



United Nations Institute for Training and Research



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TOGETHER
for a sustainable future

**Initial assessment for the
Minamata Convention on Mercury.
Barcelona, 11 July 2016**



MERCURY TECHNOLOGICAL CENTRE
Cerro San Teodoro s/n
13400 ALMADEN (Ciudad Real)



The Mercury Technological Centre, which is based in Almadén, is part of MAYASA, a public company.



Almadén is situated in the region of Castilla - La Mancha, Ciudad Real province, about three hundred kilometres southwest of Madrid

LOCATION / SITUATION



The Almadén mine has been dedicated to the exploitation and production of mercury for more than 2000 years, being one of the oldest mines in the world.



The adoption of the impending restrictive measures in the European mercury policy drove the closure of the mine in June, 2001.

The production of mercury continued until 2003, when the mining-metallurgical activity was completely finished in Almadén.

The mercury exports were banned in March 2011 by European regulations.



Mercury storage in 2011

In this context, MAYASA proposes the following objectives:

- ENVIRONMENTAL RESTORATION
- RESTORATION OF ITS HISTORICAL-CULTURAL HERITAGE

www.parqueminerodealmaden.es



United Nations
Educational, Scientific and
Cultural Organization



Heritage of Mercury,
Almadén and Idrija
inscribed on the World
Heritage List in 2012



Parque Minero
de Almadén





And finally the activity on ENVIRONMENTAL RESEARCH AND TECHNOLOGICAL DEVELOPMENT, by the creation of National Technological Center for Mercury Decontamination (CTNDM).

The European Union strategy concerning mercury, also has among its objectives the following:

“Improve the knowledge about mercury problems and solutions”

Thus, the **NATIONAL TECHNOLOGICAL CENTER FOR MERCURY DECONTAMINATION** has been created to cover social needs associated with mercury.

THE **NATIONAL TECHNOLOGICAL CENTER FOR MERCURY DECONTAMINATION**
WAS FOUNDED DUE TO THE INITIATIVE OF THE SPANISH MINISTRY OF
AGRICULTURE, FOOD AND ENVIRONMENT INITIATIVE



MAIN OBJECTIVES:

- Promoting research and technological development for the environmental management of mercury, mercury-containing waste and remediation of mercury-contaminated sites.
- Developing activities with other countries: expert training, technical assistance and technology transfer.
- Offering technological support to public organizations that need to know the current situation about mercury and other heavy metals.

ORIGIN

The facilities of the Laboratory and Environment Area of MAYASA, were given to the Centre by said company.



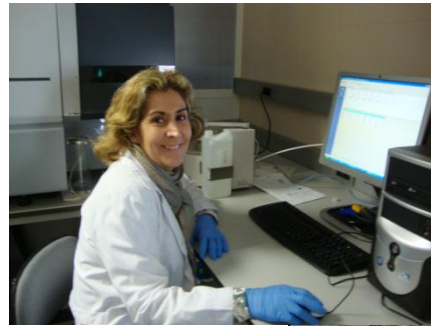
Laboratory and Environment Area of Minas de Almadén y Arrayanes, S. A.



NATIONAL TECHNOLOGICAL CENTER FOR Hg DECONTAMINATION

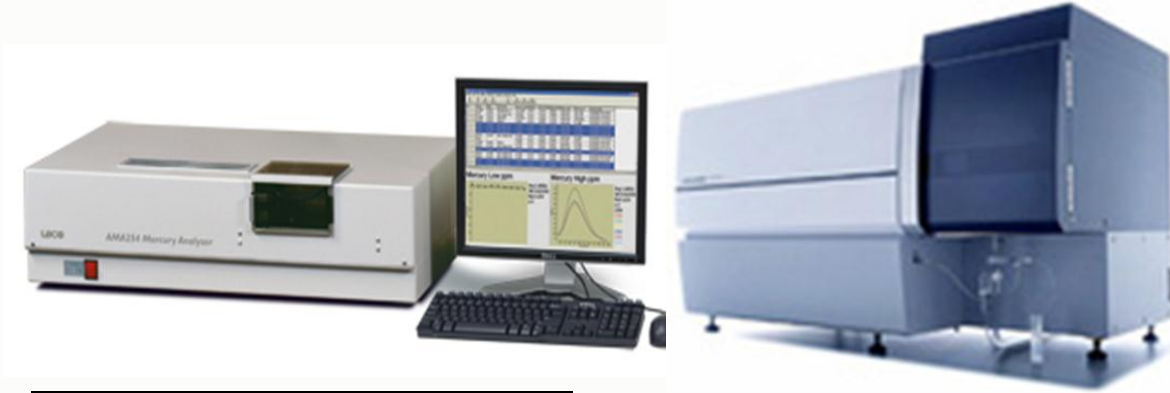
**Cerco San Teodoro s/n
13400 ALMADEN (Ciudad Real)**

