Chlorine analysis kits, mercury com-pounds, reagents for COD, effluent from labora-tories, metallic mercury, thermometers, manometers, etc.	**Conducting a comprehensive survey on current uses of mercury and on mercury waste generated and collected in laboratories.**	Survey conducted and evaluated	*2014*	Awareness raising; technical assistance; funding; Inter-agency coordination	Environmental Ministry (MVOTMA); Other Ministries; Technological Laboratory of Uruguay (LATU); National Direction of Meteorology ALADU (Association of Environmental Laboratories); Potable water company (OSE); Electric Energy company (UTE); Municipalities; Private laboratories for analysis; Others
Lighthouses	Mercury content in light-houses, mercury stock for replace-ment	**Request complete information on mercury use in lighthouses and mercury stock**	Survey conducted Draft of action lines	*2014*	Inter-agency coordination	Environmental Ministry (MVOTMA); Ministry of Defence

Table 2.6 Uruguay's National Action Plan (cont'd)

Source: *Proyecto de Almacenamiento y Disposición de Mercurio Binacional Argentina – Uruguay. 2012*

The activities scheduled in this Plan for all three waste streams are to be developed within two years.

3. ANALYSIS OF FINDINGS AND RECOMMENDATIONS

This chapter presents a number of comments and recommendations for both Argentina and Uruguay. These are derived from the results that have been described in the preceding sections of this report.

3.1 Argentina.

3.1.1 Survey and analysis of possible temporary storage locations in the country

The four final disposal/waste treatment facilities listed as potential sites for the temporary storage of mercury waste in Argentina have important advantages when considering the necessary requirements for a hazardous waste storage site. The most important advantage is their ongoing activity in the field of hazardous waste disposal/treatment. In fact, all of these sites are engaged in the disposal of mercury waste. In addition, two of these facilities practice stabilization/solidification of mercury waste. Given that no qualifications have been assigned to these sites, it is not possible to compare the four sites with each other. From a technical point of view, any of the four sites is a potential temporary storage facility for the purpose of this project.

It should be noted that the list of potential sites only includes facilities corresponding to the waste management sector, while other sectors are not considered, such as metal smelters, metal mines, chlor–alkali plants, laboratories, etc. Given its particular conditions, Argentina decided to consider as potential sites only those currently involved in authorized waste management activities, as is the case for the four facilities previously mentioned. In the event that none of these sites were eventually considered viable for temporary mercury waste storage, it is advisable to examine other industrial sectors' facilities for which the application of the matrix tool presented at the Project Inception Workshop in Montevideo in June 2011 is recommended.

It is also important to mention that 75% of this infrastructure (hazardous waste treatment/disposal) is concentrated in the Province of Buenos Aires with only one site situated in the Province of Córdoba. As regards the selection process, given the size of the country, it is necessary to take into account the costs/risks involved in waste transportation. However, it is possible that the the majority of mercury waste in Argentina originates from a single region. It is therefore appropriate to make an assessment of the

sources of mercury waste and their location in the country, based on the preliminary national mercury releases inventory elaborated in Argentina.

Finally, given their current activity related to hazardous waste, it is likely that the owners/operators of these sites are willing to become formal mercury waste storage site operators along the lines of the concept outlined in this project. The rules on internal movement of wastes across province borders may need to be revisited.

3.1.2 Review of regulatory framework

In the review of the regulatory framework in Argentina, a significant number of legal instruments have been mentioned. Most of these are related to hazardous waste management in that country and some of them directly regulate mercury waste management. Nevertheless, practically all of these instruments are national (federal government) regulations, with one of them applying at the international level and one being a regional instrument.

Constraints to install a facility for the temporary storage of mercury waste could also be found at local (provincial, municipal) regulations. Being a federal republic, Argentina's provinces enjoy a certain degree of autonomy and independence vis-à-vis the central government, including regulatory matters. Even where no specific provincial regulatory instruments were reported in the regulatory framework analysis for Argentina, it has been stated that only five (out of twenty-three) provinces in Argentina do not have restrictions on hazardous waste imports. This condition is of utmost importance and should be taken into consideration when selecting the most appropriate option for the temporary storage of mercury waste.

It is therefore strongly recommended to examine the provincial/municipal regulatory framework for those provinces and municipalities where potential sites can be located. In this sense, an analysis of needs for federal regulations that would eventually override the provincial regulations could be helpful. Special attention should be paid to transport regulations, since many provinces do not allow the import of hazardous (mercury) waste – a strong reason to eliminate a potential site.

