
To European Commission:

- Mr. Schulte Braucks
  Head of the Chemicals Unit (DG Enterprise)
- Mr Krämer
  Head of the Waste Management Unit (DG Environment)

  200 rue de la Loi
  B 1049 Brussels
  Belgium

  E-mail: env-PVC@cec.eu.int

- Copy to: **Mr Martyn Griffiths**
  Communications Manager
  ECVM
  Avenue E. Van Nieuwenhuyse 4, Box 4
  B-1160 Brussels
  Belgium
  E-mail: Martin.Griffiths@apme.org

  **Centro di Informazione sul PVC**
  Via M.U. Traiano, 7, 20149 Milano
  E-mail: infoPVC@tin.it

**Subject**: Answers and comments of Graziano Vidotto on the "Green Book on PVC "
(Centro di Informazione sul PVC - Milan - Italy)

## *1. Preliminary remarks and answers to the Green Book*

I am Graziano Vidotto, and I represent the Italian Association "Centro di Informazione sul PVC". In the context of the Italian PVC industry, constituted by about 25.000 direct employees working in 1.200 companies to manufacture and to convert into final products 960.000 tons/year of PVC with a total turnover of 12.000 billion Lira/year, the "Centro di Informazione sul PVC" has as associates the main Italian manufacturers of PVC polymer and additives, converters and manufacturers of the innumerable PVC final products destined to different application and industrial sectors.

The position of the Italian PVC industry on the environmental issues reviewed and reported in the Green Book of the European Commission, is entirely coincident with the position of the European PVC industry as well expressed in the European industry document "The European PVC's response to the questions contained in the EU Commission Green Paper on Environmental issues of PVC" dated 20th October 2000.

As representative of the Association "Centro di Informazione sul PVC" I have nothing to add to the above document as it concerns answers to specific issues and suggestions on the options to adopt for solving the open questions.

## 2. Comments

As personal contribute to the PVC issues raised in the Green Book, I would like to stress and highlight the "rules of the game" for the living and operating in a complex Civil Society as it is the European one, and I would like also to report some considerations on the meaning and evaluation of the environmental sustainability of PVC material which includes the residual risks of the material and of the relevant activities.

### *2.1 Rules of the game: legislation and knowledge*

The fundamental guarantees for a safe cohabitation in a Society open and innovative, democratic and conscious as it is the European one in which we live, are ensured by the compliance with the existing laws as produced and published by the National and European competent Institutions.

The compliance with the laws is clearly an obligation for all citizens in their activities in the present, even if, simultaneously, the human knowledge in all fields, including safety and environmental impact, is moving foreword to possibly define new temporary certainties (positive or negative with respect of the existing one) on the issues of interest and review. The progress in

the human knowledge has not a mono-directional front of advancement and usually it is multi-direction, fluid and uncertain as it is for the situations in development.

The sharp line on which the existing legislation is based - for nature and necessity - is not on the exploration front to acquire new knowledge, but is behind on a well defined line of compulsory reference that clearly separates those which are operating in compliance from those which are infringing the existing laws. This line, the compliance with the laws, gives sufficient human guarantee to assure everyone (operators in specific sectors, consumers and population) on their operative correctness, at least until this reference will be modified from the competent Institutions-Authorities.

The temporary-certainties line, on which the legislation is based, corresponds to the minimization of the risks for the human being and is modified by the competent Institutions-Authorities when new consolidated knowledge comes out and the Institutions recognize the need for a more adequate guaranteed margin of safety for the Civil Society. Really the line of the temporary certainties is a dynamic equilibrium, destined to change with the time, between the consolidated knowledge supporting the existing legislation and the progress of the knowledge on the effects (never known in their entirety) of materials and correspondent activities on men's health and on environment situation.

The issues of safety and environmental sustainability of the industrial PVC cycle and of the PVC end products, as it happens for all the other industrial cycles and correspondent products, are placed in this general frame of the human living in a Civil Society. If we take a picture similar to the one reported in the Green Book for the PVC product, of the present situation of knowledge, open issues and possible options to work on them for other polymeric materials as for example PE, PP, PST, PET (which have no more than 50 years of industrial life) and for non-polymeric material with longer life in use, but not necessarily more known, we surely will obtain the same results reported in the Green Book for the PVC. It means that the result will be the need of research on different aspects of the cycle to increase knowledge on the open problems and the several possible options of work to increase safety margins for operators and for consumers and to further decrease the environmental impact of the products and relevant activities.

The process of reviewing and updating the knowledge concerning safety and environmental impact of PVC, as reported in the Green Book of the European Community, does not evidence in the existing legislation inadequacies such to require urgent interventions; moreover, in the context of existing laws, it has shown open issues requiring development of knowledge and technologies. This issues have to be solved, in the short-medium future, for PVC (as well as for other materials)

to establish and extend in the Society a satisfactory and rational system of waste management for the post-consumer PVC products and to increase safety margins for the use of PVC products in some application sectors.

On the above base, the work of reviewing and updating the knowledge on PVC products that the European Commission has carried out, to be used in operative terms as in new legislations, should be completed evaluating all the life cycle of the PVC and not only the end-of-life aspect and should be applied, at least, to all materials used in same application sectors.

Without this completion of the PVC knowledge and without the review of alternative materials used in same application sector, possible new legislation on PVC would result in a damage for the product more and better known and for the manufacturers and converters available to operate, on a voluntary basis, to further minimize residual risks. In other terms, the result should be advantageous for the alternative materials, less known and not yet deeply reviewed by the European Commission on their knowledge and open issues concerning possible effects on human health and environment.

Alternative materials to PVC suggested by Greenpeace are usually less known than PVC as it concerns their effects, mainly in medium-long term, on men's health and on environmental impact.

The PVC industry is constituted by citizens, equal to all the others, that have to respect existing laws and to adequate themselves to new legislations; moreover they are available and want to move voluntarily to increase knowledge and to minimize residual risks of their activities and relevant PVC materials in order to protect more and better themselves and the consumers of their products (the entire population). However this movement should occur in a basically "homogeneous" context of residual risks for the various materials and activities, at least with reference to the materials used in same industrial and civil sectors (building, packaging, medical devices, electrical isolation).

To impose by laws, for precautional reasons, residual risks of $10^{-5}/10^{-6}$ for a product or sector activity and to allow, also for non-knowledge, residual risks of $10^{-3}/10^{-4}$ for other materials and activities, corresponds to make uncertain and disadvantaged the continuation of the life of the known and safe activities and relevant products with very likely advantage of other less known activities and products.

It should be an enormous damage for the Civil Society and it would means that the Institutions adopt "rules of the game" which are not uniform and therefore not fair for some of the players of the Civil Society.

### *2.2 Environmental sustainability of materials and relevant activities*

At the moment (and probably for a lot of time), sustainability problems of materials and of their relevant activities do not have all the necessary and required knowledge to give exhaustive answers to the actual requirements.

In the evaluation of the environmental sustainability of all the materials (natural and industrial), the approach is that of using the incomplete existing knowledge and to work to increase this knowledge acquiring quantitative data on the much which is not yet known. Environmental sustainability includes data of energy consumption and material recycling, energy and raw materials recovery from post-consumer products, emissions in the environment and their influence on the greenhouse effect and on the ozone-layer, effects on men's health and environmental impact of products, by-products and decomposition and combustion products.

The environmental sustainability is certainly a very complex and open issue, particularly with regard to the evaluation of the risks of different materials on men's health and environment. The human life is getting longer and scientific methodologies and technologies developed and available at the present, impose and allow to evaluate risks for men's health of next generations (first and second at least), risks not even considered until some time ago. In other terms, environmental sustainability is an open issue with answers linked to the time we are living in and partial as it concerns the minimization of risks in particular those coming from new materials.

