Chlorine Industry Review

2000-2001

EURO CHLOR
REPRESENTING THE CHLOR-ALKALI INDUSTRY

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Cover Picture: view of chlorine processing facility at INEOS Chlor Limited's plant at Runcorn, Cheshire, UK.
Other photographs: kindly provided by CargoLifter AB, Akzo Nobel and Benelux Press.

Responding to society's **changing expectations**

Sustainability is increasingly a cornerstone of EU and international legislation. Its principles are also at the heart of the chlor-alkali industry's commitment to the *Responsible Care®** initiative. But what exactly is a sustainable industry? Most people take a simple view. They ask:

"How is our environment being protected?"
"What is being done to protect my health and that of my children?"
"Are your activities compatible with giving my family a better quality of life?"

In fact these questions encompass the elements of environmental protection, societal progress and economic development which are the classic pillars of sustainability. In this Review we update you on progress in all these areas.

Our **environmental performance** is consistently improving. For example, mercury emissions from electrolysis plants have been reduced by over 96% since 1977. And throughout the remaining lives of mercury cells in Europe, our members will maintain efforts to ensure that our now minor level of mercury emissions continues to decline.

On **societal progress,** chlorine-based products continue to improve the quality of life in sectors as diverse as healthcare, automobiles, aviation, construction, sports and water disinfection. Lack of safe drinking water following natural disasters in lesser-developed countries continues to highlight the critical role that chlorine plays in water disinfection. We take safe drinking water for granted in Europe, but we must not forget that water chlorination helps fight diseases such as cholera, which killed 9,000 of the 250,000 people that contracted it in 1999.

On **economic development,** the chlor-alkali sector underpins 55-60% of European chemical industry turnover and two million jobs. Demand for chlorine closely tracks economic activity and in Western Europe production hit a 12-year high in 2000.

This Review presents a snapshot in time of our sector's continuing efforts to achieve a sustainable future. Our members recognise the importance of responding to society's changing expectations. All of us have a strong interest in seeing our sector maintain its economic viability and environmental concern as well as sharing a desire to leave our children a better future. Whilst we are proud of our progress, much remains to be done – and communicated openly to the public - to improve our ability to protect the environment, to use energy efficiently and to recycle raw materials. Full sustainability may still be ahead, but we are moving to meet the challenge.

Dr Barrie S Gilliatt
Executive Director

** Responsible Care is the worldwide chemical industry's commitment to continuous improvement in all aspects of health, safety and environmental performance and to openness in communication about its activities and achievements.*

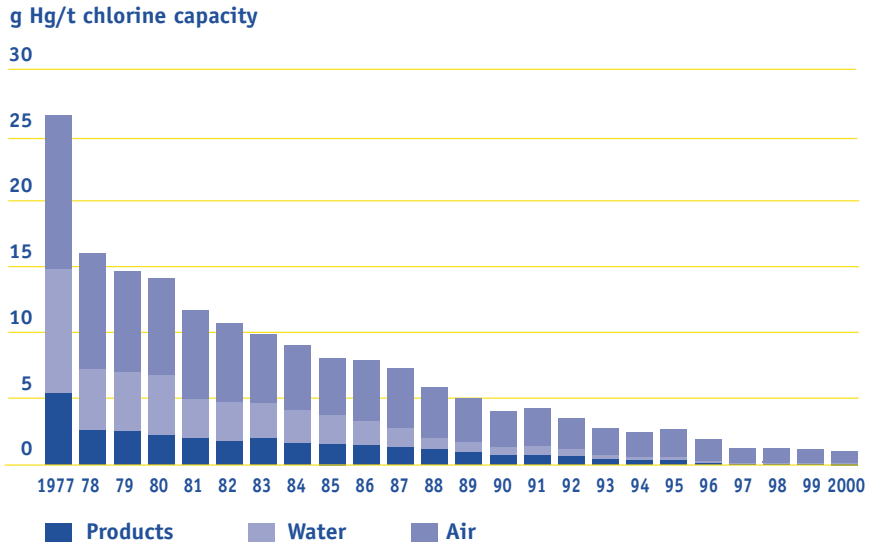
Targeting sustainability: **environmental performance**

Continuing reductions in mercury emissions

Progress continues to be made in reducing emissions of mercury from the Western European chlor-alkali plants that use mercury cell units* to produce chlorine.

In 2000, producers achieved a figure of just 1.25 grammes of mercury emitted to air, water and in products per tonne of mercury cell chlorine capacity compared to 1.34g per tonne in 1999. Total annual mercury emissions to air, water and in products by Euro Chlor members have been reduced by 74% during the past 10 years to eight tonnes in 2000. Since record-keeping began in 1977, a 96% reduction has been achieved (see diagram).

European chlor-alkali mercury emissions to air, water and products



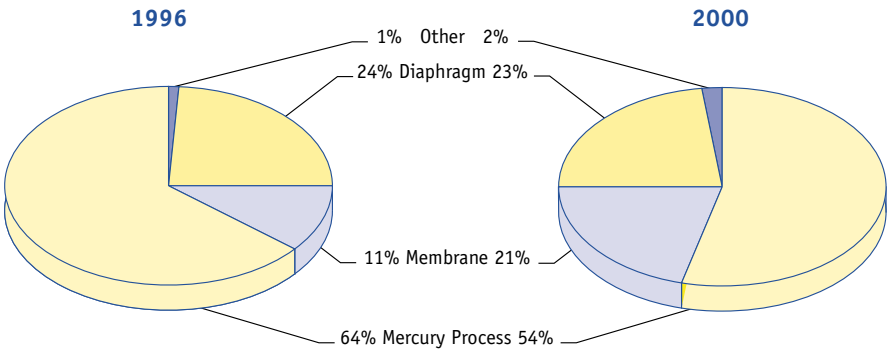
The producers face the challenge of diminishing returns as each year it becomes progressively harder to reduce already extremely low emission levels.

At the same time, the proportion of chlorine capacity accounted for by the mercury process has fallen over the past five years, from 64% to 54% of the total, whilst membrane capacity has virtually doubled from 11% to 21%. Diaphragm capacity remained steady at 23% with 2% resulting from other methods of production (see page 3).

Notwithstanding this performance and voluntary commitments for continuing improvements, pressure to discontinue using the mercury process continues in Western Europe.

** The majority of European chlorine plants use mercury as the cathode in the electrolysis process.*

Production routes to chlorine in Western Europe



OSPAR fails to reach consensus on revision of mercury cells phase-out

The Paris Commission recommendation 11 years ago (PARCOM 90/3) to phase-out the use of mercury cells in the North Sea area by 2010 required a review and ratification by OSPAR in 2000. A committee of national representatives assisted by Euro Chlor worked for two years prior to the deadline in order to agree a constructive and pragmatic approach.

Euro Chlor proposed a package of measures designed to meet the objectives of the original recommendation whilst taking economic and environmental realities into consideration. The bottom line promised a fixed phase-out date of 2020 and a guarantee of cumulative emissions no greater than those implied by the PARCOM 90/3 recommendation. A final proposal based very much on these ideas was agreed by the OSPAR Working Group for submission to the Hazardous Substances Committee (HSC).

The OSPAR HSC met in April 2001, but national representatives of four countries rejected the views of the Working Group and opposed any review or extension of the 2010 date. This effectively blocked achievement of a political consensus between governments and so by default the 1990 recommendation remained unchanged.