The review of the regulatory framework has been an important activity in this project, insofar as the results have revealed areas where it is necessary to advance in order for Argentina to have a comprehensive legal structure allowing for the sound management of

mercury waste. It is recommended to move ahead in this direction, thereby taking into consideration the most significant elements discussed in the ongoing negotiations for a Global Legally Binding Instrument on Mercury.

3.1.3 Establishing a decision-making process

A decision-making process in Argentina has been initiated and certain steps have been taken, such as organizing a stakeholder group, reviewing its regulatory framework, and preparing sectoral inventories; however, it is necessary to define the next activities and to increase the involvement of all relevant stakeholders in this process.

It is recommended to involve the working group covered for this project in the process of elaborating a detailed national action plan. Also, the items considered in the IKIMP proposal for the decision-making process are adopted here for consideration by Argentina:

- Identify any existing mechanisms for coordinating decisions on hazardous materials, public health and environmental protection.
- Define the roles of central and regional government departments as well as other official agencies and stakeholders (such as civil society and research institutions responsible for public health and environmental protection).
- Specify any need for new bodies (e.g. expert panels, inspection teams, etc.).
- Decide on the nature and extent of stakeholder engagement.

Some of these recommendations have been addressed and are reflected in Argentina's preliminary National Action Plan. This includes defining the respective roles for public and private stakeholders as well as deciding on the precise involvement of the various stakeholders.

3.1.4 Technology status/Assessing basic management options

Argentina has a relatively advanced infrastructure (as described in 2.1.1) and the corresponding regulatory framework to offer hazardous waste treatment/disposal options to national generators, including mercury waste. According to Argentina's report, the option for solidification/stabilization of mercury exists in the country - an option not yet available in most other GRULAC countries.

However, (i) current regulations may inhibit internal transfer of wastes to facilities, and (ii) no options are currently available in Argentina for the distillation (retorting) of mercury containing waste.

As part of the assessment of basic management options, Argentina presented an interesting proposal as a solution to the permanent storage of mercury waste. Even though the INTI proposal is still at an early stage, its engineers have developed experience in this field and have a concrete proposal as a potential methodology for the safe storage of mercury waste. It is recommended for INTI to deepen the knowledge of this technology and to determine its potential as a permanent solution for mercury waste storage.

3.1.5 Developing a national storage and waste management action plan

In establishing its National Action Plan (NAP) Argentina based this process on the general needs that must be selected in order to provide a solution to the problem of managing its mercury waste. These needs correspond to opportunity areas in which it is possible to advance in achieving the environmentally-sound management of this waste.

It is therefore still necessary to proceed in the development of the formal NAP, defining detailed activities for each of the five components on which Argentina is building its NAP (starting from the four to six actions that have already been defined in the Plan). Also, for each of these activities, it is essential to fix dates for the national working group meetings, to define the specific amounts that are necessary for the required financial and human resources, to define responsible institutions/persons, and to establish detailed timeframes.

In order to accomplish the above mentioned results, it is crucial for the different actors of the national working group to work together in defining the comprehensive action plan for Argentina. It is advisable to include other actors in the NAP table who will be responsible alongside the authorities for some of the established activities. So far, responsibilities have been predominantly assigned to national/local authorities.

3.1.6 Summary of recommendations for Argentina

It is recommended for Argentina to:

- Investigate the various industrial sectors' facilities for a potential site, in addition to hazardous waste management facilities.
- Use the matrix tool for site selection presented at the Project Inception Workshop in Montevideo in June 2011.
- Prepare an assessment of the location of the sources of mercury waste, taking into consideration the location of potential sites as well as provincial transboundary regulations.
- Develop a thorough assessment of the provincial/municipal regulatory framework related to hazardous waste management.
- Proceed in drafting and adopting appropriate legal instruments, taking into consideration the ongoing negotiations for a Global Legally Binding Instrument on Mercury.
- Involve the working group in the process of elaborating the NAP. For the same working group, consider the items recommended in the IKIMP framework.
- Further assess INTI's proposed technology and determine its potential for the storage of mercury waste.
- Proceed in the development of the NAP and include other participants who will be responsible along with those authorities already engaged.

3.2 Uruguay

3.2.1 Survey and analysis of possible temporary storage locations in the country

Out of the two potential sites for mercury waste storage, the first (the local chlor-alkali plant currently in operation) presents an important advantage, given the fact that it is already a site handling mercury waste. Consequently, the plant staff is well trained and has been accustomed to handling mercury waste for several years. A disadvantage is that the local aquifer, even though a deep one, presents a certain degree of vulnerability. Also, the plant is located inside the limits of a planned natural protected area and there are surface water bodies in the vicinity of the plant. Ownership of this plant is private, which has both advantages and disadvantages.

