COMMISSION OF THE EUROPEAN COMMUNITIES

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REPORT FROM THE COMMISSION TO THE COUNCIL

concerning
Mercury from the Chlor-alkali Industry

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1. INTRODUCTION

At the Environment Council meeting 7 June 2001 the Council concluded that it would call upon the Commission to "clarify the legal situation regarding the conversion of the chlor-alkali industry, identify the possible consequences, for all parties concerned, for the use of mercury and report to the Council, preferably by the end of 2001 on the potential need for co-ordinated action in the EU and the accession countries."

1.1. Background

The chlor-alkali industry produces chlorine and alkali by electrolysis of a salt solution. The main technologies applied for chlor-alkali production are mercury, diaphragm (asbestos) and membrane cell electrolysis. These technologies were examined as part of the information exchange on best available techniques (BAT) carried out under the IPPC Directive[1] by the European IPPC Bureau[2]. The results of the information exchange were documented in the BAT reference document for chlor-alkali production[3]. They identified the best available production technology and also highlighted the environmental significance of residual mercury from this industrial sector in the case of total replacement of the mercury-cell technology.

The mercury and the diaphragm cell processes both date from the late 1800s while the membrane cell process was developed in the 1970s. The geographic distribution of chlor-alkali processes world-wide differs appreciably with predominance of the mercury-cell process in western Europe (54% of chlorine capacity 2001), predominance of the diaphragm-cell process in central and eastern Europe and the United States and the membrane-cell process totally predominant in Japan.

In the mercury-cell process the cathode is liquid mercury. Mercury cells in the European Union currently contain some 10,000-12,000 tonnes of mercury. Another 3,000 tonnes are contained in plant, buildings and waste. The total amount of mercury to be decommissioned will be approximately 12,000-15,000 tonnes. Approximately another 2,000 tonnes of mercury are expected to come from the mercury-based chlor-alkali plants in EFTA and Accession countries.

There will be a phase-out of the mercury-cell process in the European chlor-alkali industry in the coming years as old plants approach the end of their economic lifetime and/or have their permits updated according to the requirements of the IPPC Directive. The precise timetable for this phase-out will depend on how competent authorities of the Member States interpret and implement the IPPC Directive and whether or not the recommended phase-out of mercury cells is implemented.

1.1.1. Mercury-based chlor-alkali production in the EU and the accession countries

In the European Union, Denmark and Luxembourg do not have any chlor-alkali production and Austria and Ireland have no mercury-based chlor-alkali production. This leaves 11

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[1] See Section 0.2.1.) Integrated Pollution Prevention and Control (IPPC) Directive

[2] The European IPPC Bureau is part of the JRC's Institute for Prospective Technological Studies in Seville.

[3] Reference Document on Best Available Techniques in the Chlor-Alkali Manufacturing Industry (October 2000) which was adopted by the Commission in December 2001 (publicly available from the internet at http://eippcb.jrc.es).

Member States that are affected by the phase-out of mercury cells. The chlor-alkali industry employs about 40,000 people in Western Europe and the total conversion cost, on the basis of figures provided by Euro Chlor, was estimated at €3,100 million in 2001.

Of the Accession Countries, the Czech Republic, Hungary, Poland, Romania and Slovakia have mercury-cell chlor-alkali plants. These 5 Accession Countries will also be affected by the phase-out of mercury cells.

A detailed outline of the situation of mercury-based chlor-alkali plants and chlorine production capacities in Europe in 2001 is presented in Annex 1.

In the last 15 years at least 34 sites in the Netherlands, Germany, United Kingdom, Finland, France, Sweden, Norway, Italy, Portugal, Belgium, Spain, Austria and Denmark have already shut down all or parts of their mercury-cell production. All decommissioned installations have re-used the residual mercury in other remaining mercury-based chlor-alkali installations, to make up for mercury lost to air, water, products and waste during operation, and/or sold it on the open mercury market.

1.1.2. Mercury production and use

World mercury mining is currently limited to about 10 countries with the largest quantities coming from Spain and Kyrgyzstan. During the past 10 years the estimated annual world mine production of mercury has averaged about 2,500 tonnes, but world production values have a high degree of uncertainty. Annual world mining of mercury is declining and was estimated[4] at 1,630 tonnes in 1999 and 1,640 tonnes in 2000.

The only European dedicated mercury mine - the largest in the world - is located at Almadén in Spain, south west of Madrid, owned by Minas de Almadén y Arrayanes SA - MAYASA. The mine is subsidised by "sub-activity subsidies" from the Spanish State to which a commitment to reduce mining activities is attached. In 1995 €5,222 million[5] were paid to the holding company MAYASA, which includes the Almadén mine. In 1999 about 100 persons were directly employed in the mining section of the company.

Direct emissions of mercury to air from the Almadén mine were estimated at around 4 tonnes[6] in 1995 from a production of 1,500 tonnes of mercury[7].