Staff Mercury Technological Centre



MAYASA also provided the staff to be able to develop and manage the Centre's activities.. The staff Centre have more than 30 years experience in mercury management

SUPPORT TO THE ANALYTIC ACTIVITIES



The Centre has a laboratory area, which possesses a large amount of equipment to measure the amount of mercury in any kind of water/soil sample and a large (large) range of measures.

The laboratory has equipment mainly for the determination of heavy metals.

Other parameters that we can measure are ions, cations, and methyl mercury



The Mercury Technology Centre of Mercury has certified quality management system in accordance with UNE-EN-ISO 9001: 2008 by OCA Certification Institute

ENVIROMENTAL MONITORING PLAN

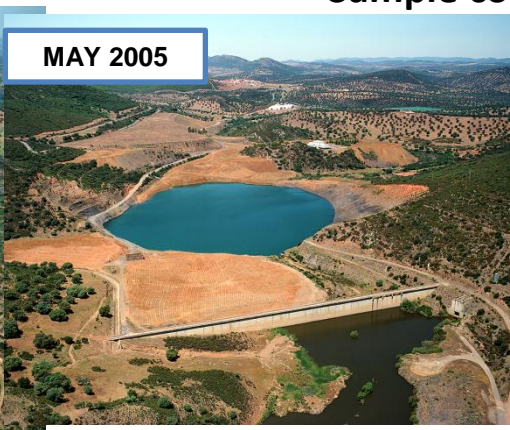
Since 1993, analytical measurements to determine the concentration of mercury in the Almadén area have been carried out.

This information lets us know the impact of the mercury in the soil and water (surface and groundwater) that surrounds our facilities.

ENTREDICHO MINE



MARCH 2000



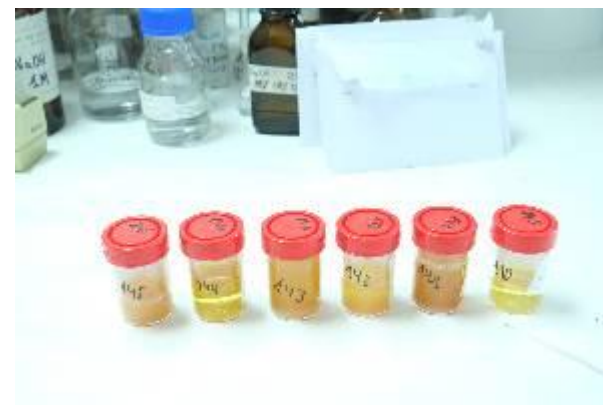
MAY 2005

Sample collection «Entredicho Mine»



BIOLOGICAL TESTING

Determination of mercury on blood and urine



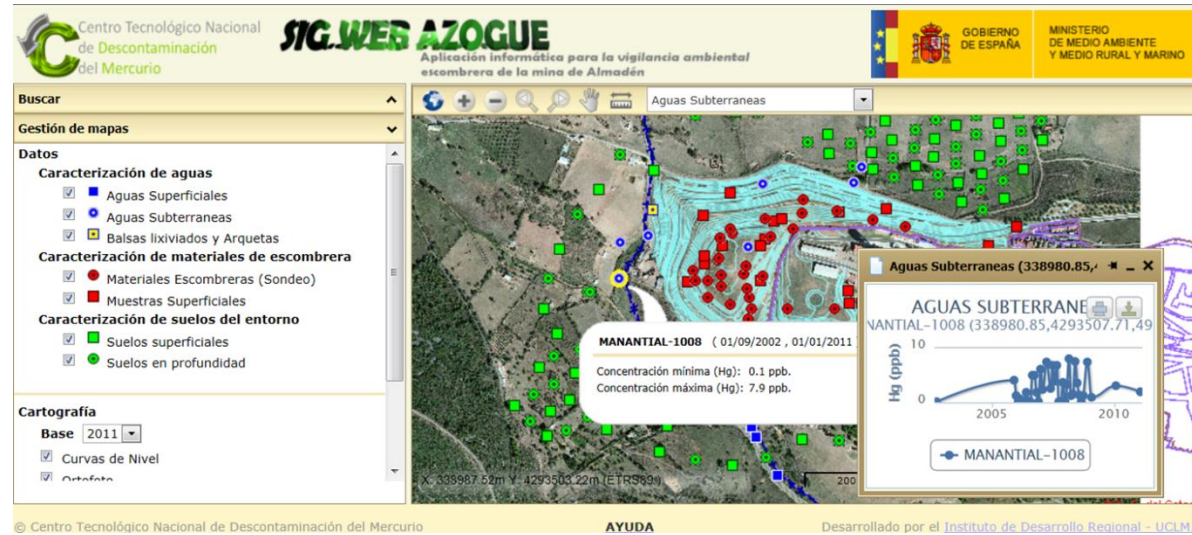
ENVIRONMENTAL MONITORING PLAN. SIG WEB AZOGUE