The security landfill in Montevideo, which is currently under construction, has been proposed as the second option to store mercury waste on a temporary basis. The main advantage of this proposal is that the site is already authorized for hazardous waste disposal, and the area where it is located in has hazardous (medical) waste treatment infrastructure already in operation. Also, the first option (the chlor-alkali plant) has the

advantage that its operation would be under a combined management as there is involvement of both the private and the public sector. This provides for a checks-and-balances mechanism and ensures all stakeholders' support for decisions *ex ante*. Conversely, the main disadvantage is due to the fact that the planned site is a landfill and that it is still under construction. The project does not consider any structure for the temporary storage of mercury waste. Another shortcoming is that, unlike the chlor-alkali plant, this site does not have experience in handling mercury waste.

An important issue is that neither of the two sites' owners/operators has been formally consulted on the possibility of becoming a storage site for mercury waste. Therefore, notwithstanding that these two sites are potentially adequate for the purpose of the project, there is no guarantee that there will be an affirmative answer after a formal proposal is made to both of them.

Gathering additional and more specific information regarding each of the two possibilities is recommended. It is important to contact the responsible persons in order to determine whether there is an interest, thus ascertaining whether these are likely to become part of the project. This is especially important for the security landfill option, as it is currently under construction, meaning that it might still be feasible to consider modifications of the original project.

3.2.2 Review of regulatory framework

The legislative framework in Uruguay is composed of a large number of different regulatory instruments. However, most of them relate to environmental issues in a more generic sense, rather than specifically addressing hazardous waste management. The only available regulatory instrument dealing with hazardous waste is the already mentioned Technical Regulatory Proposal for integrated waste management which is still a proposal and has not yet been passed even nine years after having been initiated. It is thus used as a reference, but given its current status it is not yet a binding instrument. In order to improve this situation, the process to elaborate a Waste Act was initiated in 2011 and it is expected that the instrument will be submitted to the legislature in the second half of 2012. However, the lack of particular regulatory instruments for hazardous waste in Uruguay might complicate the implementation process of the potential options.

As a general recommendation it is necessary for the responsible institutions in Uruguay to make an effort to eliminate the remaining obstacles and to finish the elaboration and

passing of the Waste Act. It would be advisable to look into the draft and see if the provisions consider all the necessary elements that such a project would require and, depending on the result, provide the necessary input for the draft.

From the point of view of the waste treatment market, it is also convenient for Uruguay to have this legal instrument and to make it binding for waste generators both to inform about the generation of hazardous waste and to take their waste to an authorized waste treatment facility. Otherwise, if the necessary regulatory framework remains inadequate, it will be difficult to convince and encourage potential investors to participate in the construction of the necessary infrastructure for the sound management of mercury waste in Uruguay. An investment or market study may be useful for Uruguay.

3.2.3 Establishing a decision-making process

According to the results included in the national report for Uruguay, the stakeholder group with representatives from the different institutions and organizations has been strengthened. Nevertheless, few activities were developed to continue with the decision-making process. Pending issues and activities as part of this important step include involving the group in the elaboration of the final National Action Plan and strengthening the relations between the different institutions involved in this process.

As for Argentina, IKIMP's proposal is here recommended as a point of reference in the decision- making process:

- Identify any existing mechanisms for coordinating decisions about hazardous materials, public health and environmental protection.
- Define the roles of central and regional government departments as well as other official agencies, and other stakeholders (such as civil society and research institutions responsible for public health and environmental protection).
- Establish any need for new organizations (e.g. expert panels, inspection teams, etc.).
- Decide on the nature and extent of stakeholder engagement.

3.2.4 Technology status/Assessing basic management options

From this project, Uruguay concludes that technical options for mercury waste management are the distillation (retorting) for mercury waste products and a security cell for the chlor-alkali plant waste. However:

- None of these options (retorting, security cell) are currently available in Uruguay.
- Costs of exporting wastes for treatment (likely to Europe) are very high.
- Most countries in the region, including Uruguay, do not allow the import of hazardous waste.
- The scale of the Uruguayan market makes it difficult to invest in local infrastructure
- Lack of a regulatory instrument on hazardous waste treatment is another obstacle to invest in this field.

