



# **Guideline for Decommissioning of Mercury Chlor-Alkali Plants**

**Env Prot 3**

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## Euro Chlor

Euro Chlor is the European federation which represents the producers of chlorine and its primary derivatives.

Euro Chlor is working to:

- improve awareness and understanding of the contribution that chlorine chemistry has made to the thousands of products, which have improved our health, nutrition, standard of living and quality of life;
- maintain open and timely dialogue with regulators, politicians, scientists, the media and other interested stakeholders in the debate on chlorine;
- ensure our industry contributes actively to any public, regulatory or scientific debate and provides balanced and objective science-based information to help answer questions about chlorine and its derivatives;
- promote the best safety, health and environmental practices in the manufacture, handling and use of chlor-alkali products in order to assist our members in achieving continuous improvements (*Responsible Care*).

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Prior to 1990, Euro Chlor's technical activities took place under the name BITC (Bureau International Technique du Chlore). References to BITC documents may be assumed to be to Euro Chlor documents.

## RESPONSIBLE CARE IN ACTION

Chlorine is essential in the chemical industry and consequently there is a need for chlorine to be produced, stored, transported and used. The chlorine industry has co-operated over many years to ensure the well-being of its employees, local communities and the wider environment. This document is one in a series which the European producers, acting through Euro Chlor, have drawn up to promote continuous improvement in the general standards of health, safety and the environment associated with chlorine manufacture in the spirit of *Responsible Care*.

The voluntary recommendations, techniques and standards presented in these documents are based on the experiences and best practices adopted by member companies of Euro Chlor at their date of issue. They can be taken into account in full or partly, whenever companies decide it individually, in the operation of existing processes and in the design of new installations. They are in no way intended as a substitute for the relevant national or international regulations which should be fully complied with.

It has been assumed in the preparation of these publications that the users will ensure that the contents are relevant to the application selected and are correctly applied by appropriately qualified and experienced people for whose guidance they have been prepared. The contents are based on the most authoritative information available at the time of writing and on good engineering, medical or technical practice but it is essential to take account of appropriate subsequent developments or legislation. As a result, the text may be modified in the future to incorporate evolution of these and other factors.

This edition of the document has been drawn up by the Environmental Protection Working Group to whom all suggestions concerning possible revision should be addressed through the offices of Euro Chlor.

### Summary of the Main Modifications in this version

<b>Section</b>	<b>Nature</b>
All	Added references to new Euro Chlor guidelines and presentations to Seminars
2.	Added references to legislation on metallic mercury recovered after shut down
5.2.	Chapter on treatments restructured and completed with new available information
9.	Chapter on health and safety completed from updated Health WG guideline on mercury
10.	Short chapter added on residual contamination, with reference to the related Euro Chlor document
Appendix 1	List of shut down plants updated
Appendices 2 and 3	Materials contaminated and possible treatments lists updated and merged
Appendix 4	Legislations topics removed

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## **Summary**

The European chlor-alkali industry has committed that the cell rooms using mercury cell technology should be shut down over the next years (2020 at the latest).

This paper has been drawn up as a reference document for Euro Chlor members on the best tried organisational processes and techniques for health, safety and environment protection during all stages of plant shut down of from initial decontamination materials through to final disposal.

It is based on the experience of member companies in shutting down more than 55 cell rooms in the last 30 years.

See also *TSEM 05/311 – Decommissioning of a Mercury Chlor-Alkali Plant*.

Other possible contaminants of the shut down installation are not treated in this document.

## **1. INTRODUCTION**

At the present time there are still a bit more than 40 chlorine cell rooms using mercury cell technology in Europe. The European chlor-alkali industry has committed that the chlor-alkali units in EU using this technology should be shut down at the latest for end 2020 and the equipment demolished afterwards.

Depending on the local situation, the building itself should be demolished or reused. As a result, thousands of tons of mercury contaminated materials will have to be reworked or disposed of in an environmentally satisfactory way, as well as the metallic mercury so recovered from the cells.