AZOGUE GIS WEB

Geographic Information System which stores the environmental information of the monitoring network of the restoration project of the Almadén mine tip.

More information in this website:

www.ctndm.es/proyectos/1.php



MERCURY WASTE STABILISATION

CEMESMER PROJECT

GENERATION OF CEMENTS TO STABILISE AND SOLIDIFY MERCURY PRESENT IN WATER, SOIL AND INDUSTRIAL WASTE

The project aims to develop new techniques for the chemical fixation of mercury, to achieve the development of a new range of high performance cements to stabilize mercury.

Participating organizations: CEMENTOS PORTLAND VALDERRIVAS, S.A, FCC Ámbito, FCC Construcción, Instituto Eduardo Torroja and CTNDM.



MERCURY WASTE STABILIZATION

CEMESMER



soil characterization

Waste chlorine-alkali characterization



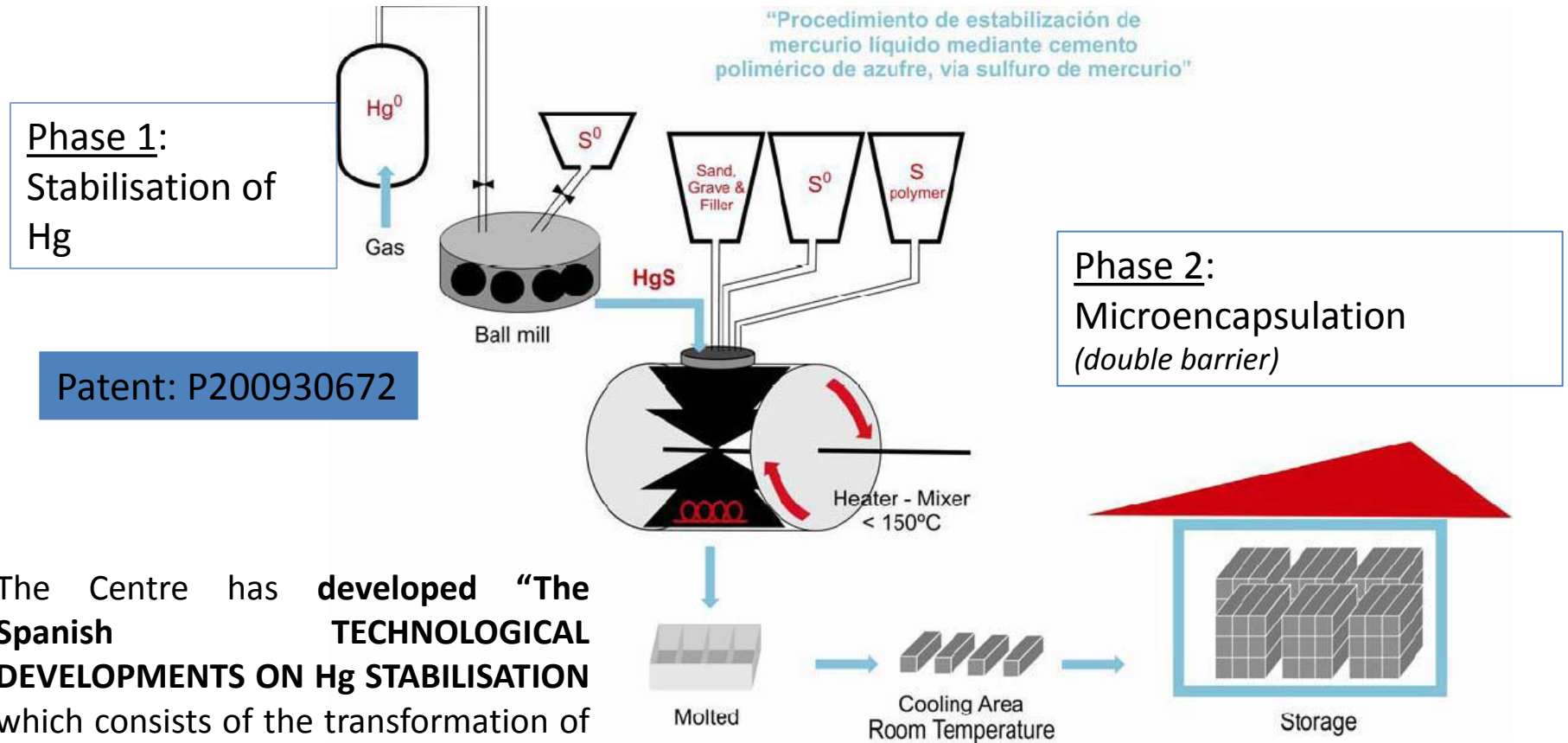
characterization of the final product



characterization of the final leachate product