We are living in and we are surrounded by an environment in which materials, artificial and natural and their by-products, represent potential risks for the men (as for example carbon monoxide, fuel oils, cyclical and poly-cyclical hydrocarbons, sulphur dioxide, formic aldehyde and chlorine) and we operate in a world full of real risks (as cars and preserved food).

The human approach to reduce these real and potential risks is the obvious one of complying with the existing legislations and of working to minimize known risks in a context of homogeneous and general minimization.

The "zero" risk, unfortunately, does not exist and do not constitute a possible option for the activities of the man on the heart.

In these conditions, the ban of PVC flexible products from toys for children and medical devices, proposed by Greenpeace and their allies, following a precautionary principle expressed by "it is not possible to state that the risk (linked to the use of these PVC products) is zero", is completely unrealistic as it is not possible to state a zero risk for any material or human activity. The application of the criteria "zero-risk" would mean the ban of all materials examined by the Commission.

On the other part, in the today European world, rich in materials and alternative choices, the ban of few examined materials, on a basis of unrealistic criteria and not on consolidated and safe knowledge, should be market-exploited by alternative materials.

In this world multi-material, competitive and often with fideistic pressures and with market - manipulation, it is the task of the Insitutions to:

- guarantee evaluations and legislations based on scientific knowledge humanly certain and on objective and impartial methodologies;
- support and promote initiatives, that in the context of the existing laws, tend to minimize materials' risks in a frame of homogeneous reduction of residual risks of all materials.

I am confident that the operative conclusions that the European Commission will draw from the Green Book and from the Consultation process, are based on scientific knowledge humanly certain, are coherent and uniform for all the players of the multi-material Society and I hope that PVC will not become the useless scapegoat of general problems.
The temporary ban of flexible PVC toys for children under 3 years of age, issued in 1999 by the European Commission, puts some doubts in my confidence and hope. With motivations similar to those used by the European Commission to temporarily ban PVC from toys, it is possible to ban all materials and products; for example it is not possible to exclude, and this could cause some concern, that the drinking-water contains a heavy metal molecule, that could trig a tumor in our body.

### *3. Conclusions and wishes*

I wish that the life together and the activities in the European Community are based and will be based on the following values: democratic participation, uniform rules of the game based on existing knowledge humanly reliable, refusal of fideistic and absolutist positions on problems regarding men's safety and environmental protection. The PVC "case" and the operative conclusions from the European Commission in 2001, will constitute an important index of the values which will prevail in the future Europe.
I trust in a future for Europe that will be human, pragmatic, rational, competent, careful to proceed with well opened eyes to become aware of problems, always smaller to be solved as soon as possible and I hope future will not be over-simplifier, abuser and so arrogant to pretend that everything has to be known before starting and continuing in human industrial and civil activities;

presumption and arrogance, in good faith or exploited, are, in my opinion, the safe basis to move into a hard-dark period.

All my best wishes to all citizens of the European Community.
Graziano Vidotto

**- A -**

*Answers and comments of Graziano Vidotto on the Green Book on PVC*
*(Centro di Informazione sul PVC - Milan - Italy)*

**CONTENTS**

# Chemson Ltd's position „Green Paper-PVC"

## 1. Preface

Chemson Ltd is a manufacturer of PVC stabilisers for more than 40 years. Together with other additive suppliers we contributed to developments, making PVC one of the most versatile and long lasting polymers.

With growing concern we follow the discussion about PVC and it's additives mostly based on emotions and not on facts. PVC today is among the best investigated materials, industry (PVC manufacturers, additive suppliers, converters) have spent large sums of money covering the technical, economic and ecological aspects of PVC.

Chemson Ltd. welcomes the EU commission's Horizontal studies and Green Paper as a chance for a more substantial and scientific debate on PVC. We are very confident that taking into account the scientific facts, many concerns and attacks on PVC will be proven to be unjustified.

However, we feel compelled to make some critical comments on the Green Paper which should be taken into consideration by the European Commission.

## 2. General/intention of the Green Paper

The object of the study was an integrated approach collecting facts about the impact of PVC on environment and human health.

In fact the assessment has been restricted to the end of PVC life cycle (waste problems). To establish a policy on substances all sections of the PVC life cycle and it's impacts on health and environment have to be assessed. Also the potential substitutes for PVC have to be investigated, for which there is substantially, less data available than for PVC. Without these comparisons an inherent danger of damage by premature substitution exists.

Sustainability also requires the consideration of economic and social aspects.

## 3. PVC/material and applications

It is worth noting the fact that 90 % of the European PVC consumption is used for applications with a service life of 10 years and more (Green Paper, p. 2, table 1). This is an advantage compared to other polymers which is partially unique.

## 4. Stabilisers

The use of additives is not restricted to PVC, many polymers as well as ceramics, glass, etc. need certain additives.

### *4.1. Cadmium stabilisers*

As stated in the Green Paper (p. 8) the consumption of Cadmium stabilisers is significantly decreasing, it's use within the EU is restricted[1)]. First assessments according to Commission directive 793/93 show no evidence for higher risk potentials than already known. Chemson Ltd. ceased the manufacture of Cadmium stabilisers over 10 years ago and fully supports the phase out as proposed in the "Voluntary Commitments"[2)]. However, mechanical recycling of Cadmium containing PVC must be possible in the future.

### *4.2. Lead stabilisers*

Lead stabilisers used for PVC building applications are among the most thoroughly investigated substances with regard to their toxicological properties[3) 4) 5)].

In Europe approximately 2 million tonnes of lead were used in 1999[6)], only 3 % of this volume go into lead stabilisers. So the statement on page 7 of the Green Paper is definitely wrong („PVC stabilisers represent one of the main applications of lead"). See also literature[7)]!.

Lead stabilisers are very well bound in the PVC matrix, which is proven by a lot of migration data e.g. from potable water pipes[8) 9) 10)]. Lead stabilisers are not a source of significant lead emissions to the environment in their manufacture, use or subsequent disposal. The safe use of lead additives for plastics was stated in several reports[11)].

For the manufacture and use of lead stabilisers many national and international regulations[12) 13) 14)] apply and tight control, and monitoring is done by the competent local authorities.

These control mechanisms and the ongoing development of dustfree product forms have minimised the environmental impact and risk to humans for Chemson Ltd. and customers alike

Recently the Scientific Committe of the European Commission (CSTEE) found in a comprehensive position paper[15)] that due to the lack of scientific evidence the Danish ban on the use of lead is not justified.

Within the ICCA-HPV programme lead stabilisers will be subject of a voluntary risk assessment. Chemson Ltd. as member of CEFIC/ESPA group co-operates with other suppliers to support this initiative.

### *4.3. Future developments*

Chemson Ltd. as a member of ESPA fully supports the „Voluntary Commitments and will of course fulfill the commitments agreed.

We have been developing lead free stabilisers for over ten years. These include „Calcium/Zinc“ stabilisers, which are a new generation of hygienic and more environmental friendly products. These new products are now being introduced into applications such as windows, profiles, cables, pipes etc.

Leading manufacturer of cables have changed from lead stabilisers to Calcium/Zinc stabilisers.

Chemson will continue it’s efforts in developing lead free stabilisers as well as in establishing production capacities for these products.

Ongoing developments with profile and pipe manufacturers in the UK have led to the introduction of lightweight profiles and pipes of high specification used in the construction industry. These products have long life of 50 years and beyond and use up to 30% less material per metre of product. Such products were introduced 7 years ago and are being used in increasing quantities.

Some of these new developments allow greater recycling potential into high specification products. This is particularly important for the future recycling of PVC at the end of its life cycle.

### *4.4. Conclusions*

We are convinced that the stabiliser systems currently used should not be subject of special restrictions or bans. If measures are to be taken they should be based on the results of risk assessments on a scientific basis. Potential substitutes for PVC and their additives have to be evaluated in the same way, which has not be done up to now.