Voluntary commitments offered to OSPAR promised further progress

The six voluntary commitments made by the Western European chlorine industry were:

- Mercury emissions will continue to be reduced, with a commitment to achieving 1.0g mercury per tonne of chlorine capacity in every country by December 2007.
- No new mercury cell capacity will be installed (this confirms a commitment made in 1995). Alternative technologies will be used for any new capacity.
- Mercury plants will be phased out at the end of their economic lives with total phase-out by 2020 at the latest.
- Dismantled plants will not be shipped to third parties for re-use.
- Individual plant mercury emissions will be disclosed and will be available for auditing by an independent third party.
- Pure mercury from closed cell rooms will be disposed of safely (see page 4: *Return of residual mercury "best environmental option"*).

Valuable opportunity missed

Producers will now have to negotiate on a country-by-country basis with national governments, some of whom already accept that there is a case to allow operation beyond 2010 based on specific local circumstances.

Failure to reach a pan-European political agreement on the future of the mercury cell process is likely to hurt the Single Market and the international competitiveness of the EU chlor-alkali sector, which directly employs more than 40,000 people. Additionally almost 2 million European jobs – many in small and medium sized enterprises - depend indirectly on chlor-alkali production. Chlorine and its co-product caustic soda underpin 55-60% of EU chemical industry turnover.

At the national level, the socio-economic impact of an enforced phase-out by 2010 in Germany has been clearly demonstrated in a report commissioned by the Federal Ministry of Economics and Technology. On the basis that 50% of the affected mercury capacity would be replaced by a combination of imports or new membrane units, the analysis projects annual tax-related losses to the German economy of about € 2,812 million (DM 5,500 million). This includes € 583 million (DM 1,140 million) in value added tax, corporation and employee payroll taxes. About 8,700 jobs could be lost - not only at the producing companies, but also their suppliers (e.g. electrical utilities, transport companies and salt suppliers) and downstream customers.

A valuable opportunity has been missed to resolve a complex pan-European industrial and environmental problem. Our industry offered a constructive voluntary phase-out commitment that would have provided a genuine win-win solution for the environment and the industry. It represented a unique and potentially historic example of a signed commitment by every relevant chemical company in Western Europe to achieve the environmental mercury emissions objectives of the Sintra Declaration* and the EU Water Framework Directive. (see page 5: *New EU water pollutant priority list adopted*).

The outcome does not bode well for similar future industry-government co-operation by other sectors. Euro Chlor has formally requested OSPAR to work with all stakeholders in an endeavour to improve the processes by which such important decisions are taken. In the meantime, Euro Chlor members will continue efforts to minimise emissions from mercury plants whilst pursuing plans to convert them to the extent that is practicable and economically viable.

Return of residual mercury "best environmental option"

One of the issues raised by any closure of chlor-alkali plants that use the mercury process is the fate of the residual mercury. There are currently about 12,000 tonnes of pure mercury within such plants. As the cells are gradually converted or closed, companies have agreed that they will progressively return this metal to an established mercury producer to replace production of virgin mercury. "This is the best environmental option," said Dr Martin Wienkenhöver (Bayer), Chairman of the Euro Chlor Management Committee. Euro Chlor has negotiated a non-exclusive agreement on behalf of its members with Minas de Almaden of Spain.

** Ministers adopted the Sintra Declaration at the 1998 OSPAR meeting in Portugal, agreeing to endeavour to move towards the target of cessation of discharges, emissions and losses of hazardous substances to the North-East Atlantic by 2020.*

Milestone reached as BREF document is finalised

A milestone for the chlor-alkali sector - and indeed the European chemical industry - was completion of the first-ever Best Available Techniques reference (BREF) document for manufacture of a chemical. The BREF on chlor-alkali production was finalised and approved by the Information Exchange Forum (IEF) in September 2000. This guidance document will have a strong influence on permit conditions set by national and local authorities for individual plants under the 1996 Integrated Pollution Prevention and Control (IPPC) Directive.

Euro Chlor provided substantial data for the BREF, which concluded that membrane and non-asbestos diaphragm technology are considered as Best Available Techniques. The BREF provides a list of possible measures that existing mercury (and asbestos diaphragm) plants could apply to protect the environment up to the time that closure or conversion to non-mercury (and non-asbestos) technologies takes place.

The BREF emphasises that in issuing a permit, authorities must take into account the technical characteristics of the installation, its geographical location and local environmental conditions. Moreover, it explicitly states: "...existing installations could move towards the general BAT levels or do better, subject to the technical and economic applicability of the techniques in each case."

Workable solution for by-product POPs

Global UNEP POPs treaty welcomed

The legally binding global UN Environment Programme POPs Treaty was signed by governments in Stockholm (22-23 May 2001). For Euro Chlor, which worked closely with other associations under the umbrella of the World Chlorine Council (WCC), the principal concern lay not with the bans on products but in how restrictions or elimination of releases of by-product POPs (principally dioxins and hexachlorobenzene) would be managed. At the conclusion, the goal of "ultimate elimination" of these by-products was qualified to actions that are technically and economically feasible.

Additionally, it was agreed that the process for adding future chemicals to the POPs convention should be science and risk based, although this will be applied with flexibility and precaution. In this respect, in spite of opposition from the EU, the Rio version of the Precautionary Principle was invoked.

New EU water pollutant priority list adopted

The Water Framework Directive (adopted June 2000) is designed to harmonise European Union water policy, especially on the quality of surface, ground and coastal waters. Although the directive's aims are commendable, there are serious concerns about its practical application and the potential socio-economic impact of disproportionate or excessive quality objectives and emission limit values.

Several chlorinated substances are on the adopted EU Commission list of 32 "priority substances" for regulation. The list contains 11 "priority hazardous substances" - including short-chain chlorinated paraffins, hexachlorobenzene, hexachlorobutadiene, hexachlorocyclohexane and mercury - targeted for cessation of emissions within 20 years, irrespective of any risk reduction measures. "Priority substances" – for which there is no cessation of emissions - include 1,2-dichloroethane, dichloromethane and trichloromethane.

A further 11 chemicals formally under review may be added by December 2003. These include pentachlorophenol and trichlorobenzenes, which could be upgraded to "priority hazardous" status.

All the chlorinated substances currently listed were included in Euro Chlor's voluntary marine risk assessment programme and the federation is, therefore, in a good position to contribute data for the setting of Environmental Quality Standards (EQS) and Emission Limit Values (ELV) for these substances.

However, a challenge facing chlor-alkali producers is that some of the listed "priority hazardous" chemicals are not purposely made, but occur as unwanted by-products during the manufacture of other chemicals. For example, hexachlorobenzene and hexachlorobutadiene are formed during the manufacture of two chlorinated solvents, trichloroethylene and perchloroethylene, and the plastics precursor, 1,2-dichloroethane.

The legal requirement under the directive to achieve zero emissions of "priority hazardous substances" within 20 years would effectively halt the production of these chlorinated materials. Euro Chlor believes that 'close to zero' emissions could be feasible – whilst giving equivalent environmental benefits - and is working to gain agreement from national authorities to such a modification.

'close to zero' emissions feasible

Euro Chlor is concerned at the process – or lack of it – that was employed to draw up the current list. For these substances, as with all others, risk assessments should be carried out with any required risk reduction measures being scientifically based and proportionate to the risk assessed. The results should then be the basis for legislation. In the case of short-chain chlorinated paraffins, the recent EU risk assessment appears to have been ignored.

For the future, Euro Chlor recommends development of a transparent process involving all stakeholders in the development of criteria for identification of any additional substances to be regulated.

Monitoring results show falling organochlorine levels

Decreasing emissions and environmental levels of chlorinated organic substances demonstrate the continuous progress in environmental performance being made by Euro Chlor member companies. The federation's voluntary programme of marine risk assessments included a survey of emissions to air and water from around 80 industrial plants in Europe. This is vital in assessing the actual levels of chemicals to which humans and the environment are exposed.