Apart from mining, mercury is also recovered, for example, during the production of other non-ferrous metals, mainly copper, zinc and lead, from the recovery of dental amalgam and silver oxide batteries and from the cleaning of natural gas. Detailed information on the production of mercury from recovery in Europe is not available. However, there is one zinc production plant in Finland, which normally produces 50-70 tonnes of mercury per year as a

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4 U.S. Geological Survey, Minerals Yearbook 2000

5 EUPHEMET Final Report (August 2000), financed by DG Research, Contract no. ENV4-CT97-0614.

6 Data from Ferrara et al. (1998) presented at the 6th International Conference on Mercury as a Global Pollutant in Minamata, Japan, in October 2001 by L. Hylander, Evolutionary Biology Centre, Uppsala Univ., Sweden.

7 According to the BREF-document* on non-ferrous metals the emission of mercury from primary mercury production is between 5-10 (winter) and 10-20 (summer) kg per tonne of mercury produced. This would mean that between 7.5-30 tonnes of mercury was emitted from the Almadén mine 1995.

* Reference Document on Best Available Techniques in the Non-Ferrous Metals Industries (May 2000) which was adopted by the Commission in December 2001 (publicly available from the internet at http://eippcb.jrc.es).

by-product (50 tonnes[8] in 1999). The Netherlands produces some 10 tonnes[9] per year by treating natural gas.

Mercury use in western Europe and North America has declined because of numerous restrictions on the use of mercury-containing products. The chlor-alkali industry will also gradually cease to be one of the major users. At the same time, the supply of secondary and recovered mercury has increased due to environmental regulation. This leaves most developed countries as net exporters of mercury and has led to steadily declining mercury prices. The market price since 1990 has been very low: prices in 1997-1999 were around €4 per kilo of mercury.

The mercury surplus on the market keeps the price of mercury low, which may encourage additional uses and increase demand on a global scale in particular outside the OECD. Mercury is thus exported to developing countries for re-use in prospecting for gold, in production of cosmetics, paints and pesticides, in addition to purposes shared with OECD countries, such as measurement and electrical devices. In this respect, the effects of continuing exports of mercury by European companies to developing countries, where its use may lead to pollution and adverse health effects, have to be given full consideration. Furthermore, a significant part of the mercury could return to Europe as long-range transboundary air pollution.

2. LEGAL ISSUES

Legal instruments concerning the conversion to mercury-free technology in the chlor-alkali industry and the handling of the mercury include the IPPC Directive, Community water, waste and occupational health legislation, the Rotterdam Convention and the OSPAR Decision 90/3.

2.1. Integrated Pollution Prevention and Control (IPPC) Directive[10]

The chlor-alkali industry is covered by the IPPC Directive which, in Article 9 paragraphs 3 and 4, requires installations to have permit conditions based on best available techniques (BAT). The mercury-cell process is not considered to be BAT for the chlor-alkali sector[11]. The Directive states in Article 5 that existing installations, i.e. installations in operation before 30 October 1999, should operate in accordance with the requirements of the Directive by 30 October 2007.

However, in accordance with Article 9 (4), when determining the permit conditions, based on BAT, for the individual installation the competent authority takes into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions. It is therefore the local competent authority that decides on the specific permit conditions.

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8 Information given by M. Himmi, Outokumpu, Finland, to the European IPPC Bureau in Seville, Spain.

9 EUPHEMET Final Report (August 2000), financed by DG Research, Contract no. ENV4-CT97-0614.

10 Council Directive 96/61/EC on integrated pollution prevention and control (IPPC)

11 Reference Document on Best Available Techniques in the Chlor-Alkali Manufacturing Industry (October 2000) which was adopted by the Commission in December 2001 (publicly available from the internet at http://eippcb.jrc.es).

2.2. Relevant Community water legislation

On the basis of Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community, the Council adopted the specific Directive 82/176/EEC on discharges of mercury from chlor-alkali-industry that lays down the emission limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry. As a result of the implementation of this Directive in addition to Directive 84/156/EEC on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry, the mercury pollution of the aquatic environment has been reduced substantially.

In the context of Directive 2000/60/EC establishing a framework for Community action in the field of water policy, however, it was recently decided to identify mercury as a "priority hazardous substance". In consequence, measures will be prepared in order to phase-out the mercury discharges, emissions and losses within 20 years after adoption of these measures. The Directive, therefore, requires as one element the review of the above-mentioned Directive 82/176/EEC by the end of 2003 in order to achieve the phase-out of discharges.

2.3. Relevant Community waste legislation

Under the Waste Framework Directive[12] as amended, waste is defined as meaning *"any substance or object […] which the holder discards or intends to discard or is required to discard"*[13].