The Commission should accept the proposals of the Voluntary Commitments as the more efficient way to make progress.

## 5. Mechanical recycling

Recycling of lead and cadmium containing PVC is regarded as a problem. From a technical point of view this cannot be understood for several reasons:

- Lead/Cadmium stabilised PVC comes from applications with a long service life; e.g. pipes (> 50 years), window profiles (> 25 years)
- the manufacturing and use of these products have shown no significant impacts on man and environment (as stated in the Green Paper!)
- no problems are evident during the recycling process (as stated in the Green Paper)
- result of the recycling process are again products with a long service life
- the new products must again fulfill all the technical standards

So it’s logic to close the loop, i.e. window profile should become window profile, pipe should become pipe again. Restrictions or bans on recycling of PVC containing lead and cadmium stabilisers are simply wrong, because mechanical recycling is the most environmental friendly type of process.

Consequently also recycling of lead crystal glass and lead batteries would have to be banned.

A final argument against PVC states that PVC causes trouble in the recycling process for other polymers. This is also the case for most plastics in that they would cause problems in recycling into other plastics and other plastics cause trouble in the recycling of PVC.

## 6. Other aspects

It was already mentioned that the vast majority of PVC is used for building applications with a long service life. The technical and economical advantages of these products, which are well documented in a number of publications[16) 17) 18) 19) 20)] are simply neglected by the Green Paper. Ongoing improvements and developments in PVC industry documented by e.g. PVC Charter[21)], Voluntary Commitments and ecocertificates are not acknowledged in the Green Paper.

The PVC industry employs approx. 530,000 people all over Western Europe and that makes it a very important economic factor.

In the UK some 50,000 people are employed in the PVC industry in 750 companies with sales of 10 billion Euro.

Chemson Ltd. is based in the North of England in an area of high unemployment and we employ 130 people with a turnover in excess of 50 million euro. Any ban on PVC would lead to the closure of our company which has been manufacturing chemical additives for 150 years.

We believe in the mechanisms of a free market rather than in simple regulatory activities which are not based on science.

## 7. Conclusion

We again want to emphasise that the questions raised in the Green Paper are not specific for PVC. PVC and it's applications are well documented by a huge number of publications which is not the case for many alternative materials.

There is no need for specific legislation on PVC. We kindly ask the European Commission to consider our arguments in the future proceedings and ensure a safe future for a safe material.

A.S. Butt,
Managing Director,
Chemson Limited.

## Literature


1 Commission directive 91/338/EG

2 Sustainable Development-Voluntary Commitments from the PVC Industry (EUPC, ESPA, ECVM, ECPI; Brussels, March 2000

3 Recommendation from Scientific Committee on Occupational Exposure Limits for Lead and it's Inorganic Compounds (SCOEL/Sum/83 L, September 2000);

4 Toxicological Profile for Lead (US Dept. of Health and Human Services; April 1993)

5 Inorganic Lead (Environmental Health Criteria 165; WHO, 1995)

6 International Lead and Zinc Study Group (ILZSG, Lead and Zinc Statistics, März 2000)

7 Principal uses of Lead and Zinc (Int. Lead and Zinc study group; January 1995)

8 Bleimigration aus PVC-Trinkwasserrohren (CH. Hametner, B. Hanauer; Österr. Kunststoffinstitut; Wien, 1995)

9 Ing. Bjarkling, Nordic Plastic Pipes Group (1995)

10 Lead (Stabilised uPVC Potable Pipes (G. Mitchener, Journ. of Vinyl Technology, Vol 14, No 1; 1992)

11 OECD-Workshop on lead/Lead containing plastics (Toronto, Canada; Sept. 1994)

12 Commission directives EC: 67/548/EC, 88/379/EC, 1999/45/EC, 94/60/EC, 91/338/EC, 82/605/EC, 96/82/EC, 793/93;

13 Dangerous goods transport regulations (RID/ADR, IMDG, IATA)

14 Control of Lead at Work Regulations 1998 (Health and Safety Commission)

15 Opinion on Lead-Danish Notification 98/595/DK (CSTEE; Brüssel, 5. Mai 2000)

16 Ökonomische Bewertung von PVC-Produkten (AgPU, Dr. S. Lindner; Mai 2000)

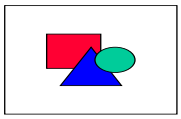
17 Ist PVC-hart im Bauwesen sinnvoll zu ersetzen ? (IVK; Darmstadt Okt. 1993)

18 Ist PVC im Bauwesen sinnvoll zu ersetzen/Teil 2: Baustoffe aus PVC-weich (IBK; Darmstadt, Feb. 1996)

19 Langzeitbewährung und Enwicklungstendenzen von Kunststoff-Bauprodukten im Wohnungsbau (IBK; Darmstadt, Mai 1995)

20 Construction – The PVC option (British Plastics Federation; Nov. 1996)

21 ECVM Industry Charta for the production of VCM and PVC (ECVM; Brüssel, 1995)



# C & K Extrusions Ltd.

Thermoplastic Extrusions
Established 1972

12, Drayton Road,
Tonbridge,
Kent TN9 2BE
United Kingdom
Tel: 01732 361-434
Fax: 01732 771-009
e-mail:- admin@ckextrusions.co.uk

European Commission
env-pvc@cec.eu.int

Dear Sirs,

**Re:- Green Paper – Environmental issues of PVC**

My company is involved in the extrusion of thermoplastic profiles, predominantly PVC. We are a small organisation currently employing twenty people producing custom profiles for larger companies. As such we are representative of many such organisations directly involved in, or supporting, the PVC industry in this country.

The Green paper on PVC poses eight questions, the answers to which will potentially form the basis of a legislative framework for the manufacture and waste management of PVC. I feel that the objective of controlling and reducing the environmental impact of the production of PVC products can only be approached by examining their whole life cycle and answering the following questions:-

1. Are the perceived environmental problems with PVC greater than those that would be created by inhibiting its use, (e.g. alternative materials used, inability to produce products without PVC or greater environmental effect in its avoidance). Have these alternatives and effects been studied to the same extent as PVC ?

2. Regardless of future PVC production, existing products should be recycled. This cannot logically be carried out if restrictions are placed on the type (original composition) that can be used and reincorporated. Is the stabiliser type, when combined in the polymer matrix, an issue of sufficient weight to preclude or restrict the use of this material and cause other resources to be used instead ?

3. The voluntary charter agreed by the European PVC industry has committed us to challenging targets while maintaining a viable industry capable of developing new technologies to make PVC sustainable. Would ill-conceived mandatory instruments produce the same level of innovation or would they result in a concentration on complying with legislation.?

Without a complete and detailed answer to these questions I consider legislation against PVC would be arbitrary and premature. Although satisfying certain environmental pressure groups in the short term the result could ultimately retard potential sustainable environmental improvements.

Yours faithfully,

David Winder
Materials Manager

Message from Danielle Vaillant, Greg Sum, Raja Gunaseharan, Craig L. Shoemaker, Claude Senechal

Messieurs :

Je veux vous remercier pour l'opportunité de commenter le « Horizontal Initiative » de la Commission Européenne ainsi que le « Green Paper » sur le PVC.

Je suis un travailleur dans l'industrie du plastique et me suis engagé à améliorer l'environnement. Je crois que les plastiques, incluant le PVC, bénéficient à notre société. Les produits faits de PVC aide la population en sauvant des vies, en améliorant l'éfficacité et en conservant nos ressources – **un plus pour l'environnement**. Ma compagnie a fait sa part pour réduire les émissions atmosphériques, améliorer la sécurité des employés au travail et faciliter le recyclage de nos produits. Nous sommes très fiers des progrès que nous avons faits, et continuons à faire, pour nous améliorer. Mentionnons entre autre la certification ISO14001 que nous avons obtenu à notre usine de St-Rémi qui fabrique des composés de vinyle.