Against the backdrop of these considerations, it is safe to say that there is an opportunity to invest in creating the necessary infrastructure for the treatment of mercury waste (products) in Uruguay. Reportedly, there is an interest in providing this kind of service (retorting). However, to date there is no competition, meaning that the market is practically unexplored. It is true that the demand could be limited and will decrease in time, as eventually some mercury added products will be prohibited and will disappear from the market. In the meantime, however, it is likely that the consumption of some mercury added products will increase, as is the case for the CFLs which, through their energy efficiency, reduce the emission of greenhouse gases. Elemental mercury obtained through retorting would be stored on a temporary basis at the selected facility after the site selection has been completed and the project implemented.

Secondly, for the chlor-alkali waste, further analysis is necessary. In any case, according to the findings of this study, it is difficult to foresee a possibility to separate the elemental mercury from the accumulated waste sludge. It seems that the waste would have to be dewatered as much as possible, and then stored at the selected facility along with the waste mentioned in the previous paragraph.

Finally, based on available figures for mercury waste generated in Uruguay, it is recommended, as a first step, to estimate the size of the facility that would be needed for the storage for mercury waste.

3.2.5 Developing a national storage and waste management action plan

Uruguay has outlined the main elements to be considered in its National Action Plan (NAP) in a different way than Argentina. As mentioned before, Uruguay chose an approach based on the selection of the main mercury waste streams in the country. Next, several activities were defined based on these waste streams, which compose the basis for the

NAP. It is conceivable that the differences of scale between the two countries had an influence in choosing the scope for this activity.

An advantage resulting from this approach is that several of the planned activities have a practical dimension (such as application of pilot programs), and could perhaps be more easily implemented, as opposed to the more general activities featured in the Plan. Conversely, the use of this approach results in a certain degree of dispersion due to the several matrixes elaborated. There is also the risk that some tasks derived from the activities could be duplicated, if the same kinds of waste (i.e. lamps, thermometers) were addressed under different programs. This might result in the consumption of more resources than necessary. Hence there is a need to streamline activities via a coordination mechanism.

It is necessary to involve the stakeholder group in this important activity. This can perhaps be achieved through the integration of a task force and the necessary subgroups to make progress in the elaboration of the national action plan. In addition, it is recommended to incorporate action lines dealing with general issues such as regulations, awareness raising, and others in the final NAP.

3.2.6 Summary of recommendations for Uruguay

It is recommended that Uruguay will:

- Obtain additional and more specific information regarding each of the two potential sites in order to allow for an improved assessment.
- Contact the owners/operators of the potential sites and inquire regarding the possibility of becoming a storage facility.
- Estimate the size of the mercury waste storage facility
- Proceed with the elaboration and adoption of the Waste Act. Examine the draft and determine if the provisions take into account all necessary elements.
- Engage the working group participants in the elaboration of the NAP according to their responsibilities.
- Consider the items recommended in the IKIMP framework.
- Develop a more comprehensive analysis of chlor-alkali waste.
- Incorporate in the NAP additional activities dealing with general issues such as regulatory instruments, awareness raising, communication, and others.

4. CONCLUSIONS

A number of important results have been obtained during the implementation of the *Mercury Storage and Disposal Two Countries Project in Latin America*. First, in line with a key objective of the project, a pre-selection of potential sites for the temporary storage of mercury waste has been conducted. Four waste management facilities in Argentina have been identified as potential sites, one of them having the decisive advantage of being located in a Province that allows the import of mercury waste. In Uruguay, two sites were determined with a large potential of becoming a temporary mercury waste storage facility, one of them with previous activities related to mercury waste.

Secondly, each country has established a solid basis from which it can develop a comprehensive National Action Plan (NAP) for the environmentally sound management of elemental mercury and mercury waste. Different approaches have been followed by the two countries. This divergence reflect the existence of important differences between Argentina and Uruguay in terms of their regulatory framework, number of waste generators, number of potential facilities, country extension, and so on. It is expected that both countries will soon have their own NAP with the collaboration of all the participating stakeholders.

Further important results have been obtained in the project framework via the work performed in Argentina and Uruguay: This includes the acquisition of more profound knowledge on the regulatory instruments that are still missing in each country and that are necessary to attain environmentally sound management of mercury and mercury waste. A comprehensive regulatory framework is also essential to establish confidence amongst potential investors in waste management infrastructure.

It is important to consider some elements of the ongoing negotiations on a Global Legally Binding Instrument on Mercury – particularly the control measures – when creating new legal instruments on mercury-related issues in each country.