The distinction between waste and product is a legal distinction designed to set an appropriate balance between freedom of commerce and responsible environmental waste management. The Court of Justice has repeatedly been called upon to interpret the waste definition and has developed a number of key criteria for assisting in determining the existence of waste in practice. Significantly, the Court has confirmed on a number of occasions that the definition should not be interpreted restrictively, given that Article 174(2) of the EC Treaty confirms that Community environment policy is to aim at a high level of protection and is to be based, in particular, on the precautionary principle and the principle that preventive action should be taken[14]. In addition, the Court has expressly stated that it is immaterial to the legal definition of waste whether a substance or object may have a commercial value or is capable of economic reutilization[15].

The Court has also underlined that the term 'discard' must be interpreted in light of the aim of the Waste Framework Directive, pointing out that in that regard, the third recital states that 'the essential objective of all provisions relating to waste disposal must be the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste'[16].

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12 Council Directive 75/442/EEC on Waste, as amended by Council Directive 91/156/EEC of 18 March 1991 and Commission Decision 96/350/EC of 24 May 1996.

13 Article 1 (a) of the Directive refers to the substances objects 'in the categories set out in Annex I'. It is important to note that the list in Annex I is non-exhaustive, given that category Q16 refers to 'Any materials, substances or products which are not contained in the above categories'. Therefore, the definition of 'waste' is open-ended in the sense of covering any substance or object which the holder discards, intends to discard or is required to discard.

14 See paragraphs 39-40 of the ECJ judgement in Case C-418-419/97 ARCO Chemie Nederland Ltd [2000] ECR I-4475.

15 Case C-359/88 Zanetti [1990] ECR I-1509.

16 Case C-418-419/97 ARCO Chemie Nederland Ltd (supra), paragraph 37 of judgement.

In the absence of Community provisions, Member States are free to choose the modes of proof to establish the presence of discarding, provided that the effectiveness of Community law is not thereby undermined. The Court has held that the effectiveness of both Article 174 EC and the Waste Framework Directive would be undermined if modes of proof were to be employed which had the effect of restricting the scope of the Directive and not covering materials, substances or products which correspond to the definition of 'waste' within the meaning of the Directive[17].

In addition, the Court has also identified a number of other criteria for determining the presence of waste, discussed principally in the context of production residues[18]. In particular, the European Court has also made it clear that where special precautions must be taken when a residue is used, owing to the environmentally hazardous nature of its composition, this may be regarded as evidence of discarding[19].

A number of consequences flow from the application of the waste definition. When a material is considered to be waste, it is subject not only to the requirements and controls contained in the basic framework legislation of the Community pertaining to waste, namely the Waste Framework Directive, the Hazardous Waste Directive (HWD)[20] as well as the Waste Shipment Regulation (WSR)[21], which implements the Basel Convention in the EU, including its provisions forbidding the export of hazardous wastes to non-OECD countries. It is also subject to a number of specific Community legislative instruments addressing particular treatment operations[22] and waste streams[23].

2.3.1. Mercury from decommissioned chlor-alkali plants

Mercury is obtained from decommissioned cells and by treatment of equipment and waste containing mercury. This mercury is pure and of a similar quality to that sold on the open market.

With regard to the definition of waste in the Waste Framework Directive 75/442/EEC and available case law, pure mercury siphoned off from disused electrolysis cells for sale on the open market cannot be presumed to be waste. This depends on whether in fact the owner of the decommissioned plant discards, intends to discard or is obliged under national legislation to discard the mercury. This is to be decided case by case according to the individual circumstances.

The requirement under the IPPC Directive 96/61/EC to phase out the mercury-cell process in the Chlor-alkali industry is not considered sufficient to make the general presumption that, in the event of a chlor-alkali plant being decommissioned, the decommissioned mercury will be discarded, is intended to be discarded or that there is an obligation to discard the pure

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17 Case C-418/97 ARCO Chemie Nederland Ltd (supra), paragraph 42 of judgement.

18 See in particular Cases C-418/97 ARCO Chemie Nederland Ltd (supra), paragraphs 44-97 of judgement and C-9/00 Palin Granit Oy, judgement of 18 April 2002 (not yet reported).

19 Court of Justice cases C-418 and 419/97 (ARCO), paras 86 and 87

20 Council Directive 91/689/EEC of 12 December 1991 on hazardous waste.

21 Council Regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community.

22 Notably, Directive 99/31/EC of 26 April 1999 on landfill of waste and Directive 2000/76/EC of 4 December 2000 on the incineration of waste.

23 Notably, including Directive 75/439/EEC of 16 June 1975 on the disposal of waste oils (as amended), Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, Directive 2000/53/EC of 21 October 2000 on end of life vehicles.

mercury. It can therefore not concluded or presumed that pure mercury siphoned off from disused electrolysis cells of decommissioned chlor-alkali plants is waste for the purposes of Community waste legislation.

On that basis the decommissioned mercury is not automatically governed by the Community waste legislation or by the requirements of the Basel Convention. This means that there are no special conditions for its treatment nor any requirements as to its trading within the EU and outside.

2.4. Relevant Community occupational health legislation

Council Directive 98/24/EC on the protection of the health and safety of workers from risks related to chemical agents at work should be considered when mercury is handled. This Directive lays down minimum requirements for the protection of workers and allows setting an occupational exposure limit value and a biological limit value for mercury.