Je suis inquiet que la Commission Européenne soit en train d'étudier le PVC pour l'identifier comme étant une « substance requérant une attention spéciale » alors que des substitut au PVC, dans plusieurs applications, peuvent présenter beaucoup plus de risques pour les gens et notre environnement. Je vous conseille de comparer le vinyl et les diverses alternatives avant de prendre une décision.

L'industrie européenne du PVC s'est engagée volontairement à de nombreuse actions pour répondre à toutes les questions apportées par Green Peace. Le "Voluntary Commitment" est une approache avangardiste qui pourrait servir d'exemple à d'autres industries.

Vue que les actions que vous prendrez affecterons les produits de PVC mondialement, j'attends avec impatience et intérêt les décisions qui vous prendrez.

Bien à vous,

København Den 29. november 2000

# Danmarks Naturfredningsforenings høringssvar til EU-kommissionens Grønbog om PVC

**Danmarks Naturfredningsforening præsenterer her nogle overordnede synspunkter på EU-kommissionens Grønbog om PVC (Udkast til GRØNBOG. Miljøaspekterne i forbindelse med PVC (DA). COM 2000/469. 27/7/2000. Høringsfrist den 30. november 2000):**

Grønbogen gennemgår på en god og overskuelig måde de mange forskellige problemstillinger om PVC-produktionen og –forbruget i Europa samt de komplicerede miljø- og sundhedsmæssige forhold der knytter sig til PVC.

Den fortæller bl.a., at den europæiske produktion (og forbrug) af PVC på årsbasis udgør ca. en fjerdedel (5-6 mill. tons PVC, svarende til knapt 8 mill. tons PVC-produkter) af den samlede globale produktion (og forbrug)
af PVC. Den belyser ligeledes, at nogle af de største miljøproblemer knytter sig til selve PVC-produktionen (primært arbejdsmiljø), til anvendelsen af tungmetalholdige stabilisatorer (bl.a. bly, hvor der årligt i Europa anvendes mængder svarende til godt 50.000 tons rent bly årligt), til anvendelsen af forskellige organiske stabilisatorer (phthalater) og til PVC-en, når denne ender som affald. PVC er et problemstof i affaldsbehandlingen, både hvad angår genanvendelse, forbrænding og deponering.

Grønbogen belyser desuden de forskellige muligheder, der er for at løse nogle af de omfattende problemer, der knytter sig til PVC.

**Det er Danmarks Naturfredningsforenings opfattelse:**

- at frivillige aftaler med industrien om afvikling af brugen af de uønskede stoffer, bly, cadmium, organiske tinforbindelser og phthalater i PVC-en **ikke** er tilstrækkelige. I erkendelsen af disse stoffers farlighed og uønskede tilstedeværelse overalt i miljøet må brugen af disse stoffer afvikles/forbydes hurtigst muligt **uanset**, at man i nogle kredse kunne ønske sig yderligere vurderinger af stofferne. Efter foreningens opfattelse ved vi i dag tilstrækkeligt om disse stoffer til at bruge forsigtighedsprincippet uden yderligere forsinkelse. Bly og cadmium blev allerede i 1960-erne og 70-erne erkendt som værende sundhedsmæssigt og miljømæssigt stærkt problematiske stoffer, som man gjorde alt hvad, der var muligt, for at undgå. Det gør en forsinkelse af indsatsen ydermere absurd. Stofferne skal udfases over en kort årrække, igennem hvilke man pålægger den fortsatte anvendelse af stofferne en progressivt stærkt stigende afgift,
- at nogle af de væsentligste miljø- og sundhedsmæssige problemer, og problemerne i affaldssammenhæng, f.eks. med genanvendelse og forbrænding, skyldes, at nyt "jomfrueligt" PVC ganske enkelt er alt for billigt et råmateriale. Dette kan der kun rådes

bod på ved at lægge en betydenede råvareafgift på ny PVC, således, at nogle af de miljømæssigt mere optimale løsninger på PVC-problemerne bliver økonomisk konkurrencedygtige. Foreningen mener, at dette vil være et meget effektivt middel til at nå de nødvendige resultater, og nærmest må anses som et nøglesvar på de fleste af de 8 spørgsmål, Grønbogen stiller. Styring ved hjælp af en høj råvareafgift på ny PVC er i øvrigt et emne, som Grønbogen stort set ikke kommer ind på. Den synes at være tilhænger af de mere "bløde løsninger", som foreningen imidlertid ikke har megen tiltro til,

- at genanvendelse af PVC med indhold af problematiske stoffer som udgangspunkt er uønsket, fordi det alt andet lige vil betyde en yderligere spredning af disse stoffer i miljøet, så det bliver endnu vanskeligere at løse de medfølgende problemer. Genanvendelse bør under alle omstændigheder kun foregå i produkter, som er helt identiske med de oprindelige produkter. I øvrigt vil en sikker genanvendelse kun kunne ske ved en effektiv og korrekt mærkning af PVC-en, ellers kan de forskellige typer ikke holdes adskilt. Hertil skal føjes at anvendelse, herunder også fortsat øget anvendelse, af PVC med indhold af problematiske og uønskede stoffer, resulterer i, at samfundet har en opgave, som bliver større og større, med at forhindre de problemer, som brugen afstedkommer. Stofferne ender i sidste ende i miljøet, hvis der ikke gøres en ekstraordinær indsats,
- at den bedste kortsigtede løsning på PVC-affaldsproblemet er sikker deponering, dvs. deponering, hvor de forskellige PVC-typer deponeres adskilt og naturligvis også adskilt fra andet affald, og at man har styr også på f.eks. gennemsivende vand (perkolat) samt processene i PVC-affaldet. Sikker deponering er en forudsætning for en forsvarlig og nødvendig senere efterbehandling,
- at en mere langsigtet løsning på PVC-affaldet må være oparbejdning (kemisk destruktion),
- at den endelige løsning på PVC-problemerne nødvendigvis må være en noget nær total udfasning af brugen af PVC. Ifølge den danske Miljøstyrelses PVC-handlingsplan er der i dag stort set alternativer til PVC i alle anvendelser. Blot er PVC alt for billigt, så alternativerne ikke er konkurrencedygtige. Substitution af PVC (eller af uønskede hjælpestoffer i PVC) må naturligvis ikke ske for enhver pris, f.eks. må det ikke ske med stoffer, som er værre end PVC
- at forbrænding af PVC bør undgås, men hvis det sker, da må det kun foregå under stængt kontrollerede og optimerede forhold (specialforbrænding). Brug af PVC som brændsel i mere eller mindre tilfældige anlæg, som kan aftage "brændslet", f.eks. cementfabrikker o.l. er ikke acceptabelt, og
- at miljømærkning (EU-blomsten, Svanen) af produkter, der indeholder PVC under ingen omstændigheder kan komme på tale. De erkendte miljø- og sundhedsmæssige problemer, knyttet til PVC, gør, at miljømærkning af PVC-holdige produkter vil undergrave miljømærkets troværdighed.

Allan Andersen, miljømedarbejder,
Danmarks Naturfredningsforening,
Masnedøgade 20, 2100 København Ø.
Tlf. 39 17 40 35.
**mailto:aa@dn.dk**

Message from Dennis Cocco :

Dear Mr. Shulte-Braucks

While I am sure you have received numerous other letters on this subject I want to take this the opportunity to comment on the European Commission's Horizontal Initiative and Green Paper on PVC.