For most of the 25 substances investigated, emissions to air have been reduced by more than 70% and to water by 85% since the start of the study in 1985. These amount to a four-to-six-fold reduction over the period, even in cases where production levels increased (for example, vinyl chloride, used to make PVC).

Statistical analysis of existing monitoring data shows similar decreases in environmental concentrations indicating an improvement in the quality of the environment to which the chlorine industry has made a major contribution.

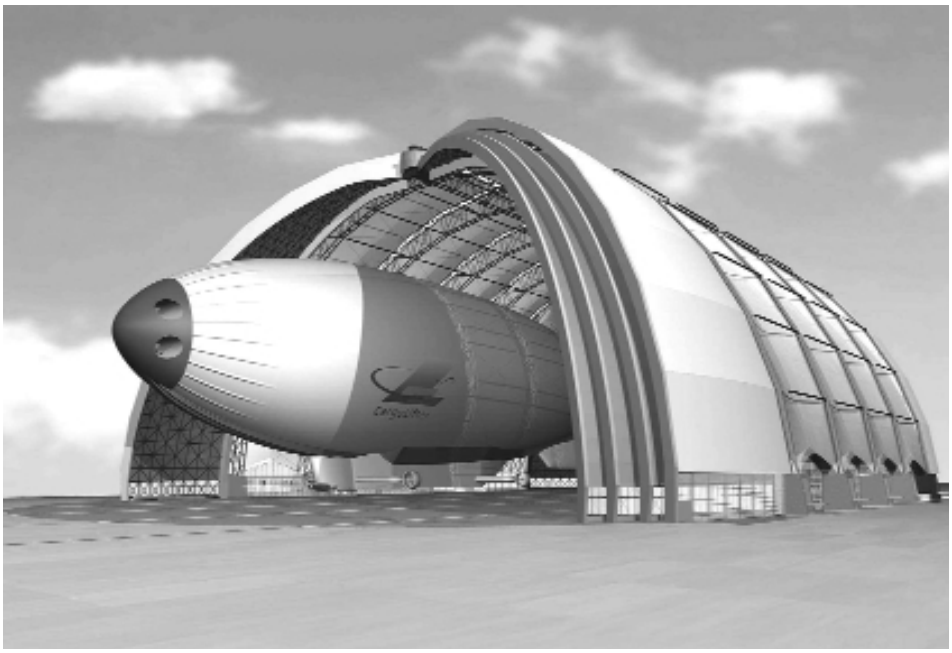
This was confirmed by the latest Helsinki Commission (HELCOM) report, which found that levels of mercury and DDT in the Baltic Sea fell markedly in the 1994-98 period, "benefiting the health of many birds of prey and mammals."

HELCOM's study found improved overall coastal water quality and confirmed that the white-tailed sea eagle is reproducing as successfully as in the period before 1950 and guillemot eggs have shells as thick as those found 25 years ago.

PVC industry launches environmental initiative

The European PVC industry – a major user of chlorine - has signed a voluntary commitment to invest up to € 250 million over the next 10 years to reduce the environmental impact of its products and manufacturing processes.

Supported by the European Council of Vinyl Manufacturers (ECVM) and three industry partners representing plasticisers, stabilisers and plastics converters, the initiative will promote continuous environmental improvement and resource efficiency in PVC manufacture and use. One of the goals is to increase mechanical recycling of PVC pipes and window frames to 25% by 2003 and 50% by 2005. Other goals relate to the staged reduction or elimination of heavy metals as stabilisers.



Two of the new generation airships designed to carry 16 tonnes of cargo can be housed in this PVC fabric covered hangar at Brand, Germany. The largest freestanding hangar in the world, it is 360m long and 107m high.

Targeting sustainability: **social responsibility**

Increasing the knowledge base

HPV chemicals programme on target

Euro Chlor and its partners within the World Chlorine Council are on schedule in the development of data for about 150 chlorinated chemicals within the framework of the chemical industry's global chemicals management initiative. Launched at the end of 1998 by the International Council of Chemical Associations (ICCA), the initiative aims to complete hazard assessments – including toxicology and ecotoxicology data - for 1,000 high production volume (HPV) chemicals by 2004. Small consortia of producers have been established to jointly provide the needed data for 88 chlorinated substances. Consortia for a further 50 chlorinated chemicals will be set up in 2002.

The list includes substances that raise concerns because they are widely dispersed during use or because humans could be extensively exposed to them. Since it is difficult to tackle all chemicals simultaneously, the industry has set priorities for the chlorinated substances to be reviewed.

Products being examined in Europe include inorganic and organic compounds such as potassium chloride, caustic soda, 1,2-dichloroethane, 1,2-dichloropropane, 1,2-dichlorobenzene and 2,4-dichlorophenol. Two chlorinated compounds were among 11 initial industry hazard assessments approved at an OECD expert meeting in January 2001.

Euro Chlor participates through the European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC) in the Long-range Research Initiative, a chemical industry programme that includes studies of exposure, persistence and validation of modelling approaches. It is also collaborating with ECETOC on revision of the EU technical guidance document for risk assessments.

Literature reviews by independent experts on possible human health effects of chlorinated substances are also being funded, particularly in the fields of children's health, immunotoxicity and neurotoxicity. These are areas where relatively little is known and industry has a responsibility to fill data gaps.

Special biocides registration process

An area of direct concern to chlorine producers is the implementation of the EU Biocides Directive (98/8/EC). This will regulate the use of products such as disinfectants and preservatives, which are intended to destroy or control viruses or other harmful organisms. The Directive introduces a specific authorisation process for allowing the marketing of the 23 different classes of biocides. Producers are required to complete a two-step process under the Directive if their products are to remain on the market.

The first step is submission of a notification dossier by 28 March 2002. This must include information on applications and use plus summaries of the substance's physicochemical, toxicological and eco-toxicological properties. Products that are not notified by March 2002 must be withdrawn from the market. Those notified may be marketed for a further three years pending submission of the second-step full dossier. This must include efficacy data and a full risk assessment for each biocidal application notified.

The EU is currently suggesting that the administrative cost for each registration evaluation will be € 50,000-250,000. Additionally, the cost to companies of data collection for a new product has been estimated at € 2-4 million, although existing availability of data is expected to reduce these costs considerably for most chlorine-related products.

A centralised registration process is being set up within Euro Chlor to prepare notification dossiers for the 2002 deadline. Member company experts are currently working on draft notification dossiers for chlorine, sodium hypochlorite, calcium hypochlorite and caustic soda. Discussions are still underway on whether to submit notifications for caustic potash and hydrogen chloride. Even though most of the required data is available, it is becoming increasingly clear that the costs associated with registration will result in some companies discontinuing the marketing of products for certain applications.