The EU Scientific Committee on Occupational Exposure Limits (SCOEL) has recently adopted a recommendation on occupational exposure limits for elementary mercury and inorganic divalent mercury compounds (SCOEL/SUM/84 final). Following external consultations on the recommendation, the Commission may propose a European occupational exposure limit for mercury.

2.5. Rotterdam Convention for the application of the PIC procedure

The Rotterdam Convention for the application of the Prior Informed Consent (PIC) procedure for certain hazardous chemicals and pesticides in international trade was concluded in 1998. It was signed by the European Community on 11 September 1998. The Convention will enter into force on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession[24].

The basic principle of the Convention is that the export of a banned or severely restricted chemical that is included in Annex III to the Convention can only take place with the Prior Informed Consent of the importing Party. The Convention establishes a mechanism for including further substances, provided that certain criteria are met.

The Commission has proposed a Council Regulation concerning the export and import of dangerous chemicals[25] to give effect to the provisions of the Convention within the Community. The proposed Regulation would implement the Convention and replace Council Regulation (EEC) No 2455/92. The chemicals that are subject to export notification, and those that qualify for PIC notification and are subject to the international PIC procedure are listed in Annex I to the proposed Regulation.

Metallic mercury is currently not listed in Annex I to the current or proposed Regulation or in Annex III to the Convention. Metallic mercury would appear, however, to fulfil the criteria for inclusion and it should be possible to add metallic mercury to both Annex I to the new Regulation and in Annex III to the Convention.

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[24] In July 2002 thirteen parties have ratified the Convention.

[25] Proposal for a Council Regulation concerning the export and import of dangerous chemicals - COM(2001) 803 final

2.6. Oslo and Paris Convention (OSPAR)

The European Community is a contracting party to the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.

OSPAR Decision 90/3 of 14 June 1990 recommends that existing mercury cell chlor-alkali plants should be phased out as soon as practicable with the objective that they should be phased out completely by 2010. The recommendation of mercury cell phase-out in Decision 90/3 was reviewed in 1999-2001 but no changes were made.

The Council has not formally approved OSPAR Decision 90/3. The Community therefore has no obligation to act in compliance with it.

3. CONSEQUENCES OF MERCURY-CELL PHASE-OUT

The phase-out of the mercury-cell process in the European chlor-alkali industry has already started and will continue for at least a decade. The precise timetable for this phase-out will depend on how national competent authorities interpret and implement the IPPC Directive and whether or not the recommended phase-out of mercury cells by 2010 in OSPAR Decision 90/3 is followed. Some Member States seem to be firm about an early phase-out of mercury cells whilst others have not yet indicated what will be the most likely course of action.

The phase-out of mercury-based chlor-alkali plants represents, in principle, a step forward for the environment. It will significantly reduce mercury emissions and energy consumption in this industrial sector. However, the decommissioning of mercury-cells will lead to some 12,000–15,000 tonnes of mercury becoming available in the EU in the coming years. If this mercury is not dealt with properly, it could represent a higher risk for the environment than the present confined use in the chlor-alkali industry. The fate of the decommissioned mercury is therefore of crucial importance if the benefits of the phase-out are to be safeguarded.

There are three basic scenarios for the fate of the mercury from the chlor-alkali industry:

1. Re-use

2. Intermediate storage

3. Definitive storage.

In the table below the different scenarios are summarised according to key indicators.

Scenario	Mercury emissions will stop	Long-term solution	Cost
1	No	No	Low
2	Yes	No	Medium
3	Yes	Yes	High

3.1. Re-use

Decommissioned mercury from chlor-alkali plants is currently re-used in different ways. It is re-used by the chlor-alkali industry, placed on the market and taken up by the mine in Almadén.

Re-use by the Chlor-alkali industry

Some of the mercury is re-used in remaining mercury-cell chlor-alkali installations that will close down at a later date. This is common practice today, but in the coming years, as the pace of mercury-cell phase-out is increased, there will be more mercury available than remaining European plants can use. The re-use of mercury within the chlor-alkali industry would effectively not remove the mercury, but would contribute to further dissipation of mercury to the environment through wastes and products of the production process.

At a later stage, when the technology is fully replaced in Europe there will be no demand for the mercury in European chlor-alkali-industry. Then the mercury might be sold off to mercury-cell plants outside Europe. This would shift the problem outside Europe. It would reduce the demand for primary mined mercury.

Placing on the market

Residual mercury is disposed of by each company with some restrictions from local authorities. So far, all decommissioned plants have sold their surplus mercury on the open market without restrictions.

The world demand for mercury is uncertain, but does not exceed 5,000 tonnes/year[26]. The world mercury consumption was estimated at 3,800 tonnes in 1993[27] and 3,400 tonnes in 1996[28]. The amount of mercury obtained from recovery operations is increasing and the legal use of mercury is decreasing, which means that there will be an increasing quantity of mercury available on a shrinking market.