I have been in the plastics industry for nearly thirty years and I am committed to improving the environment. At the same time I believe that plastics including PVC add great benefit to society by helping to save lives and conserving resources - an environmental plus. During my tenure in thisindustry I have always tried to ensure that my company has been doing its share to reduce emissions, improving safety, and addressing the recycling of our products. I am proud of our record and progress towards providing products that creates such far reaching benefits.

I am concerned that the EC may be studying PVC in preparation for singling it out as a material needing special attention when the alternatives to PVC in many applications may be worse for people and for the environment. I urge you to compare vinyl to its alternatives before making a decision.

The European PVC Industry has voluntarily committed to a number of actions that will address the questions raised in the Green Paper. The Voluntary Commitment is a progressive approach that could well set an example for other industries to consider.

People around the world will be watching with great interest your actions. I ask you to set aside issues brought forth by groups with a narrow perspective whom do understand the full consequences of their ideas. The actions you take will affect PVC worldwide and affect an industry that has been instrumental in improving the safety of countless millions around the world.

Sincerely,

PolyOne Corporation

Message from Didier Ternaux :

Le PVC est un produit pratique, sûr et recyclable. Il est utilisé depuis plus de cinquante ans dans des domaines tels que la pharmacie et le conditionnement des produits alimentaires. Deux domaines dans lesquels des études approfondies ont et sont encore menées pour vérifier la non toxicité des produits. Il est donc surprenant d'attaquer le PVC sur le seul fait qu'il n'est biodégradable qu'au bout de quelques dizaines d'années.

Il me paraît plus judicieux de remettre en cause des produits dont la naissance est récente et pour lesquels nous n'avons pas de recul tels les produits transgénétiques. Ou bien de remettre en cause l'énergie nucléaire dont une partie des déchets est nocive durant des milliers d'années.

Veuillez agréer mes sincères salutations

Didier TERNAUX

Message from Dirk Willaert

Geachte Heren,

Hoewel ik als medewerker van een PVC-producerend bedrijf allicht niet als de meest objectieve bron van informatie kan beschouwd worden, heb ik de indruk dat mijn mening 'beduidend minder subjectief' is dan de mening van bepaalde milieu-organisaties die wel objectief claimen te zijn, maar in werkelijkheid een sterk 'fundamentalistische' houding aannemen.

Me baserend op allerlei studies (ook van onafhankelijke oorsprong) ben ik er persoonlijk sterk van overtuigd dat PVC zowel economisch, sociaal als milieu-technisch één van de best beschikbare produkten is, denk maar aan klassieke toepassingen als vloerbedekking en raamprofielen.

Graag had ik van de overheid een duidelijke ondersteuning gezien voor het gescheiden verzamelen van produkten in plastic in het algemeen, en van PVC in het bijzonder. Een prima voorbeeld van geslaagde ondersteuning door de overheid van gescheiden huisafvalverzameling zijn de containerparken en de verplichtingen als burger om bepaalde soorten afval afzonderlijk te verzamelen in zakken of containers.

Eénmaal de 'post-consumer' afvalverzameling goed georganiseerd is, en
gebruik makend van de nieuwste recyclage-technologieën, zullen we kunnen stellen dat PVC inderdaad een uiterst geschikt produkt is om 'sustainable growth' te bewerkstelligen.

Met de meeste hoogachting,

Dirk Willaert

Message from Dominique Filée :

Message à l'attention de
Mr Krämer, Head of Waste Management Unit (DG Environment)
Mr Schulte-Braucks, Head of the Chemicals Unit (DG Entrprise)

Messieurs,

Par ce présent message, je souhaiterais vous faire part de mon opinion sur l'utilisation du PVC dans la médecine tant au niveau hospitalier que domestique.

En effet, de nombreuses vies ont pu être sauvées grâce aux transfusions de sangs stockés dans des poches en PVC.

L' usage de perfusion, de tuyaux ou autres en PVC facilitent les soins à donner aux malades et leur garantit également un haut niveau de sécurité.

L'utilisation par les infirmières à domicile de matériel dit jetable tels que des pinces stériles ou encore des alèses rendent les soins et le confort des malades plus humains.

Cette liste est forte heureusement pas exhaustive et ne cessera de croître tant l'utilisation du PVC dans le domaine médicale deviendra de plus en plus indispensable et sécurisant.

Pouvons-nous décemment penser qu'un jour toutes ces applications disparaissent par le simple fait de la méconnaisance d'un produit qui allie tant de qualités.

Je vous remercie de m'avoir donner la possiblité de m'exprimer et je vous présente mes salutations distinguées.

Dominique Filée

Message from Donald Burke, Timothy L. Ray, Roger McKinney, Robert A. Mansfield, Birger Kuck, Scott D. Johnson, Mario Tremblay, Jim Schneringer, Pierre-André Gignac, Yves Blanchet Roy C. Golz, Jan Kucirka, Janelle Pederson :


Mr. Ludwig Kramer
Waste Management Unit
DG Environment
Wetstraat 20
B-1049 Bruxelles, Belgium

Mr. Reinhard Shulte-Braucks
Chemicals Unit
DG Enterprise
Wetstraat 20
B-1049 Bruxelles, Belgium

Gentlemen:

Thank you for the opportunity to comment on the European Commission's Horizontal Initiative and Green Paper on PVC.

I am a worker in the plastics industry and I'm committed to improving the environment. I believe that plastics including PVC add great benefit to society. Products made from PVC help people by saving lives, improving efficiency, and conserving resources - an environmental plus. My company has been doing its share to reduce emissions, improving safety, and addressing the recycling of our products. We're proud of our record and progress toward continuously improving.

I am concerned that the EC may be studying PVC in preparation for singling it out as a material needing special attention when the alternatives to PVC in many applications may be worse for people and for the environment. I urge you to compare vinyl to its alternatives before making a decision.

The European PVC Industry has voluntarily committed to a number of actions that will address the questions raised in the Green Paper. The Voluntary Commitment is a progressive approach that could well set an example for other industries to consider.

Because the actions you take will affect PVC worldwide, I will be interested in your decisions.

Sincerely,

Thanks,

ECOLOGY CENTER

**November 30, 2000**

Mr. Kramer
Head of Waste Management Division
DG ENV; and
Mr. Schulte Braucks
Head of the Chemicals Unit
DG ENTR
Via e-mail: ENV-PVC@cec.eu.int.

**Comments on the EU Green Paper "Environmental Issues of PVC"**
**By the**
**Ecology Center, Ann Arbor, Michigan, USA**

## I.Introduction:

The Ecology Center welcomes the opportunity to comment on the EU Green Paper regarding environmental issues associated with the production, use, and final fate of PVC. For the three past decades, the Ecology Center has been intimately involved with issues of toxics in the environment including the use of toxic chemicals in the automotive industry. This includes aspects of vehicle production, vehicle use, and end-of-life-of-vehicles (ELV). While the following discussion and commentary on the environmental impacts of PVC is limited primarily to automotive applications, we strongly believe our conclusions and recommendations to be of general significance related to PVC issues and applications.

In general, we agree with the facts and findings of the Green Paper, however, we would also like to submit additional comments regarding PVC issues that go beyond the scope of the EU document. In the first part, we will state our findings and recommendations derived from US studies in the automotive applications of PVC. In addition we will address alternatives to PVC and to the production of soda ash without the generation of chlorine.

## II. Environmental Impacts of PVC from Automotive Applications

### A. Plasticisers:

Soft grades of PVC containing up to 60% of plasticisers (e.g. phthalates) are heavily used in vehicle interiors. These toxic volatile plasticisers are evaporating during summer temperatures and are thus posing unnecessary health risks to the passengers. Phthalates have also been found in landfill leachates due to the presence of soft grades of PVC including PVC contained in automotive shredder residue (ASR). Since all landfills will eventually leak, we must expect our invaluable groundwater resources to become unsuited for human and animal consumption.