SPANISH TECHNOLOGICAL DEVELOPMENTS ON Hg STABILISATION

MERCURY STABILISATION:



The Centre has developed “The Spanish TECHNOLOGICAL DEVELOPMENTS ON Hg STABILISATION which consists of the transformation of liquid mercury to an inert solid.

MERCURY STABILISATION: TECHNICAL DESCRIPTION

This technology transforms the metallic mercury into another mercury chemical compound, which is less risky and less dangerous, a compact and resistant solid, technically inert, safe and much easier to handle.

This technology provides a clean solution for the environmentally and sound storage and the disposal of mercury, which fulfills all the safety conditions of its final disposal.



MERCURY STABILISATION. LEACHING TEST

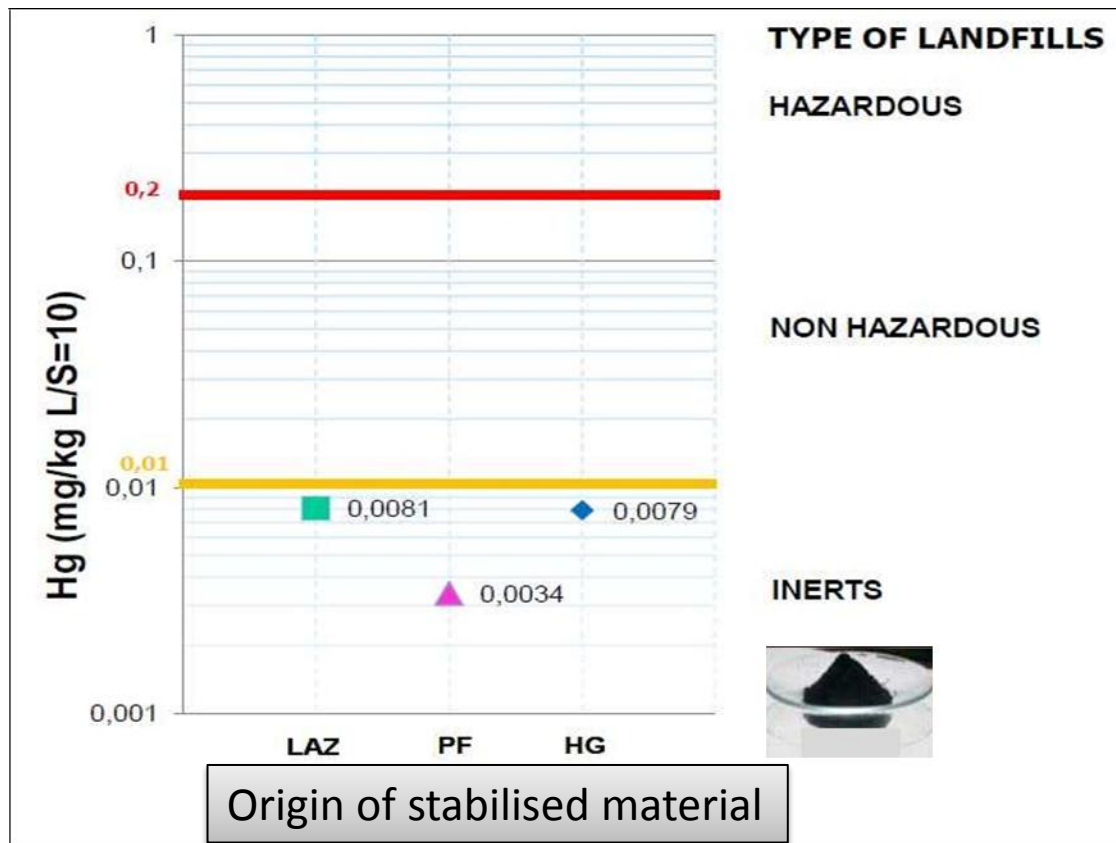
EUROPEAN LEGISLATION⁽¹⁾

Granulated monolithic waste

TOTAL HG IN LEACHATE FOR L/S=10



(1) CEN/TS 14405:2004
Characterization of waste –
Leaching behaviour test – Up flow
percolation test (under specified
condition)