The fate of the decommissioned mercury would be uncertain. A significant part of the mercury could end up being used without restrictions, such as small-scale gold mining in China, the Philippines, Indonesia, Brazil, Colombia and other countries.

Take-up by the Almadén mercury mine

The mercury is sold and transported to the Almadén mercury mine in Spain. The extraction of mercury would be reduced and replaced with appropriate storage capacity.

Euro Chlor, which represents the European chlor-alkali industry, has a contractual agreement in place with Minas de Almadén. The agreement provides that Minas de Almadén will buy the surplus mercury from the West-European chlor-alkali plants and put it on the market instead of new production. All EU members of Euro Chlor have agreed to sell their surplus mercury to Almadén. Euro Chlor believes that it would be possible to come to an agreement with the central and eastern European members as well. It should be noted that not all

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26 EUPHEMET Final Report (August 2000), financed by DG Research, Contract no. ENV4-CT97-0614.

27 EUPHEMET Final Report (August 2000), financed by DG Research, Contract no. ENV4-CT97-0614.

28 ERM report (December 1998), commissioned by DG III, Reference 5260

companies with mercury-cell chlor-alkali plants in the accession countries are members of Euro Chlor.

The Spanish mine is the biggest producer in the world and reportedly mercury sales have been between 700 and 1300 tonnes/year[29]. According to Euro Chlor and Minas de Almadén if some 400-500 tonnes mercury/year are made available from the West-European chlor-alkali industry it could be absorbed by the market. These figures are based on the scenario that the phase-out will take place within more than twenty years as expressed in the discussions for a revision of the PARCOM 90/3 recommendation of OSPAR.

However, if there was to be a forced phase-out earlier than 2020, problems would arise as the market would not be able to absorb the yearly amounts of mercury transferred to the mine. In this case the mercury would have to be put into storage. The agreement between Euro Chlor and Minas de Almadén concerns up to 1,000 tonnes of mercury in any year. If more than this becomes available in any year, the conditions of the agreement are to be reviewed.

In the year 2000 transfers of mercury to Minas de Almadén from West-European chlor-alkali plants amounted to 354 tonnes. In 2001 this rose to 506 tonnes and for the year 2002 it is estimated that a quantity in the order of 450 tonnes will be transferred. In 2000 Almadén produced 236 tonnes[30] of mercury and sold in total 1095 tonnes which shows that Almadén is mining less and is instead selling mercury from stocks and chlor-alkali plants.

It is important to note that the estimated total quantity of decommissioned mercury from the chlor-alkali industry in West-Europe (12,000-15,000 tonnes) would correspond to about 7–9 years of world production on the basis of world production at 1,650 tonnes in 2000.

The agreement with Minas de Almadén is part of the West-European chlor-alkali producer's strategy for a safe disposal of metallic mercury from shutdown cells.

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[29] Risks to Health and the Environment Related to the Use of Mercury Products, Final report prepared for the European Commission, DG Enterprise, July 2002

[30] Information given by IGME (Instituto Geologico y Minero d'España) to the European IPPC Bureau in Seville, Spain.

Re-Use	
Advantages	***Disadvantages***
Demand of primary mined mercury would be reduced. Impact on the environment in the area around the mines could improve due to less mined mercury. Long-range transboundary mercury emissions from the mining would be reduced. Good acceptance by industry because it would not cause additional costs for the decommissioning.	Problem with residual mercury would be postponed or shifted to countries outside Europe. Local and long-range transboundary air emissions from use of mercury would continue. The fate of the decommissioned mercury would be uncertain. A significant part of the mercury is likely to end up in countries with no or non-enforced restrictions and lead to major health and environmental impacts in some parts of the world.

3.2. Intermediate storage

The mercury could be stored safely for an unknown period of time until a strategy for re-use and/or safe disposal is available. This could be done on the production site, at the Almadén mine in Spain or elsewhere, where appropriate storage could take place. The mercury could eventually be re-used or disposed of. Environmentally safe storage capacity would need to be built up.

As this would be an interim solution it would create additional costs for a not foreseeable time period. During the storage period the owner of the storage facility leaves responsible. Stored mercury could be re-used or disposed of finally when appropriate users or disposal facilities are available. Additional emissions from handling are possible.

Intermediate storage	
Advantages	***Disadvantages***
If storage takes place on site of the chlor-alkali plants the responsibility would still be with these operators. Both options of re-use or final disposal of the mercury would be possible. There could still be public control over the fate of the mercury.	As it is a temporary solution this would mean additional costs to a final solution. Capacities would need to be built up. Emissions into the environment from handling and/or re-use are possible. The final fate of the mercury would still be uncertain.