### B. Heavy Metals:

The use of heavy metals (lead, cadmium, and mercury) and other toxic chemicals as additives to PVC plastics raises serious questions regarding the release of these toxins to the broader environment. While the degradation of PVC stored in landfill environments may take a long time, ultimately the release of toxic additives must be expected. Combustion including co-generation of PVC poses a number of problems not only regarding release of heavy metals but also formation of extremely toxic dioxins and furans (to be discussed below).

Portions of volatile forms of these metals will escape with hot flue gases into the air whereas the rest is captured in dry form or as wet residues both of which are considered hazardous wastes. Confinement in so-called 'state of the art' landfills is only a temporary solution at best. Recent research clearly indicates that land disposal of toxic and hazardous waste is highly unreliable in assuring the short- and certainly long-term protection of human health and of the environment. Serious problems with monitored containment are encountered in a large number of "state-of-the-art" landfills as is reflected in a 1995 report of the General Accounting Office (GAO/RCED-95-75BR). Accordingly, 74% of all U.S. hazardous waste landfills are already leaking into groundwater.

Automotive shredder residue, ASR is the 25% of vehicles that is not recycled or recovered. Ten million cars discarded per year will create on average, 2.7 million metric tons (3 million short tons) of ASR, or 1.5 % of the total solid waste generated in the United States. Due to the complex composition of ASR, there are no current technologies available to recycle the resources contained in this lighter fraction of vehicular wastes. More importantly, ASR contains significant levels of toxic contaminants and is therefore treated as a special waste in California*** and, usually, as a hazardous waste in Europe*.

Table 1 presents the concentrations of toxic contaminants in ASR, as reported in three studies. The most complete data are from a report by the German Umweltsbundesamt, which found high concentrations of a number of contaminants in ASR, including mercury. The U.S. EPA conducted a pilot study of ASR, which also found high concentrations of PCBs, lead and cadmium. The EPA study did not evaluate mercury. Based on its 1989 evaluation of analytical data on untreated ASR, the state of

California Department of Health Services concluded that mercury is one of the metals of concern in ASR

**Table 1: Toxic Contaminants in Automotive Shredder Residue**

| Contaminant | Concentration in mg/kg | | |
|---|---|---|---|
| | German ASR* | U.S. ASR** | California ASR*** |
| Mercury | 6-15 | Not measured | 0.7 |
| Lead | 3,500-7,050 | 570-12,000<br>mean: 2,700 | 2330-4616 |
| Cadmium | 60-100 | 14-200<br>mean: 47 | 46-54 |
| Chromium | 370-770 | Not measured | 247-415 |
| Arsenic | 57-63 | Not measured | Not measured |
| PVC/phthalates; heavy metals etc. | ca. 6% | Not measured | Not measured |
| Other (e.g. PCB's) | Unknown | 1.7-210<br>mean: 32 | Not measured |

Source: *****Weiss et al, Ermittlung und Verminderung der Emissionen von Dioxinen und Furanen aus Thermischen Prozessen, Forschungsbericht 104 03 365/17, 1996, Umweltsbundesamt (UBA).
** U.S. EPA, PCB, Lead and Cadmium Levels in Shredder Waste Materials: A Pilot Study;EPA 560/5-90-00BA; April 1991
***Nieto, Eduardo, Treatment Levels for Auto Shredder Waste, State of California Department of Health Services, June 1989.

According to a December 1999 EPA announcement, ASR cannot be reused or recycled due its high content of Polychlorinated Biphenyls (PCBs), which are regulated under the Toxic Substance Control Act. This rule applies to any material containing PCBs. Automotive shredder residue may only be used (not re-used) as cover material.[i] As mentioned previously, ASR is treated as a special waste in California. The European Union (EU) does not in general classify ASR as hazardous in the European Waste Catalogue unless the content of toxic compounds exceeds certain specified levels in the new categories listed under 19 10 03 and 19 10 04.

While for a number of reasons discussed in this document a phase-out of PVC would eliminate all the problems associated with PVC, at a minimum, we recommend a strict phase-out of all toxic additives previously used in PVC formulations**.**

## C. Dioxins and Furans:

Dioxins and furans are now recognized as some of the most toxic, bioaccumulative and persistent chemical compounds known. The Environmental Protection Agency, in their most recent draft reassessment of dioxin-like compounds, found that dioxin is a known carcinogen and that the risk of cancer to some people is 10 times higher than estimated before. Americans' average daily intake of dioxin can be up to 200 times greater than the EPA's recommended guidelines. At the current state of knowledge, we can assume that **there is no safe level for dioxins**!

EPA's dioxin reassessment finds that, based on all available information, dioxins are potent animal toxicants with potential to produce a broad spectrum of adverse effects in humans. These include, for example, adverse effects upon reproduction and development; suppression of the immune system; and cancer. EPA characterizes TCDD [the most deadly of dioxin-like compounds) as a "human carcinogen" based on the weight of evidence of animal and human studies, and characterizes other dioxins as "likely human carcinogens." The Environmental Protection Agency (EPA) has recently concluded that the cancer risk from dioxin for some parts of the population is as much as ten times higher than previous projections.

It is well documented that the formation and subsequent environmental release of dioxins/furans (as well as other toxic chlorinated organic chemicals) is prevalent during the entire lifecycle of PVC, from the cradle to the grave. In view of availability of economically feasible alternatives to PVC, the public health risks posed by the release of these extremely toxic substances cannot be justified.

Auto manufacturers continued use of polyvinyl chloride (PVC) is the major source of dioxin from cars. PVC plastics are used in wiring, undercoating, sealers, and vehicle interiors. In this industrial sector, the primary problems associated with PVC occur during the end of life of vehicles (ELV). First, the complex mixture of plastic components including their additives contained in ASR renders economically viable methods for recovery of these resources unfeasible. Second, spontaneous combustion of ASR piles has been found to lead to alarmingly high releases of dioxins. Landfilling of ASR (see Table 1) results in leaching of phthalates and heavy metals.

High formation and releases of dioxins have also been reported during the recycling of the ferrous and non-ferrous (copper wires) of automotive scrap. Various reports show that PVC and organochlorine impurities lead to significant dioxin emissions during steel scrap recycling in electric arc furnaces. Furthermore, high emissions of mercury from electric arc furnaces have also been recently reported.

### C.1. Automobile Shredders

The shredding process for metal recovery produces intense heat, which can vaporize volatile metals, such as mercury, and lead to the formation of dioxins and

furans. Shredding has been demonstrated to lead to the formation of dibenzodioxins and furans due to the heat generated in the process that facilitates the thermal decomposition of PVC plastics and other organochlorine compounds. Emission concentrations from shredders of dioxins have been reported in the range from 0.19-2.35 ng toxic equivalents (TEQ) per normal cubic meter.

**C.2: PVC Related Dioxin/Furan Releases from Metals Recovery & Auto Scrap**

The shredder-derived ferrous fraction (65-70% of the weight of the car) is sent for recycling to steel smelters, almost exclusively electric arc furnaces. In the case of a flattened hulk directly fed to an electric arc furnace, any material contained in, adhering to, or entrained in the steel particles such as plastics, paint, heavy metals, etc. becomes part of the ferrous metal recycling process. For example, due to strong adhesion, nearly all of the PVC from undercoatings of vehicles is part of the ferrous fraction.

Steel smelting plants, along with other metal recovery facilities, have been poorly regulated with reference to air toxics. The industry is required to do only very limited testing and typically employs only the simplest particulate matter controls. A review of available data, however, shows steel smelters and metal recovery facilities to be significant sources of dioxins. For example, the steel smelter DDS in Denmark was recently found to be the single largest dioxin emitter in the country.