Moreover, it is important to stress the need to move ahead in the development of the NAPs in both countries, engaging the stakeholders involved in each of the activities designed for the action plans.

Finally, after the positive and encouraging results obtained in both Argentina and Uruguay, the possibility of replicating this project in other countries in the GRULAC region should be considered. Such follow-up projects could take advantage of the experience gained via the implementation of this project.

ANNEXES

ANNEX A. FACILITY INVENTORY MATRIX

FACILITY INVENTORY FOR (COUNTRY NAME**):**	
General population data	
Population (number of inhabitants)	
Year and reference for population data	
GDP (Gross Domestic product)	
Year and reference for GDP data	
Main sectors in the economy of country (list)	
Contact point responsible for inventory	
Full name of institution	
Contact person	
E-mail address	
Telephone number	
Fax number	
Website of institution	

PRODUCTION AND PROCESSING FACILITIES WITH INTENTIONAL MERCURY USE

Manufacturing processes in which mercury is used	A. Address	B. Type of location	C. Land use	D. Type of property	E. Seismic zone	F. Geologic faults	G. Floodplains	H. Type of Aquifer	I. Type of soil	J. Vulnerable facilities	K. Cultural landmarks	L. Current Hg activities	M. Access
Chlor-alkali production with mercury-cells													
1													
2													
…													
VCM production with mercury catalyst													
1													
2													
…													
Acetaldehyde production with mercury													
1													
2													
…													
Other													
1													
2													
…													

COLUMN HEADINGS & CODES
A. Address. Write the postal address of facility
B. Type of location. Specify whether the facility is located in area type: urban 1, semiurban 2, rural 3
C. Land use. Land use where facility is located corresponds to: households 1, commercial 2, agricultural 3, industrial 4
C. Type of property. Specify if the facility is owned by a: private 1, public 2
D. Seismic zone: Is facility located in a seismic zone? Yes 1, no 2
E. Geologic faults. Is facility located on a geologic fault? Yes 1, no 2
F. Floodplains. Is facility located in a floodplain? Yes 1, no 2
G. Local aquifer. Is the aquifer under the facility: shallow? 1, deep? 2
H. Type of soil. The soil where the facility is located is: permeable 1, impervious 2
J. Vulnerable facilities. Are there any schools, hospitals, etc. near the facility? Yes 1, no 2
K. Cultural landmarks. Are there any cultural heritage, ancient ruins, etc. near the facility? Yes 1, no 2
L. Current Hg activities. Is facility currently carrying on any kind of Hg management? Yes 1, no 2
M. Access. Is access to facility (by road, railroad, etc): difficult? 1 adequate? 2

PRODUCTION AND PROCESSING FACILITIES WITH INTENTIONAL MERCURY USE

Manufacturing of Mercury-added products	A. Address	B. Type of location	C. Land use	D. Type of property	E. Seismic zone	F. Geologic faults	G. Floodplains	H. Type of Aquifer	I. Type of soil	J. Vulnerable facilities nearby	K. Cultural landmarks	L. Current Hg activities	M. Access
Hg thermometers (medical, air, lab, industrial etc.)													
1													
2													
…													
Electrical switches and relays with mercury													
1													
2													
…													
Light sources with mercury (fluorescent, compact, others:													
1													
2													
…													
Batteries with mercury													
1													
2													
…													
Manometers and gauges with mercury													
1													
2													
…													
Biocides and pesticides with mercury													
1													
2													
…													
Paints with mercury													
1													
2													
…													
Skin lightening creams and soaps with mercury chemicals													
1													
2													
…													
Dental amalgam with mercury													
1													
2													
…													

ENERGY CONSUMPTION & FUEL PRODUCTION

Energy consumption													
Coal combustion in large power plants	**A. Address**	**B. Type of location**	**C. Land use**	**D. Type of property**	**E. Seismic zone**	**F. Geologic faults**	**G. Floodplains**	**H. Type of Aquifer**	**I. Type of soil**	**J. Vulnerable facilities**	**K. Cultural landmarks**	**L. Current Hg activities**	**M. Access**
1													
2													
Other coal uses													
1													
2													
Combustion/use of petroleum coke and heavy oil													
1													
2													
Combustion/use of diesel, gasoil, petroleum, kerosene													
1													
2													
Use of raw or pre-cleaned natural gas													
1													
2													
Use of pipeline gas (consumer quality)													
1													
2													
Biomass fired power and heat production													
1													
2													
Charcoal combustion													
1													
2													
Oil extraction													
1													
2													
Oil refining													
1													
2													
Extraction and processing of natural gas													
1													
2													