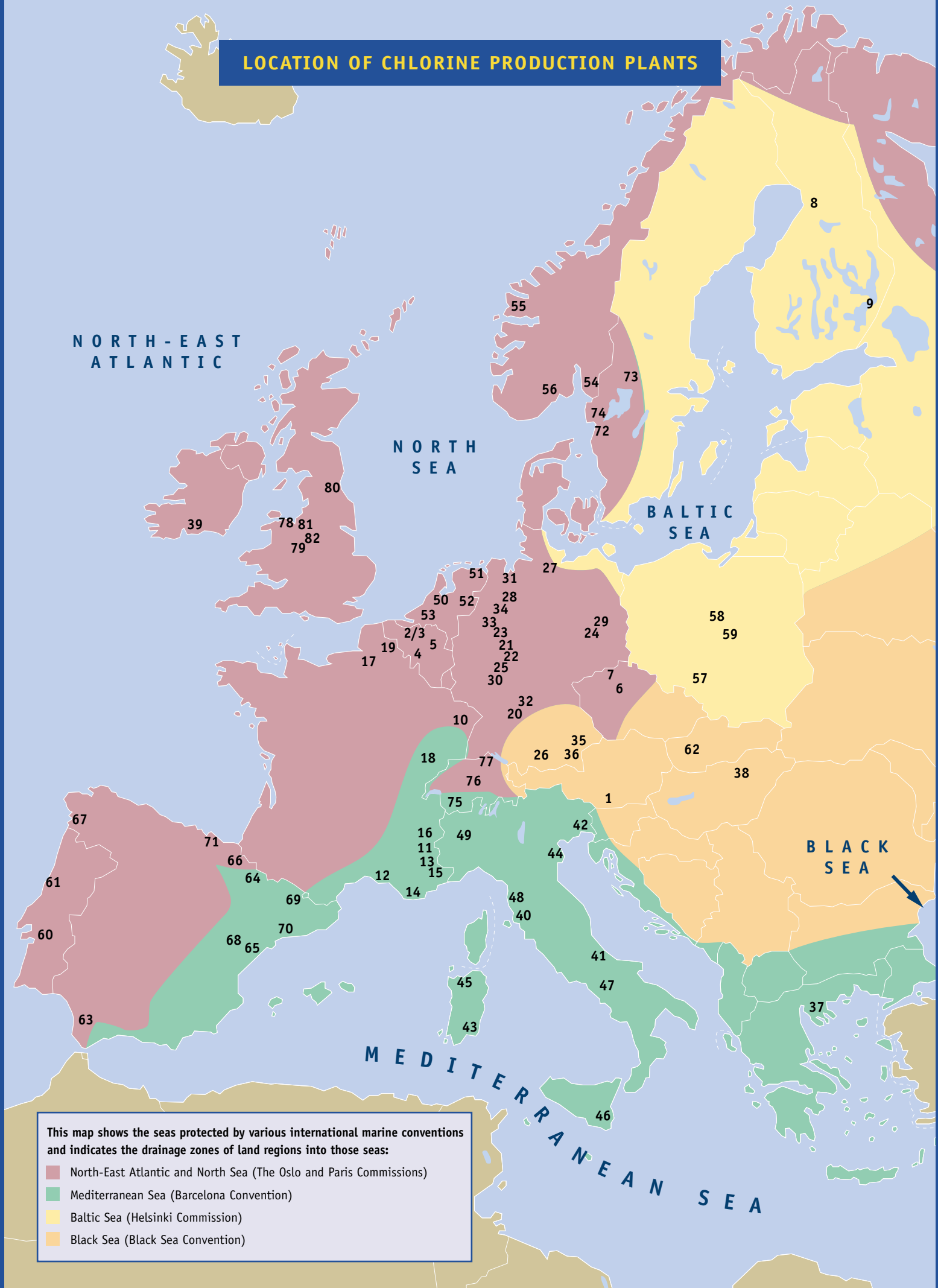
Further detailed information is available on the Euro Chlor public website, *Chlorine Online (www.eurochlor.org/chlorine/science/BPDIintro.htm)*.

Caustic soda - an essential co-product of the chlorine manufacturing process - is widely used industrially in a diluted form to rinse and disinfect glass bottles of all types.

The struggle of Politics vs. Science

Regulatory pressures continue to be exerted on the use of the chlorinated solvents perchloroethylene, trichloroethylene and methylene chloride. The European Chlorinated Solvent Association (ECSA), which is part of Euro Chlor, finds that political expediency is increasingly taking precedence over sound science.

For example, ECSA disagrees strongly with an EU Technical Progress Committee decision to change the health classification of trichloroethylene, under the EU Dangerous Substances Directive. The product – which is the most efficient metal-cleaning solvent available - will have to be labelled "may cause cancer".


LOCATION OF CHLORINE PRODUCTION PLANTS
NORTH-EAST ATLANTIC
NORTH SEA
BALTIC SEA
BLACK SEA
MEDITERRANEAN SEA
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This map shows the seas protected by various international marine conventions and indicates the drainage zones of land regions into those seas:
North-East Atlantic and North Sea (The Oslo and Paris Commissions)
Mediterranean Sea (Barcelona Convention)
Baltic Sea (Helsinki Commission)
Black Sea (Black Sea Convention)

COUNTRY	NUMBER on MAP	COMPANY	SITE	BASIN	PROCESS	CAPACITY (000 tonnes)
AUSTRIA	1	Donau Chemie	Brückl	D	M	55
BELGIUM	2	Solvin	Antwerp	A	Hg	100
	3	Solvin	Antwerp	A	Hg	230
	4	Solvin	Jemeppe	A	M	202
	5	Tessenderlo Chemie	Tessenderlo	A	Hg	250
CZECH REPUBLIC	6	Spolana	Neratovice	A	Hg	135
	7	Spolechemie	Usti	A	Hg	48
FINLAND	8	Akzo Nobel	Oulu	C	Hg	40
	9	Finnish Chemicals	Joutseno	C	M	75
FRANCE	10	Albemarle	Thann	A	Hg	72
	11	ChlorAlp	Pont de Claix	B	D	240
	12	Atofina	Fos	B	D, M	270
	13	Atofina	Jarrie	B	Hg	170
	14	Atofina	Lavera	B	Hg, D	326
	15	Atofina	Saint Auban	B	Hg	184
	16	Métaux Spéciaux	Pomblières	B	Na	20
	17	Prod. Chim. d'Harbonnières	Harbonnières	A	Hg	23
	18	Solvay	Tavaux	B	Hg, M	363
	19	Tessenderlo Chemie	Loos	A	Hg	18
GERMANY	20	BASF	Ludwigshafen	A	Hg, D	360
	21	Bayer	Dormagen	A	M	370
	22	Bayer	Leverkusen	A	Hg	240
	23	Bayer	Uerdingen	A	Hg, M	220
	24	Dow	Schkopau	A	M	220
	25	Vinnolit	Knapsack	A	Hg	150
	26	Clariant	Gersthofen	D	M	40
	27	Dow	Stade	A	D, M	1270
	28	ECI	Ibbenbüren	A	Hg	120
	29	ECI	Bitterfeld	A	M	65
	30	Degussa	Lülsdorf	A	Hg	140
	31	Ineos Chlor	Wilhemshafen	A	Hg	130
	32	LII Europe	Hoechst Fkft	A	Hg	150
	33	Solvay	Rheinberg	A	D	200
	34	Vestolit	Marl	A	Hg	180
	35	Vinnolit	Gendorf	D	Hg	72
	36	Wacker	Burghausen	D	M	40
GREECE	37	Hellenic Petroleum	Thessaloniki	B	Hg	37
HUNGARY	38	BorsodChem	Kazinbarcika	D	Hg	125
IRELAND	39	MicroBio	Fermoy	A	M	6
ITALY	40	Altair Chimica	Volterra	B	Hg	27
	41	Ausimont/Montedison	Bussi	B	Hg	70
	42	Caffarro	Toreviscosa	B	Hg	69
	43	EniChem	Assemini/Cagliari	B	M	170
	44	EniChem	Porto Marghera	B	Hg	200
	45	EniChem	Porto Torres	B	Hg	90
	46	EniChem	Priolo	B	Hg	190
	47	Eredi Zarelli	Picinisco	B	Hg	6
	48	Solvay	Rosignano	B	Hg	120
	49	Tessenderlo Chemie	Pieve Vergonte	B	Hg	40
NETHERLANDS	50	Akzo Nobel	Botlek	A	M	350
	51	Akzo Nobel	Delfzijl	A	D	140
	52	Akzo Nobel	Hengelo	A	Hg	70
	53	GEP	Bergen-op-Zoom	A	M	64
NORWAY	54	Borregaard	Sarpsborg	A	M	40
	55	Elkem	Bremanger	A	M	10
	56	Norsk Hydro	Rafnes	A	D	130
POLAND	57	Rokita	Brzeg Dolny	C	Hg	120
	58	Organika Zachem	Bydgoszcz	C	D	50
	59	Anwil	Wloclawek	C	D	180
PORTUGAL	60	Solvay	Povoa	A	M	28
	61	Uniteca	Estarreja	A	Hg, M	61
SLOVAK REPUBLIC	62	Novacke Chemicke	Novaky	D	Hg	76
SPAIN	63	EIASA (Aragonesas)	Huelva	A	Hg	101
	64	EIASA (Aragonesas)	Sabinanigo	B	Hg	25
	65	EIASA (Aragonesas)	Villaseca	B	Hg, M	175
	66	Electroq. de Hernani	Hernani	A	Hg	15
	67	Elnosa	Lourizan	A	Hg	33.5
	68	Ercros	Flix	B	Hg	150
	69	Quimica del Cinca	Monzon	B	Hg	30
	70	Solvay	Martorell	B	Hg	209
	71	Solvay	Torrelavega	A	Hg	63
SWEDEN	72	Akzo Nobel	Bohus	A	Hg	100
	73	Akzo Nobel	Skoghall	A	M	90
	74	Norsk Hydro	Stenungsund	A	Hg	120
SWITZERLAND	75	Syngenta	Monthey	B	Hg	22
	76	Saürefabrik Schw.	Pratteln	A	Hg	26.5
	77	Solvay	Zurzach	A	Hg	55
UK	78	Associated Octel	Ellesmere Port	A	M	40
	79	Albion Chemicals	Sandbach	A	Hg	89
	80	Ineos Chlor	Wilton	A	D	170
	81	Ineos Chlor	Runcorn	A	Hg, M	763
	82	Rhodia	Staveley	A	Hg	29