According to the 1998 the US EPA dioxin draft reassessment the metal recovery portion of all anthropogenic sources in 1995 is between 310 and 2,092 grams TEQ/year (or about 26%). A more refined quantification of emission sources for the same reference year was released by EPA in June of 2000. Accordingly, quantifiable air releases of dioxin in 1995 from all known anthropogenic sources were 2,293 grams TEQ/yr., with the metal recovery portion accounting for 381.93 g TEQ/yr, (or 16.7%)(see Table 2). Further explanation of the emission estimates for different sectors of the metal recovery industry is noted below.

The automotive contribution of dioxin emissions from metal recovery operations is more difficult to estimate. For instance, based on the number of vehicles annually scrapped in the US( ca. 10 million) with an average copper (brass) content of 46.5 lbs/car and the total annual production of secondary copper (637,000 metric tons/yr in 1995), the automotive portion would be on the order of 63 % of the copper scrap source. For electric arc furnaces, with a total production of 38.4 million tons/yr in 1995 and 11 million tons of scrap processed, the automotive contribution would be only 29 % of that sector.

**Table 2: Dioxin Emissions from Metal Recovery Processes**

| **Dioxin Emission Range** | | | |
|---|---|---|---|
| | 1995 g TEQ released | 1995 g TEQ released | 1995 g TEQ released |
| | **LOW ESTIMATE** | **HIGH ESTIMATE** | **QUANTIFIABLE** |
| **Ferrous** | | | |
| Electric Arc Furnaces | 3.84 | 50.0 | 44.3 |
| Sintering Plants | 100 | 256 | 25.1 |
| Ferrous Foundries | 17.5* | 17.5* | 17.5 |
| | | | |
| **Non-Ferrous** | | | |
| Secondary Aluminum | 17 | 55 | 27.4 |
| Secondary Copper | 171 | 1,710 | 266 |
| Secondary Lead | 0.73 | 3.65 | 1.63 |
| | | | |
| **Total** metal source** | **310** | **2,092** | **381.93** |
| **Total anthropogenic** | **1,161** | **7,946** | **2,293** |

** mean value*

However, other factors must be considered regarding these estimates:

a) A large percentage of steel scrap comes from pre-consumer sources and is assumed to be much less contaminated with PVC compared to automotive scrap.
b) The average lifetime of vehicles compared to other durable goods containing these metals is relatively short. This means that the turnover of retired vehicles from scrap to re-usable metals is greater in comparison. This is noted in the Green Paper which cites the life cycle for construction related PVC materials to be as high as 50 years, while the typical auto has a life cycle of only 12 years.

For these reasons, we conservatively estimate the automotive contribution of dioxin emissions from the metal recovery sector to be very significant. Clearly more research into the exact composition of feedstocks into metals recovery processes is necessary in order to precisely quantify this.

While the hormone mimicking properties of dioxins suggest that there is no safe level for these compounds, maximum daily intakes for cancer protection of humans have been enumerated by toxicologists of various agencies. The World Health Organization's1998 revised tolerable daily intake (TDI) for dioxins is given as: 1-4 pg TEQ/ per kg of body weight.

## C.2.a: Dioxin Emissions from Ferrous Metal Recovery

There are several processes specific to ferrous (steel) metal recovery that can lead to emissions of dioxin: electric arc furnaces used for steel smelting, iron sintering plants, and steel foundries. In the section below, we describe the basis for emission estimates made in EPA's dioxin reassessment.

Steel Smelting: Unfortunately, dioxin emissions have not been tested in the U.S. for electric arc furnaces (EAFs). However, a rough estimation of the annual TEQ emissions from U.S. electric arc furnaces can be made based on the German EPA emission factor range of 0.1-1.3 ng of TEQ/kg of scrap (20) and the 1995 U.S. production of 38.4 million metric tons. Accordingly, 3.84-50.0 g of TEQ (average: 44.3 g) were emitted in the United States from this branch of the steel industry.

Iron Sintering: A 1996 CBNS report states that iron sintering plants - which are adjuncts to blast furnace operations - appear to be an important source of dioxins deposited in the Great Lakes, accounting for 21% of the total deposition in Lake Michigan. This previously unknown source of dioxin emissions was discovered from European (particularly German) studies of the industry. The chlorine portion of raw materials sintered stems from recycling dust and other scrap accumulated by the industry. Again, U.S. dioxin emissions tests for sintering plants have not been conducted. Our estimates for the annual emission range of dioxins from sintering in the U.S. of 100-256 grams TEQ are based on data from European sintering plants.

Foundries: A quarter of the automotive ferrous scrap in the US is used to produce high strength iron and steel castings in foundries. Dioxin emissions are generated during the melting of steel scrap, primarily in electric arc or induction furnaces, and during the pouring of the molten metal into molds. While dioxin emissions data for the 1000 U.S. foundries are limited to one facility only, annual emission estimates were made by adding data from eight German foundries. Accordingly, in 1995 the 1000 U.S. ferrous foundries processing 13.9 million metric tons of steel, emitted an estimated amount of 17.5 grams of TEQ.

While dioxins are generated and emitted directly during smelting, a portion is captured with the filter dust together with semi-volatile heavy metals, such as cadmium and lead, and large amounts of zinc. Subsequent thermal operations, designed to recover the zinc, lead to further problems with dioxin emissions. Significant quantities of heavy metals are used as additives in PVC formulations and are likely released during thermal processing of PVC contaminated metal wastes.

## C.2.b: Non-Ferrous Metals

Currently, the metal contained in the non-ferrous shredder fraction is between 6-8% of the dismantled weight of the vehicle. This primarily includes the metals aluminum, cadmium, chromium, lead, magnesium, mercury, nickel, stainless steel, tin, and zinc. It

should be noted that up to 50% by weight of the non-ferrous fraction received by metal recovery facilities is a non-metallic residue (also known as heavy ASR), which is currently landfilled. A detailed description of the processes involved in non-ferrous metal separation and recovery follows.

Non-ferrous metal scrap contains impurities, such as heavy metals (particularly, cadmium, mercury and lead), chemical forms of chlorine, and organic compounds. Therefore, emissions of toxic heavy metals and chlorinated organics should be expected. Whereas mercury and cadmium issues are discussed under "Ferrous Metals", the potential of their emissions also exists for the smelting of non-ferrous metals. However, dioxin and furan emissions from non-ferrous smelters are the focus of the following discussion, since these releases have received greater attention in the recent past. For example, a study of a Finnish reclamation plant processing scrap aluminum, copper, and different steels reported the emission of PCPs, PCBs, PCDD/PCDFs, PAHs, as well as other chlorinated organic compounds during smelting operations. A large part of these emissions were formed due to PVC plastics used in electrical cables and equipment.

Secondary Aluminum Smelters

Because of great savings in energy and resources, a high percentage of scrap aluminum is currently being recycled. Due to the increasing use of this light metal in automotive production, any potential toxic emissions from processing scrap aluminum is of concern to end-of-life vehicle issues. Recycling of aluminum scrap involves two steps, pre-cleaning and smelting, each of which may produce dioxin emissions.

Pre-cleaning involves roasting aluminum at elevated temperatures to vaporize organic impurities and sweating at temperatures above the melting point of the metal. Chlorine gas is used to reduce the magnesium content during smelting. The dioxin emissions from four secondary aluminum smelters have been analyzed in 1994, three of which were performed in conjunction with representatives of the USEPA and the Aluminum Association. An average of 13.1 ng of TEQ/kg of scrap feed was found for these four facilities. German studies of 25 aluminum smelters resulted in a range of 0.01-167 ng TEQ/kg of scrap feed with a mean emission factor for the11 more reliable tests of 42 ng TEQ/kg. In 1995, the secondary aluminum industry smelted 1.3 million metric tons of aluminum scrap. Applying the average emission factors obtained in the two studies, the range of the annual U.S. dioxin emissions are between 17.0 and 55 grams of TEQ.