3.3. Definitive storage

Final disposal of surplus mercury would be the optimal solution and a sustainable approach to reduce mercury emissions from an environmental point of view. The environmental benefit for the phase-out of mercury-cell technology is evident. If decommissioned mercury is definitively stored, emissions from this mercury are stopped and much less energy is used by the chlor-alkali industry. However, appropriate methods are not yet fully developed and costs are relatively high. The 'polluter-pays' principle might be applied, but this could affect the competitiveness of the European chlor-alkali industry in comparison to non-European competitors.

Mercury could be processed into an insoluble amalgam, with sulphide, for example, and disposed of in dedicated landfills or in landfills for hazardous waste. Treatment capacity for the EU would have to be built up and technical solutions would have to be developed. Costs for treatment and available capacities in Member States are not known at this stage.

The Swedish authorities have plans for terminal storage of all mercury and mercury containing waste deep down in bedrock. Their estimations of the costs for the method, excluding pre-treatment costs, is €15-22/kg mercury. For Western Europe's 12,000-15,000 tonnes of decommissioned mercury this would translate into €180-330 million, which could be compared to the estimated total cost for conversion at €3,100 million[31] for West-Europe. Thus, this rough estimate indicates an additional cost of 6-10% for the final disposal of decommissioned mercury in West-Europe.

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31 According to Euro Chlor a typical conversion cost is €530 per tonne of chlorine production capacity and total mercury based chlorine capacity in western Europe in 2001 was 5850000 tonnes, which gives a total conversion cost of €3100 million.

Definitive storage	
Advantages	***Disadvantages***
Sustainable approach to reduce emissions from mercury. There is a clear environmental benefit in the case of the phase-out of mercury-cell technology: total stop of emissions of mercury and less energy consumption by the chlor-alkali industry. Europe could be a good example for other countries and thereby speed up the global reduction of mercury emissions.	No disposal capacity available for the moment. Appropriate methods are not yet fully developed. Further research is needed. Costs for final disposal are not yet known but compared to the other scenarios costs for industry or taxpayers would be much higher. Resistance from industry is likely as this approach would cause additional costs for the decommissioning.

4. A GLOBAL PERSPECTIVE

Mercury is not a local problem. Elevated background levels of mercury are found all over the world. Coal-fired power production is today deemed the single largest global source of atmospheric mercury emissions. The burning of other fossil fuels is also a major contributor. Another global main source is the use of mercury in small-scale gold mining. This mining technique involves heating the mercury so that it evaporates, which means that virtually all mercury used is released into the atmosphere. The Chlor-alkali industry is a major user of mercury, although the direct emissions from the plants are relatively small. These sources, and others, add to the global pool of mercury in the biosphere.

The origins of atmospheric mercury deposition - flow of mercury from air to land and oceans - are local as well as global. Apart from local sources, such as coal combustion, industry and small-scale gold mining, the general background concentrations in the global air contribute significantly to the mercury burden at any point on earth. Local sources, in turn, contribute to the global background levels. [32] This is because mercury is volatile and its emissions are spread over long distances in the atmosphere and in the oceans.

Man-made emissions of mercury have since pre-industrial times resulted in 0.5-3 times increased deposition rates on average around the globe[33]. In and around the regions with the highest concentration of industrial activity - Europe, North America, south-eastern China - the deposition rate has increased by a factor of 2-10 during the last 200 years.

32 Bergan et al (1999); Lindquist et al (1984) as cited in 'Experiences from phasing out the use of mercury in Sweden', K. von Rein and L.D. Hylander, Reg Environ Change (2000) 1:126-134.

33 Position Paper on Ambient Air Pollution by Mercury (Hg), 2001. Published by the Commission and available on the DG Environment website at http://europa.eu.int/comm/environment/air/ambient.htm (scroll down to "The fourth Daughter Directive" and the Position paper on Mercury).

The impact of mercury pollution, initially recognised as an acute and local problem, is now also understood to be global, diffuse, and chronic. Mercury is persistent and bioaccumulates. The toxicity of mercury and its compounds is well-known and documented: adverse neurodevelopmental effects, toxic effects on the nervous system as well as adverse effects on the cardiovascular, immune and reproductive systems and the kidneys. The neurodevelopmental deficits and psychomotor effects indicative of central nervous system toxicity are the most sensitive and well-documented effects.

Mercury is partly transformed into methylmercury by natural processes and bioaccumulates in the food chain with obvious risks for animals and man. Populations with a high intake of fish, including shellfish and marine mammals, are especially vulnerable.[34] Methylmercury is transferred to the foetus; it passes the blood-brain barrier and even at low levels is likely to hamper mental development, often without the mother showing any clinical symptoms. [35]

4.1. Mercury strategies in North America

The effects of mercury have been a major concern in North America for several years. Canada, the USA and Mexico have agreed an action plan for mercury.

The U.S. Government holds more than 5,000 tonnes of mercury. This stock has been kept in storage since 1994, when questions were raised about the possible environmental impacts of unloading this onto the world commodity market. Therefore, interim policy has been to store Federal holdings of mercury on environmental grounds. An environmental impact study is underway to seek public comments as to what should be done with this mercury.