BASIN A: North Sea - Atlantic C: Baltic Sea
B: Mediterranean Sea D: Black Sea

PROCESS Hg: Mercury M: Membrane
Na: Sodium D: Diaphragm

Science is key to sound regulation

However, ECSA continues to believe that the science does not justify this change from cancer category 3 (with labelling risk phrase R40) to category 2 (with risk phrase R45) which, under the Solvents Emissions (VOC) Directive, would mean that substitute cleaning products would have to be assessed by users.

Trichloroethylene users may continue to use the product safely under recommended conditions until Member States have implemented the decision, a process that should be completed by July 2002.

The EU decision was based on apparent health effects of historical usage patterns, which are no longer relevant. ECSA believes that in addition to the potential socio-economic impact, the results of current research should be taken into account. The association is funding further epidemiological studies to verify the safety of the solvent under current European working conditions.

ECSA notes that a life cycle analysis by Ecobilan showed that aqueous alternatives have a far higher environmental impact than trichloroethylene, which uses much less energy and avoids the need for detergents, which may pollute the water.

Health and environmental issues related to another chlorinated solvent, perchloroethylene, were reviewed at a workshop (January 2001) for dry cleaners. The workshop was organised by ECSA in co-operation with the International Committee on Textile Care (CINET). More than 30 delegates from across Europe heard that achieving sustainability would need the continuing co-operation of all stakeholders: producers, distributors, dry-cleaners, recyclers, research institutes and machine manufacturers.

Small, but important, victory

The EU Council of Ministers' decision to uphold a Commission proposal for a limited ban on short-chain chlorinated paraffins (SCCPs) was a small, but important, victory for science over politics.

The ban, which the European Parliament Environment Committee amended to encompass applications other than metalworking and leather treatment, flows from draft legislation first proposed in July 1999. It is based on the EU risk assessment of SCCPs – one of the first to be completed under the EU process. However, the Commission maintained that the risk assessment showed that risks from the other applications were negligible.

The Council's support effectively endorsed the risk assessment procedure, which is viewed by industry as fundamental to ensure scientifically sound regulation of chemicals. The SCCP legislation is subject to the co-decision procedure and now returns to Parliament in autumn 2001 for a second reading.

Euro Chlor believes that in the light of the more up-to-date EU risk assessment for SCCPs, there is a need to review the outdated PARCOM 95/1 decision recommending a phase-out of SCCPs as flame-retardants in plastics, rubber and textiles, and as plasticisers in paints and coatings. To date, the OSPAR recommendation has been implemented only in The Netherlands, Finland, Sweden and Belgium.

Use of short-chain chlorinated paraffins in Western Europe has fallen from 13,000 tonnes in 1994 to about 4,000 tonnes in 2000, whilst environmental emissions have been reduced 70% during the same period. Implementing the Commission proposal will achieve an overall 98% reduction and leave just 50 kg/year for use in other applications, where they are often essential for safety and pose no threat to the environment.

Eco-labels – a potential tool for discrimination?

The European eco-label scheme was launched in 1993, ostensibly to encourage manufacturers to make products that are less damaging to the environment and to provide consumers with clear information so that they can make an informed choice. The EU scheme runs in parallel with national eco-label schemes.

The Regulation notes that an eco-label "may not be awarded to substances or preparations classified as very toxic, toxic, dangerous to the environment, carcinogenic, toxic for reproduction, or mutagenic...nor to goods manufactured by processes which are likely to significantly harm man and/or the environment, or in their normal application could be harmful to the consumer".

Equal treatment needed for all chemicals

In practice, it appears that the phrase "substances or preparations classified..." is interpreted to mean "substances or preparations containing chemicals classified...". Although it is said that the criteria for awards are based on the life cycle of the product, there is no requirement to base decisions on science and risk assessment. As a result, pressures have increased for 'politically' motivated criteria rooted in environmental dogma rather than environmental effect. Halogenated chemicals seem to be particularly targeted.

Moreover, there is little consideration given to efficacy or safety within the criteria. This results in the exclusion of products containing halogenated fire retardants in electrical equipment or, more bizarrely, the exclusion of any preparation containing bleach from all-purpose and sanitary cleaners on the basis of its toxicity classification. It appears to have escaped notice that it is this ability to kill bacteria that makes bleach the most effective low-cost biocidal product for protecting public health.

Equally worrying to industry is the use of eco-labels in 'green purchasing' for public procurement. In the July 2001 Communication on the possibilities for integrating environmental considerations into public procurement, the Commission re-iterated Article 10 of the Eco-label Regulation: "*In order to encourage the use of Eco-labelled products the Commission and other institutions of the Community, as well as other public authorities at national level should, without prejudice to Community law, set an example when specifying their requirements for products.*"

Chlorinated compounds are used in the manufacture of a diverse range of consumer products that offer real benefits in everyday life. Euro Chlor believes that the present approach to eco-labelling may discriminate unjustifiably against products that incorporate or use chlor-alkali derivatives in their manufacture. Euro Chlor together with other producer and user associations will continue to argue for the equal treatment of all chemicals with suitability based on risk assessment of the specific application.

Sharing best practices

Transportation safety

Whenever possible, Western European producers minimise the transportation of chlorine and there have been no chlorine-related fatalities due to bulk shipments during the past 50 years.