Ref.: A. López-Delgado, F. A. López, F. J. Alguacil, I. Padilla, A. Guerrero. "A microencapsulation process of liquid mercury by sulfur polymer stabilization/solidification technology. Part I: Characterization of materials". REVISTA DE METALURGIA, 48 (1), 45-57, 2012.

“Reduce exposure of mercury to human health and the environment by promoting sound chemical management in Mongolia”



Consortium



OBJECTIVE: Provide the best technical solutions for mercury management in the contaminated Boroo (Mongolia) site .



Develop a monitoring plan to establish the conceptual model of the contaminated site, in order to obtain an adequate environmental assessment and determination of future corrective action.



The alternative evaluation of the applicable remediation technologies at the mercury contaminated site (Boroo) by the implementation of laboratory tests and the preparations and redesign of the pilot tests to be performed at the mercury contaminated site.

“Reduce exposure of mercury to human health and the environment by promoting sound chemical management in Mongolia”



At the end of this project Mongolia representatives will have good knowledge of proven mercury monitoring techniques and treatment technologies and will be in position to undertake certain actions without the need of international expertise.







To this end, the project has two training courses:



Characterization and monitoring of a site contaminated with mercury, providing knowledge on procedures for identifying sites contaminated with mercury, identifying environmental impacts, sampling methods, and other critical points for the proper identification of mercury contamination sites. This training was held in October 2015.

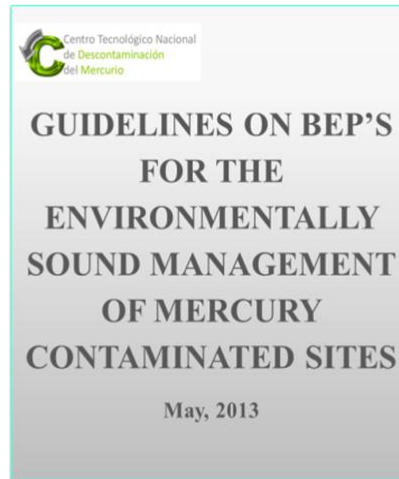
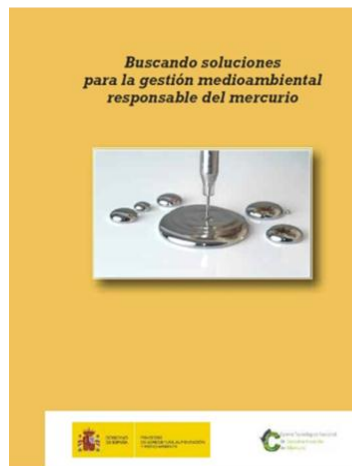


Training Course remediation techniques of a site contaminated with mercury, which consists of a basic training course in mercury contamination remediation techniques. This training will be held in September

WORKSHOP	ORGANISER	DATE
Workshop on mercury management in the Latin American and Caribbean Region,	 	Brasilia-Brazil 21st-22th May 2012.
Workshop on mercury management and decontamination in the framework of the Mediterranean regional plan on mercury	 	Almadén, Spain, 12th-13th December 2012.
Training on mercury management and remediation of contaminated sites	 	Almadén, Spain, 18th and 19th of November 2015

According the objective of the Center, Developing activities with other countries: expert training, technical assistance and technology transfer, the Center has taking the following Workshops in cooperation with different organisations.





The Center has produced the documents:

- **“Buscando soluciones para la gestión medioambiental responsable del mercurio”,**
- **“GUIDELINES ON BEP’S FOR THE ENVIRONMENTALLY SOUND MANAGEMENT OF MERCURY CONTAMINATED SITES”.** This document provides general guidelines for the assessment of mercury contaminated sites with the objective of providing national environmental staff and relevant authorities with an overview of procedures and activities that should be foreseen and taken into account when planning a restoration in a mercury contaminated site. You can download in this link our website

[Guidelines on Best Environmental Practices for the Environmental Sound Management of mercury contaminated sites](#)



THANK YOU FOR YOU ATTENTION

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