Primary metal production	A. Address	B. Type of location	C. Land use	D. Type of property	E. Seismic zone	F. Geologic faults	G. Floodplains	H. Type of Aquifer	I. Type of soil	J. Vulnerable facilities	K. Cultural landmarks	L. Current Hg activities	M. Access
Mercury (primary) extraction and initial processing													
1													
2													
Mercury (secondary) extraction													
1													
2													
Production of zinc from concentrates													
1													
2													
Production of copper from concentrates													
1													
2													
Production of lead from concentrates													
1													
2													
Gold extraction by methods other than mercury amalgamation													
1													
2													
Alumina production from bauxite (aluminium production)													
1													
2													
Primary ferrous metal production (iron, steel production)													
1													
2													
Gold extraction with mercury amalgamation - without use of retort													
1													
2													
Gold extraction with mercury amalgamation - with use of retorts													
1													
2													
Other materials production													
Cement production													
1													
2													
Pulp and paper production													
1													
2													

HAZARDOUS WASTE TREATMENT, STORAGE AND DISPOSAL FACILITIES

TREATMENT FACILITIES	A. Address	B. Type of location	C. Land use	D. Type of property	E. Seismic zone	F. Geologic faults	G. Floodplains	H. Type of Aquifer	I. Type of soil	J. Vulnerable facilities	K. Cultural landmarks	L. Current Hg activities	M. Access
Thermal													
Incineration of municipal/general waste													
1													
2													
…													
Incineration of hazardous waste													
1													
2													
…													
Incineration of medical waste													
1													
2													
…													
Medical waste Autoclaving/microwaving													
1													
2													
Sewage sludge incineration													
1													
2													
Pyrolisis													
1													
2													
Physico-chemical													
1													
2													
Other													
1													
2													
RECYCLING FACILITIES													
1													
2													
TRANSFER STATIONS													
1													
2													
STORAGE FACILITIES													
1													
2													
FINAL DISPOSAL FACILITIES													
Sanitary landfills													
1													
2													
Security landfills													
1													
2													
OTHER: INDUSTRIAL WAREHOUSES,													
1													
2													

ANNEX B. REGULATORY FRAMEWORK MATRIX

REGULATORY FRAMEWORK ON MERCURY															
	A. Environmental standards	B. Mercury/products-waste/processes									C. Facilities				
Instrument type	Air, water, soil, biota	1. Source register	2. Import/ export	3. Trade	4. PRTR	5. Treatment/ recycling	6. Transport	7. Storage	8. Final disposal	9. Phase out	1. Releases	2. Land use	3. Authorization procedure	4. Inspection	5. EIA/ Risk
Local															
National															
Regional															
International															

A. ENVIRONMENTAL STANDARDS

Air, water, soil, biota. Refers to maximum Hg concentration limits in air, soil, water, biota (quality standards)

B. MERCURY/PRODUCTS-WASTE/PROCESSES

1. Source register. Refers to a register for all generators of hazardous waste, waste mercury

2. Import/export. Refers to regulations related to mercury/waste mercury import and export

3. Trade. Refers to domestic commercial operations for mercury and products with mercury

4. PRTR. Refers to a Pollution Release and Transfer Register which would include mercury.

5. Treatment/recycling. Refers to instruments related to these activities involving mercury/waste mercury

6. Transport. Refers to regulations related to mercury/waste mercury transportation

7. Storage. Refers to regulations related to any kind of mercury/waste mercury storage

8. Final disposal. Refers to regulations related to final disposal facilities for mercury/waste mercury

9. Phase out. Refers to regulatory measures establishing the phase-out of mercury containing products/processes involving mercury

C. FACILITIES

1. Releases. Refers to regulations related to maximum limits for Hg concentrations in releases to air, soil, water (emmission standards).

2. Land use. Refers to regulatory instruments related to land use, zonification, etc.

3. Authorization procedure. Refers to a procedure which defines the necessary steps to authorize a mercury/waste mercury management facility

4. Inspection. Refers to regulatory instruments stating the need to inspect a mercury /waste mercury management facility

5. EIA/Risk. Refers to regulation stating the need to elaborate an Environmental Impact Assessment and Risk Analysis studies for a mercury /waste mercury management facility

ANNEX C. STAKEHOLDERS' LISTS

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OLEKAR – medical waste incineration		Romeo SILVEIRA

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