In fact almost 90% of all chlorine is manufactured and used or converted on the same site. About 5% of chlorine production is currently transported by rail in special crash-resistant tank cars for use at another location and a similar quantity is moved between sites by inter-plant pipelines. Road transportation, in equally protected state-of-the-art vehicles, amounts to less than 2% of annual production. Bulk chlorine movements by water were discontinued in Europe in 1996.

Dedicated bulk tank cars move chlorine in The Netherlands

As part of its efforts to share best practices on safe manufacture, distribution and handling of chlorine, Euro Chlor maintains a wide range of technical literature for producers and users. Five new publications were issued during 2000 bringing the total available to over 100. During 2002, most of these publications will be available via the website *Chlorine Online* (www.eurochlor.org).

Publicising such material on the Internet will make it more easily available to chlorine producers and users both in Europe and in other parts of the world, particularly where there is no established national chlorine association.

Building on its long-established European database, Euro Chlor is also developing a worldwide database of chlorine accidents. This is being done on behalf of the WCC, again with the objective of enabling producers across the world to learn from each other and share best safety practices.

Targeting sustainability: **economic development**

Chlorine production reaches 12-year high

Higher production and improved capacity utilisation rates during the past two years (1999-2000) underscore chlorine's role as a key building block for the European chemical industry.

One third of chlorine recycled

Chlorine is a reliable barometer of economic activity. Production in Western Europe during 2000 totalled 9.70 million tonnes - the highest since 1988 (9.82 million tonnes) – which was a 5.2% increase over the 1999 figure of 9.22 million tonnes. European consumption of chlorine's essential co-product, caustic soda, totalled 10.11 million tonnes in 2000 out of a total production of 10.14 million tonnes.

With rises in electricity costs in the US outstripping those in Europe together with the weakening of the Euro, the competitive position for European chlorine producers temporarily improved during 2000. The gain in chlorine volumes was also partly due to continuing recovery of the Asian economies from their low in 1998. For the first time ever, European cellroom operating rates outstripped those of US competitors. However, the significant fall in growth of the global economy had a marked downwards effect on production in the first half of 2001.

Because chlorine is such an established key raw material for many chemicals and plastics, changes in use tend to occur gradually over time. To improve understanding of production, use and recycling of chlorine, Euro Chlor periodically conducts a detailed analysis of the total industry chain.

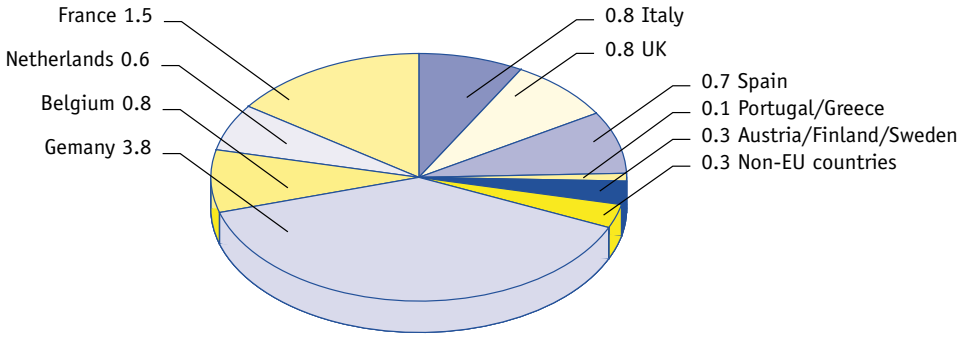
The latest in-depth *Chlorine Flow Study* completed in 2000 confirms that PVC continues to be the largest single end-use of chlorine, accounting for 35% of production. In fact engineering materials - polymers, resins and elastomers - consume about two-thirds of European chlorine production.

Since the late 1970s, there has been a sharp increase in chlorine use for making phosgene, di-isocyanates and propylene oxide, precursors for making polyurethanes and polycarbonate plastics. Conversely, since the early 1980s, use of elemental chlorine has fallen – mainly as a result of being phased out in pulp bleaching in Scandinavian countries.

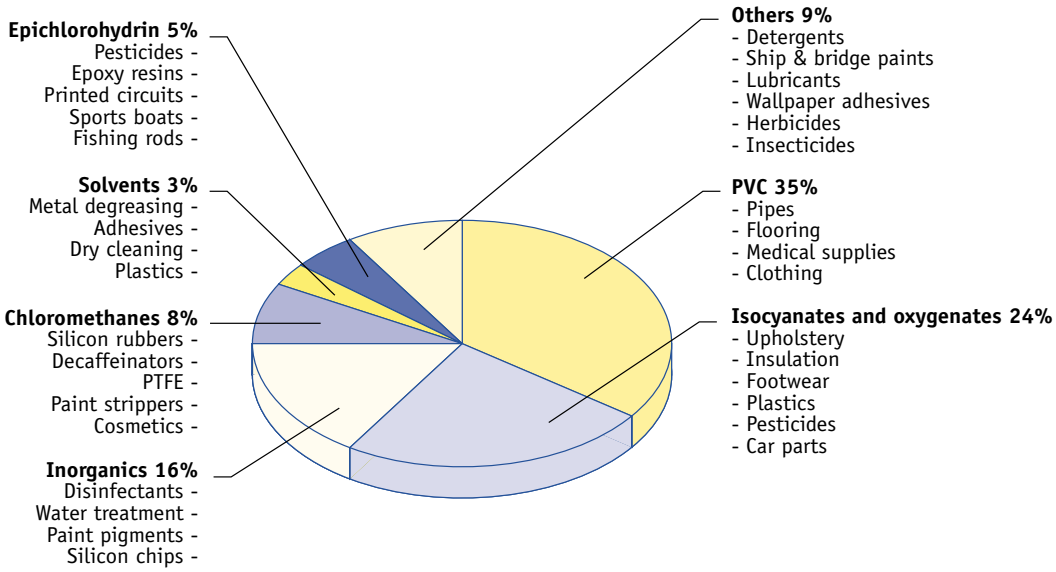
Although not generally recognised outside the industry, many European chlorine producers operate integrated sites where there is the scope to achieve high recycling levels within their complexes and this is being progressively improved. In 1998, 35% of chlorine was recycled within chemical processes compared with 33% in 1997 and 31% in 1996.

Western European chlorine production in 2000

Total production: 9.7 million tonnes

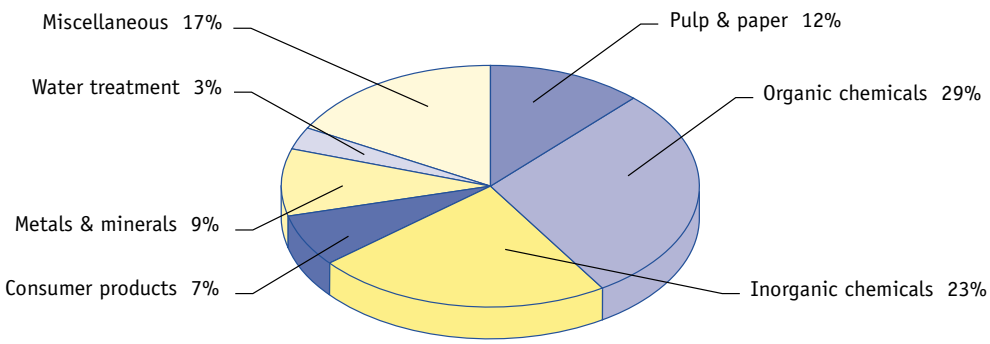


Western European chlorine applications in 2000



Western European caustic soda applications in 2000

(10.1 million tonnes)



Communications

Porto forum examines risk assessment methods

As part of our industry's continuing activities to improve awareness and understanding of issues related to chlorine, a forum on *Assessing the risks of chlorinated substances for health and the environment* was held in Porto (May 2000). Some 76 delegates – including six journalists and 23 regulatory or scientific representatives - attended this WCC Second International Science Research Forum. In addition to Europeans, there were delegates from Japan, the USA, Saudi Arabia, Canada and Brazil.

