Projects and experiences on the application of mercury stabilization and solidification technologies


2. Development of Mercury Risk Management approaches in Latinamerica. GEF, BCCC Uruguay, Argentina Ecuador; Peru, Uruguay.
Background

- Mercury toolkit level 1 and 2 identified main mercury sources in Uruguay
- UNITAR and Swiss Government funding to support countries towards ratification and early implementation of Minamata Convention.
- Development of INCs negotiations

Demostration Project: stabilization technologies for chlor-alkali mercury waste
Mercury inventories in Uruguay

**URUGUAY**
Hab. 3.431.555, Area: 176,215 km²

main mercury sources of mercury:

1. Chloralkali sector
   - 1 facility operating since 1950
   - mercury cells from different data
   - various types of waste

2. Waste coming from end-of-life articles and products containing mercury:
   - lamps, cfls, medical devices, dental amalgam

<table>
<thead>
<tr>
<th>main sources</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>cloroalkali sector</td>
<td>38</td>
</tr>
<tr>
<td>waste sector from articles containing mercury</td>
<td>36</td>
</tr>
<tr>
<td>releases to water from dental amalgam</td>
<td>11</td>
</tr>
<tr>
<td>emissions due to informal waste burning</td>
<td>11</td>
</tr>
<tr>
<td>others</td>
<td>2</td>
</tr>
</tbody>
</table>
There are different types of mercury waste in a chloralkali facility, derived from the various materials utilized to operate the process and to eliminate mercury from the final products.

Type of chloralkali mercury waste selected to be stabilized according to the following criteria:

- **Small volumen and high content of mercury**
- **Large volumen and low mercury content**
Demonstration Project: stabilization of chlor-alkali mercury waste

Stabilization/ solidification process performed in two centers in Spain:

1. Stabilization and microencapsulation in a sulphur polymeric matrix by National Technological Center for Mercury De-contamination (CTNDM)

2. Stabilization with sulphur microcemements by Cement International Technologies (CIT)
### RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Masa desmercurizante</th>
<th>Slude from salt solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury content ( %)</td>
<td>6.51</td>
<td>0.21</td>
</tr>
<tr>
<td>[Hg] lecheate mg/L, sludge without treatment</td>
<td>0.500</td>
<td>1.110</td>
</tr>
<tr>
<td>[Hg] lecheate mg/L, monolite after stabilization</td>
<td>0.0192</td>
<td>0.0020</td>
</tr>
<tr>
<td>Mercury content in the monolite g/Kg</td>
<td>7.2</td>
<td>1.3</td>
</tr>
<tr>
<td>[Hg] lecheate µg/L, monolite after stabilization/solidification</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Compression resistance, Mpa</td>
<td>&lt; 53-61</td>
<td></td>
</tr>
<tr>
<td>Flexion resistance, Mpa</td>
<td>&lt; 7-10</td>
<td></td>
</tr>
</tbody>
</table>
Demonstration Project: stabilization of chlor-alkali mercury waste

- Monolite of Mercury waste after stabilization is 1,7 in mass from the original waste

- Mercury concentration in leacheate decreases 96% in the final monolite for both types of waste.

It is feasible to stabilize chlor-alkali mercury waste selected though the sulphur polymeric + stabilization, technology as well as stabilization with microcements.

As for mercury concentration in leacheate and in the final monolite, it could be sent to industrial landfill according to Uruguayan legislation:
- no free liquids
- % Humidity: less than 80
- Hg conc. in leacheate less than 5 mg/L
Project: Development of Mercury Risk Management approaches in Latin America.

Funded by GEF and co-financed by Uruguay, Argentina, Ecuador, Peru, Uruguay.
Coordinated by Basel Convention Coordinating Center for LAC

- October 18th-20th, 2nd Regional workshop to decide the focus at national and regional level
  - Storage of waste, mining waste, by-product mercury
  - Contaminated sites
  - Communication strategies
  - Analytical capacity
  - Waste and dismantling of chloralkali facilities were identified as core work areas.

Definition of ToR and one specifically for chloralkali waste and contaminated sites.
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