These issues are of major concern and were addressed at the North American conference, "Breaking the Mercury Cycle: Long Term Management of Surplus & Recycled Mercury & Mercury-Bearing Waste," co-sponsored by the U.S. Environmental Protection Agency, Environment Canada and others, in Boston, Massachusetts, 1-3 May 2002.[36]

4.2. International initiatives

Mercury is an issue of international concern for which some international action has already been taken. Apart from OSPAR Decision 90/3, mercury-cell chlor-alkali installations are covered by the UNECE 1998 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution (LRTAP) on Heavy Metals.

The objective of the LRTAP Heavy Metals Protocol is to “control emissions of heavy metals caused by anthropogenic activities that are subject to long-range transboundary atmospheric transport and are likely to have significant adverse effects on human health or the environment”. Mercury cell chlor-alkali production is one of the activities listed with corresponding mercury emission levels.

Mercury and its compounds are also subject to a global assessment by UNEP, in co-operation with other members of the Inter-Organisation Programme for the Sound Management of Chemicals (IOMC). The assessment will be based on contributions from governments and

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34 UNEP Global Mercury Assessment, 1st draft report of 25 April 2002. Available on the UNEP GMA website at http://www.chem.unep.ch/mercury/report/1stdraft-report.htm.

35 Toxicological Effects of Methylmercury (2000), U.S. National Research Council. The report was commissioned by USEPA and is available from the website http://www.nap.edu.

36 http://www.newmoa.org/Newmoa/htdocs/prevention/mercury/breakingcycle/toc.cfm

intergovernmental and non-governmental organisations. The report[37] is to be presented to the UNEP Governing Council at its twenty-second session (GC 22) in 2003.

5. CONCLUSION

The Council has asked the Commission to "clarify the legal situation regarding the conversion of the chlor-alkali industry, to identify the possible consequences for the use of mercury and report to Council on the potential need for co-ordinated action in the EU and the accession countries".

In response to the Council request the Commission has outlined the current situation of mercury from decommissioned chlor-alkali plants and identifies a number of key considerations. This indicates that

– There is clear evidence that the mercury load on the environment is still considerable and needs to be reduced further.

– Mercury is a long-range transboundary air pollutant and further placing on the market will lead to mercury emissions that add to the already increased local and global background levels in the environment.

– Forty-seven mercury-based chlor-alkali plants in the EU will give rise to approximately 12,000-15,000 tonnes of mercury when they are decommissioned. Approximately another 2,000 tonnes of mercury are expected to come from the mercury-based chlor-alkali plants in EFTA and Accession countries.

– Mercury from decommissioned chlor-alkali plants in Europe will be a major mercury source and the final fate of this mercury could, if not handled in a safe and sustainable way, be associated with considerable environmental damage in the European Union, in future Member States as well as in third countries.

– There is little demand for mercury in the EU and North America, but there is demand globally. A continuing supply of surplus mercury will keep the price low and the use of mercury will remain attractive.

The legal situation governing the mercury based chlor-alkali industry has revealed that

– The IPPC Directive is the only legally binding instrument that governs the phase-out of mercury cells. The mercury-cell process is not considered to be BAT for the chlor-alkali sector and it will be for the local competent authority to decide on BAT-based permit conditions for individual installations on a plant-by-plant basis. All existing installations should meet permit conditions based on BAT and operate in accordance with the requirements of the Directive by 30 October 2007.

– The mercury from the cells of decommissioned chlor-alkali plants cannot automatically be presumed to fall within the waste definition. Whether the decommissioned mercury is waste can only be concluded on a case-by-case basis,

[37] A first draft of the Global Mercury Assessment was circulated for comments on 25 April 2002 and is publicly available at http://www.chem.unep.ch/mercury/Report/1stdraft-report.htm.

depending on whether the plant owner is discarding, intends to discard or is obliged under national legislation to discard the mercury.

Therefore the decommissioned mercury is not automatically governed by the EU waste legislation nor by the requirements of the Basel Convention. This means that the rules under Community waste legislation and the Basel Convention for treatment and trade within the EU and outside are not generally applicable.

The main objective when dealing with the large quantities of mercury becoming available from decommissioned mercury-based chlor-alkali plants is to ensure a high level of protection of the environment and human health. In order to be effective, a solution must take into account the global situation, be sustainable in the long term and be attentive to the risk of internal market distortions.

This objective can be achieved by responsible handling of the mercury and by ensuring that it is only traded with due consideration of the risk of negative environmental effects. Under the existing legal constraints there are primarily two ways of making progress towards meeting this objective:

– Mercury-based chlor-alkali installations in the Accession Countries and in future Accession Countries could be encouraged to follow the same scheme as the West-European members of Euro Chlor, which means selling the mercury to the Almadén mercury mine. This would make it easier to monitor mercury flows without imposing further legal restrictions.