The forum, which was organised primarily by Euro Chlor on behalf of WCC, concluded that the future of the risk evaluation of chemicals depends on industry's ethical commitment, stakeholder involvement and political will.

Sharing best HSE practices

As part of its commitment to sharing information on best health, safety and environmental practices, Euro Chlor held its 5th Technical Seminar, *A sustainable future for chlorine* on 8-9 February 2001, in Barcelona. The seminar was opened by Felip Puig (Minister of Environment in the Government of Catalunia), who spoke about the chemical industry and the environment.


European Chlorine Sector Braces For Conversion

NEGOTIATING AWAY MERCURY EMISSIONS

There were more than 260 delegates from 31 countries, with 32 firms represented at the accompanying technical exhibition. During the two-day event, 18 topics were discussed in depth. Industry speakers discussed, for example, operational reliability and quantitative plant risk assessments, conversion to membrane technology and occupational health issues.

Speakers from outside the industry included Don Litten (co-ordinator of the EU Integrated Pollution Prevention and Control Bureau in Seville) and Victor Macià (Director of the Catalunia Government Centre for Occupational Health and the Working Environment) as well as independent technical and economic experts.

Fourteen journalists from six countries participated in the seminar and also a special media visit to Solvay's Martorell chlorine plant near Barcelona where a briefing was given on the industry's voluntary commitments to OSPAR on mercury cells.

On the move towards sustainability

This autumn Euro Chlor will publish its first brochure on sustainability and the European chlor-alkali industry. "*On the move towards sustainable development*" will explain the contribution that the sector makes to the economic, social and environmental well-being of society.

The brochure addresses health, safety and environmental issues and the steps that member companies are taking to develop voluntary commitments encompassing emission reductions, manufacturing and transportation safety and reductions in energy and water consumption. Readers interested in receiving a copy when published should email their name and address to can@cefic.be.

Occupational health

In the same vein as the Barcelona event, Euro Chlor organised a health seminar in Warsaw (October 2000). About 50 medical practitioners and plant managers from primarily Eastern European countries participated in discussions on various work-related topics, including the issue of medical treatment for accidental chlorine exposure.

A Euro Chlor code of practice – published ahead of the seminar – provided detailed workplace recommendations. It includes information on how to measure worker exposure at the recommended new, low short-term exposure limit of 0.5 ppm.

Worker health monitored

Electromagnetic fields (EMF) in chlor-alkali production were also discussed at the Warsaw meeting and compared with exposure limits recently adopted in EU Member States. Additional data is to be compiled on workplace exposure.

The Warsaw seminar participants also heard that an independent study of Norwegian chlor-alkali workers has confirmed that workplace exposure to very low doses of mercury has no measurable adverse health effects. Exposure of European workers to mercury is monitored constantly following a Euro Chlor code of practice. Based on this, results over the last 10 years have shown a significant decrease in urinary levels of this metal among workers.

Need to improve awareness of chlorine benefits

The importance of improving public understanding of the benefits of chlorine and the issues affecting the industry has never been greater.

A pan-European opinion survey in spring 2000 revealed that more than eight out of ten people in France (84%), Italy (88%) and Britain (93%) know nothing or little about chlorine. Of 3,000 people interviewed in the three countries, only a small proportion (7-16%) claimed to know something about chlorine. The majority of these had a more favourable opinion of the chlorine sector than of the chemical industry as a whole.

The survey confirmed that most of the general EU population is not aware of the extent to which chlorine is used in a wide range of everyday products and applications that protect public health and maintain living standards.

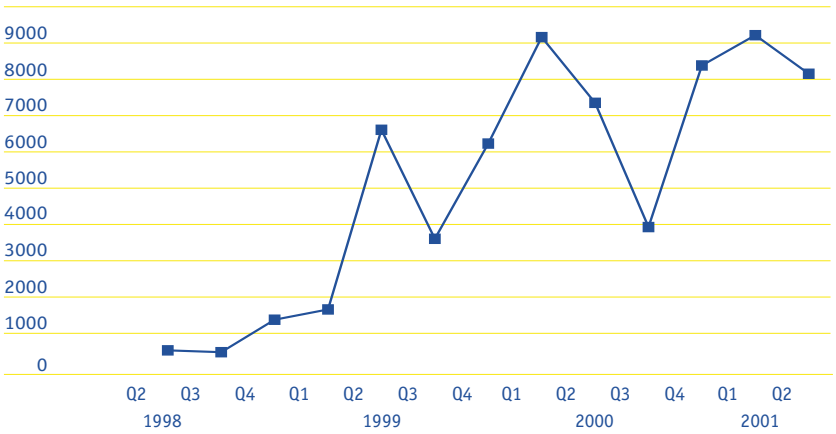
Renewed effort is needed to improve knowledge about chlorine among specific stakeholders, including government officials, regulators and politicians. This poses an additional challenge to the chemical and plastics industries, but is essential to help achieve consistently equitable, non-politicised regulatory decisions on the manufacture, use and disposal of products.

With the evolution of the Internet, society has at its disposal a highly effective communications tool that reaches across national boundaries. The chlorine sector has taken advantage of this at national, regional and international levels. For example, during 2000, Euro Chlor upgraded its then two-year old website *Chlorine Online* (www.eurochlor.org).

Changes have been made to make the website more user friendly and attractive. A topical news feed has been added to the website home page and is regularly updated with news of industry developments. This has substantially improved the number of visits to the site with almost 300 people visiting *Chlorine Online* every day. During the first half of 2001, there were 52,000 visits compared with 30,000 for the same period in 1999.

Internet information sources

***Chlorine Online* visits (quarterly averages)**



To illustrate the diverse range of end-uses for chlorine chemistry, a special *World of Chlorine Chemistry* screen saver was developed and made available free to website visitors. Several hundred were also distributed on a CD-ROM to key opinion-formers.

At the national level, chlorine associations of several countries – including Belgium, Italy and the United Kingdom – maintain informative websites on chlorine chemistry. In France a new website (www.conso.org) on safe use of chlorinated household products was launched in spring 2001 by a coalition of seven French consumer associations with the support of the Syndicat des Halogènes et Dérivés.

Educational initiative in Spain

The Spanish chlor-alkali industry association (ANE) has undertaken an educational project, the *Chlorine workshop,* a teaching unit giving students information about chlorine. Educational materials include fact sheets on chlorine as a chemical element, its applications and role in everyday life, production processes, health, safety and environmental aspects. These are being distributed on CD-ROM to high schools in cities near chlor-alkali plants.

White Book on chlorine industry in Belgium

Euro Chlor associate member BelgoChlor updated its *White book on Chlorine*. The second edition – published in French and Dutch – provides a useful reference source on all aspects of chlorine, including socio-economic aspects, health and environmental issues and production and use in Belgium.

New edition of academic book on chlorine

Apart from producing and publishing material about the sector, Euro Chlor also collaborates with others to help improve public access to independent information about chlor-alkali chemistry. For example, in 2000 Euro Chlor assisted publishers Wiley-VCH Verlag by reviewing for technical accuracy a new edition of the text book *Chlorine: Principles and Industrial Practice* (ISBN 3-527-29851-7; editor: P Schmittinger). Chapters cover physical, chemical and toxicological properties of chlorine; production processes; handling; quality, specifications and analytical methods; uses; economic and ecological aspects.