Since many years, the European chlorine producers who have already faced this problem have pooled their experience in this regard.

This document contains guidelines for the shut down and decommissioning of mercury cells plants and has been drawn up on the basis of the operations that have proved to be of value over the last 30 years during which many of cell rooms have been shut down. The actual list of these cell rooms is given in Appendix 1 – Sites with experience of shutting down mercury cell rooms.

## **2. LEGISLATION**

The closure of a cell room does not remove the operation from regulation. Much of the legislation applicable to operational plants also applies whilst dismantling a mercury cell room. Examples are:

- Protection of the health and safety of workers

- Protection of the environment (air and water emissions, soil contamination)
- Handling, transport, treatment and disposal of wastes.

At the European level, several Regulations and Directives have already been approved or are in preparation.

It is possible for any Member State to enforce stricter obligations and it is therefore essential to have a full understanding of the relevant national/regional requirements. Nonetheless, examination of European legislation provides a view on the general framework and common provisions which currently or shortly will apply in each country or region.

In particular, in dealing with mercury-containing wastes, the following common features apply:

- Mercury-containing wastes above a threshold concentration (3% in EU, but may be lower in individual countries) are classified "hazardous".
- Hazardous and non-hazardous waste should be separated as much as possible, and mixing of these should be avoided.
- Limitations and obligations apply to trans-frontier movements of wastes, especially of hazardous wastes.
- Wastes sent to disposal have to fulfil acceptance conditions (fixed by the waste management company, based on its permit).

For metallic mercury, a specific legislation (Regulation EC 1102/2008 of October 22 2008) is banning the export from Europe starting March 15 2011 and defines the principal requirements for safe temporary above ground storage or permanent storage in salt mines or deep underground. Details will be confirmed through the Commission comitology procedure; the conclusions are foreseen before end 2010.

### **3. PROJECT MANAGEMENT**

Before proceeding with closure it is strongly recommended that a small task force is set up to prepare the overall planning of the project. The role of the team is to prepare a well documented plan of action for discussion with the authorities before obtaining formal approval for it. It is vital that this team contains personnel from the chlor-alkali management of the site. If used, contractors should be involved in this procedure as soon as appointed.

During the decontamination and clean up phase it is highly recommended that some of the staff experienced in running the plant are retained. If other personnel who are not experienced in mercury handling are to be used, a detailed training and supervision programme will be necessary. Medical supervision and emissions measurements must continue through all stages of the project.

The planning should include:

- provision of a suitable working area and equipment for mercury handling;
- provision of procedures and instructions (see [chapter 9](#) for health and safety aspects);
- determination of the quantity of mercury to be recovered and provision of the number of containers to be used;
- estimation of the quantity of mercury contaminated waste to be disposed of;
- discussions with the operator of the storage facility to ensure that the necessary permits, handling facilities and storage space are available;
- planning and permitting of the transport operation.

Project planning should be framed around the procedures mentioned here below.

### ***3.1. Contact with authorities***

The statutory authorities should be informed as soon as possible on environmental, safety and health aspects of the project after the decision to decommission, in particular those involved with the control of waste disposal and liquid/gaseous emissions. For certain wastes the authority may require standardised testing to justify any disposal option. It is recommended that all aspects of decommissioning are formalised prior to project approval. The main aspects are described in the following points.

### ***3.2. Options for re-use of buildings***

If it has been decided to reuse the building, it will be decontaminated so that there is no residual hygiene problem. Experience has shown that this can be achieved by cleaning the walls, then coating or painting to give them an impermeable surface. Wooden and asbestos structures could be contaminated with mercury as well as concrete floors. Renewal of non-structural materials (including the top layer of the concrete floor) should be considered. Furthermore, the cleaning or, if necessary, renewal of the existing sewer systems in or around the plant is

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