– Provided the necessary criteria are fulfilled, metallic mercury could be proposed for inclusion in Annex III to the Rotterdam Convention for the application of the Prior Informed Consent (PIC) procedure for certain hazardous chemicals and pesticides in international trade; it could also later be added to Annex I to the proposed new Council Regulation concerning the export and import of dangerous chemicals[38]. This would aim at a situation in which companies trading in metallic mercury were more informed about its potential impacts. An obstacle for a successful amendment is that another party to the Convention from another geographical region has to notify metallic mercury as well.

However, from an environmental point of view, final disposal of surplus mercury would be the optimal solution considering that appropriate methods are not yet fully developed and costs are relatively high. The ‘polluter pays’ principle might be applied but this could affect the competitiveness of the European chlor-alkali industry in comparison to non-European competitors.

A coherent and sustainable strategy should ideally, in addition to dealing with the problem of mercury from the chlor-alkali industry, include action in relation to primary production of mercury in Europe.

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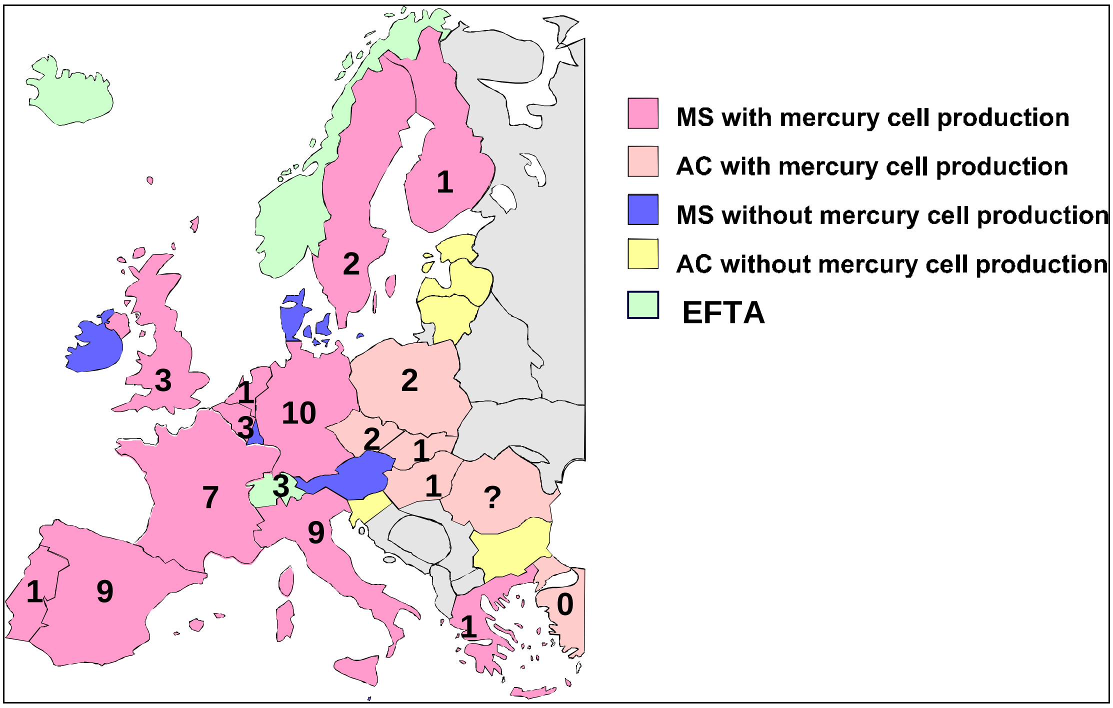
[38] COM(2001) 803 final,

ANNEX I: Mercury-cell chlor-alkali plants and chlorine production capacities in the European Union, EFTA and Accession Countries in 2001



Number of mercury-cell chlor-alkali plants in the European Union, EFTA and Accession Countries in 2001

Country	Mercury-cell process		Total	Mercury-based
	Number of installations	Chlorine capacity ('000 tonnes)	chlorine capacity ('000 tonnes)	Capacity of total
Austria	0	0	55	0%
Belgium	3	550	752	74%
Finland	1	40	115	35%
France	7	874	1686	52%
Germany	10	1482	3972	37%
Greece	1	37	37	100%
Ireland	0	0	6	0%
Italy	9	812	982	83%
Netherlands	1	70	624	11%
Portugal	1	43	89	48%
Spain	9	762	802	95%
Sweden	2	220	310	71%
United Kingdom	3	856	1091	78%
EU total	**47**	**5746**	**10521**	**55%**
Norway	0	0	180	0%
Switzerland	3	104	104	100%
EU+EFTA total	**50**	**5850**	**10805**	**54%**
Czech Republic	2	183	183	100%
Hungary	1	125	125	100%
Poland	2	152	433	35%
Romania	n.a.	n.a.	n.a.	n.a.
Slovakia	1	76	76	100%
Turkey	0	0	n.a.	n.a.
AC total	**6**	**536**	**817**	**66%**

Mercury-based chlor-alkali plants and chlorine capacities in Europe 2001[39]

[39] Information given by Euro Chlor