Euro Chlor Federation

Emphasis on *Responsible Care*

Ensuring best health, safety and environmental practices

Euro Chlor represents 85 industrial companies directly employing more than 40,000 people in the chlor-alkali sector across 21 countries. Almost all chlor-alkali producers in the European Union and 10 producers in Eastern Europe and the Middle East, belong to the federation. Members also include engineering and equipment suppliers worldwide, downstream users and 11 European national chemical industry associations.

Member companies of Euro Chlor, which is an affiliate of Cefic (the European Chemical Industry Council), operate 82 chlorine plants and annually produce a combined total of about 20 million tonnes of chlorine, caustic soda and hydrogen. These three materials serve other parts of industries employing 2 million people.

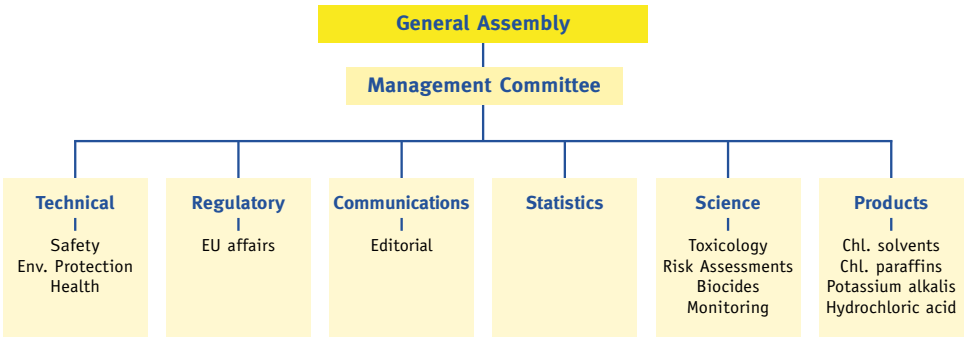
An integral part of Euro Chlor is the European Chlorinated Solvent Association (ECSA), which represents the interests of chlorinated solvent producers. Euro Chlor and ECSA work on behalf of their members towards the goal of achieving a sustainable future for chlor-alkali chemistry and derivative products. A strong emphasis is placed on advocacy and the provision of balanced and objective science-based information to regulators, politicians, scientists, the media and other interested stakeholders.

Ensuring the best health, safety and environmental practices in the manufacture, handling and use of chlor-alkali products is also an essential element of Euro Chlor activities in order to assist our members in achieving continuous improvements (*Responsible Care*).

Management Committee and staff

The Management Committee of Euro Chlor provides overall direction and strategic guidance to the Secretariat. The nine executives and five support staff work closely with specialised committees and working groups to implement agreed action programmes. There are seven main committees and a multiplicity of working groups providing specialist advice and assistance in such areas as advocacy, scientific research, safe production, transportation, and use and disposal of chlor-alkali derivatives.

Euro Chlor committees & principal working groups



Management Committee

Scheffers, H C J	Akzo Nobel	**Tane, C**	Ineos Chlor
Pernot, Ph	Atofina	**Lydersen, O**	Norsk Hydro
Bergmann, U	BASF	**Zak, J**	Rokita
Wienkenhöver, M (co-chair)	Bayer	**Mesland, J-M** (co-chair)	Solvay
Guinet, J-F	ChlorAlp	**Aparicio Díez, M**	Solvay Química
Schollemann, F	Dow	**Linard, B**	Tessenderlo Chemie
Erba, A	EniChem	**Ertl, J**	Vinnolit
Smith, S	Finnish Chemicals		

Secretariat Staff

Management
Dr Barrie S Gilliatt, *Executive Director*
Françoise Minne, *Assistant*

Product Management
André Orban, *Derivatives Manager (ECSA & Chlorinated Paraffins Co-ordinator)*
Françoise Minne, *Assistant*

Communications
Peter Whippy, *Manager*
Griet Provoost, *Co-ordinator*

Environmental & Regulatory Affairs
Dr Arseen Seys, *Director*
Caroline Andersson, *Regulatory Affairs Co-ordinator*

Science
Prof. André Lecloux, *Director (until 01/04/02)*
Véronique Garny, *Manager*
Dr Dolf Van Wijk, *Manager (from 01/09/01)*
Dr Raf Bruyndonckx, *Manager*
Vivianne Norré, *Senior Secretary*

Technical & Safety
Dr Guy Mesrobian, *Manager*
Carole Vanderlinden, *Secretary*

Membership

Full Members
Akzo Nobel
Albemarle
Albion Chemicals
Anwil
Aragonesas Industrias y Energia
Atofina
Ausimont
BASF
Bayer
Borregaard Industries
BorsodChem
Caffaro
ChlorAlp
Dow
ECI Elektro-Chemie Ibbenbüren
Electroquímica de Hernani
Electroquímica del Noroeste
EniChem
Ercros
Finnish Chemicals
GE Plastics
Hellenic Petroleum
Ineos Chlor
LII Europe
Métaux Spéciaux
Norsk Hydro
Novácke Chemické Závody
Produits Chimiques d'Harbonnières
Química del Cinca
Rhodia
Rokita
SF-Chem
Solvay
Solvin
Spolana
Spolchemie
Tessenderlo Chemie
Uniteca
Vestolit
Vinnolit
Zachem

Associates
Arch Chemicals
Asociación Nacional de Electroquímica (Spain)
Association of Chemical Industry of the Czech Republic
Chemical Industries Association (UK)
Cotelle (Colgate-Palmolive)
De Nora Impianti
Du Pont de Nemours
Electrochemical Industries Ltd
ExxonMobil Chemical Europe
Fédération des Industries Chimiques de Belgique
Federazione Nazionale dell'Industria Chimica (Italy)
Leuna Tenside
National Petrochemical Company of Iran
NCP
Pentachlorophenol Task Force (USA)
Polish Chamber of the Chemical Industry
Procter & Gamble Eurocor
Schweizerische Gesellschaft für Chemische Industrie (Switzerland)
Sveriges Kemiska Industrikontor (Sweden)
Syndicat des Halogènes et Dérivés/Chimie Minérale (France)
Unilever Hellas
Verband der Chemischen Industrie (Germany)
Vereniging van de Nederlandse Chemische Industrie (The Netherlands)

Technical Correspondents
3V Sigma
Arabian Chlorine Co
Avecia
Beltech
Buckbee-Mears Europe
Carburos Metalicos
Chemtec
Claushuis Metaalmaatschappij
Descote
Electroquímica de Sagua
Garlock Sealing Technologies
Kerr-McGee Pigments
Krebs Swiss
Kronos Europe
KSB-AMRI
Nufarm Coogee
Occidental Chemical Belgium
Phönix Armaturen-Werke Bregel
Polifin
Pottasche Stassfurt
Preussag Anlagenbau
Quicksilver Recovery Services
Reliance Industries
Resistoflex
Samson
Schumacher Umwelt und Trenntechnik
Senior Flexonics Ermeto
Severn Trent Water
Shaw, Son & Greenhalgh
Shell Nederland Raffinaderij/Chemie
Technip LCI
Washington Group International
W L Gore & Associates

Euro Chlor is the voice of the European chlorine industry. It plays a key communications and representation role on behalf of its members, listening and responding to society's concerns about the sustainability of chlorine chemistry.

For further information contact:

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EURO CHLOR
REPRESENTING THE CHLOR-ALKALI INDUSTRY

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