U.S. and European studies of aluminum smelters point out very significant differences in the dioxin emissions from this industry. For the U.S. study the emission range was between 0.26-30 ng TEQ/kg of aluminum produced and for the German tests it was between 0.01-167 ng TEQ/kg. These differences can be attributed to the levels of impurities of the scrap, the pre-cleaning and smelting technologies employed, and the control technologies applied. The average of 13.1 ng TEQ/kg is currently used as the allowable emission level in new and modification type permits in Michigan and probably elsewhere in the United States. The fact that all smelters of aluminum scrap are basically

performing the same task but with drastically different emission levels illustrates the impact of scrap contamination on emissions.

Aluminum smelters may also be responsible for high mercury emissions. This is due to the simple fact that aluminum-mercury amalgam is easily formed. This assumption is supported by a study report from the state of New Jersey, which ranks mercury emissions estimates from aluminum scrap smelting as some of the highest of all industry sectors.

Secondary Copper Smelters

Dioxin stack emissions from 24 typical secondary copper smelters in the U.S. were evaluated by USEPA during a national dioxin study. The feed consisted of a variety of copper-bearing scrap including 22% of plastic coated wires. The emission factor for TEQ was found to be 779 ng TEQ/kg of scrap. Assuming this value to be the geometric mean of the 24 facilities and using the 1995 consumption of 695,000 metric tons of copper scrap, the annual emission range for dioxins from this industry calculates to 171-1,710 grams of TEQ for 1995. The high dioxin emission levels for this industry could be double considering the fact that other copper-base branches, such as brass mills, wire rod mills, foundries and miscellaneous manufacturers processed an additional 958,000 metric tons of copper scrap.

## III. PVC Alternatives to Automotive Applications

About 3-4% (or 200 million pounds) of the annually produced vinyl chloride is used in the production of automotive parts that includes instrument panels, seat covers, arm rests, door cladding, wire covering, sealers, and under-coating. The PVC content of vehicles is approximately distributed as follows:

| | |
|---|---|
| underbody: | 40 % |
| interior trim: | 30% |
| cable insulation: | 30% |

Halogen-free alternatives, principally flexible polyolefines and polyurethanes, for most automotive applications are already on the market and are increasingly used by U.S. and foreign automakers. Some selected examples are given below:

- Volvo is currently using a hot melt solvent-free wax/bitumen undercoating in place of PVC. The coating is applied at about 50 C and solidifies at ambient temperatures.
- Opel, a GM subsidiary, has replaced PVC foil on the dash board beginning with its 1994 models and eventually aims to have a “PVC-free” car in production.
- BMW announced a similar goal at the 1995 meeting of the SAE in Detroit.
- At the same SAE meeting, the Furukawa Electric Company of Chiba/Japan, announced the production of a non-halogenated automotive wire insulation with properties either equivalent or superior to PVC and at a competitive price.

- Mercedes (now Daimler/Chrysler) uses a non-PVC plastic panel in place of a PVC undercoat in their A-class and other models. In their Environmental Report of 1998, Bruno Stark, director of Umweltgerechte Produktentwicklung, states that Daimler-Chrysler is currently using only 15-20% of the PVC other carmakers are using. Particularly, he emphasizes the replacement of PVC for undercoats by recyclable panels. "Currently, we are using PVC only for electric cables for which new PVC-free solutions are also on the horizon." The "Smart" car uses a PVC-free sealer.
- US carmakers are beginning to see the light too. In September of 1999 GM announced the phase-out of PVC in car interiors (skins for instrument and door panels) by the 2004 model year.

## IV. Alternatives to the production of Soda Ash without Generation of Chlorine

Historically the production and subsequent usage of PVC is intimately connected to the production of soda ash and chlorine. Sodium hydroxide or soda ash is a basic industrial chemical used in paper making and many other chemical processes. Currently, it is almost exclusively made by electrolytic decomposition of rock salt (NaCl) yielding a ratio of 1.13 pounds of NaOH for each pound of chlorine. This process also uses large quantities of mercury and is thereby also responsible for the release of this toxic chemical into the broader biosphere. Elemental chlorine is a free radical and highly reactive with almost any other chemical from which it will capture one electron per atom in order to reach a stable state in the form of the non-toxic chloride (Cl-) ion. A considerable excess of chlorine was generated during the early years of soda ash production. Polyvinyl chloride and many other toxic chlorinated hydrocarbons became a welcome sink for all this chlorine generated in the chloralkali process. Today, due to the widespread industrial use of PVC, there is actually an overproduction soda ash, which is usually exported. In this context it is of significance to note the entire lifecycle chemistry of PVC in relation to alkaline chemicals and chlorine:

1) To make soda ash, chlorine is generated as a stoichiometric by-product.
2) Excess chlorine becomes PVC and other organochlorines.
3) Combustion of PVC generates hydrogen chloride requiring stoichiometric amounts of soda ash or lime for neutralization. The waste products resulting from combustion of PVC are hazardous and must be secured in "safe" landfills.
4) Environmentally, it is evident that the above is a unwanted cycle.

Without any alternative pathways for the production of soda ash, the chemical co-generation of chlorine would be unavoidable. However, other choices to make soda ash are available and alternatives for PVC plastics exist for almost all applications. Two such examples are discussed below.

A. Caustification of Soda (Na2CO3):

Sodium carbonate and hydrated lime yield soda ash and limestone:

$$Na_2CO_3 + Ca(OH)_2 = NaOH + CaCO_3$$

Limestone in turn becomes hydrated lime according to:

$$CaCO_3 \ heat = CaO + CO_2$$

$$CaO + H_2O = Ca(OH)_2$$

There are huge natural resources of sodium carbonate/bicarbonate (about 140 million tons) in California's large lakes, Mono lake and Owens Lake. The Magadi Lake in East Africa is estimated to contain 200 million tons of this chemical.

B. Solvay Process:

Sodium carbonate and subsequently soda ash may also be produced from ammonia, carbon dioxide and rocksalt without the release of toxic chemicals:

$$NH_4^+ + HCO_3^- + Na^+ + Cl^- = NaHCO_3 + NH_4^+ + Cl^-$$

$$2\ NaHCO_3 = Na_2CO_3 + H_2O + CO_2$$

$$Na_2CO_3 + Ca(OH)_2 = NaOH + CaCO_3$$

While data on the economics of soda ash production via the described pathways are not readily available for comparison, it may be argued that the electrolysis of rocksalt is economically superior. This may be true as long as environmental health impacts and other production and use related consequences are externalized, that is only when true cost accounting via Life Cycle Analysis is ignored.

## V. Summary and Recommendations

- From cradle to grave, PVC poses significant risks to biological health and the general environment.
- Toxic phthalates, the predominant additives to soft grades of PVC (e.g. car interiors, window blinds and curtains), tend to evaporate during the useful life of PVC and therefore poison the atmosphere. Phthalates are also found in the leachate of landfills from where they are expected to contaminate groundwater resources.
- The production and final combustion of PVC not only forms extremely lethal dioxins, but also generates large amounts of hazardous wastes that later are expected to leak into the broader environment.
- In the automotive sector, PVC has its greatest environmental impact during the end-of-life phase of vehicles. First, due to its adhesion to steel, copper and other metals, it becomes part of the metal recovery processes with the subsequent formation and release of dioxins. Second, large amounts of PVC are either burned or landfilled

leading to problems with dioxins, heavy metals and other toxins entering the environment.
- Due to the complexity of PVC formulations and its mixing with other plastics, no feasible technology exists to recycle these valuable resources. This is particularly evident with automotive shredder residue, also a toxic waste.
- Economically feasible alternatives to PVC exist for almost all current applications indicating that a phase-out of this problem material is possible and preferable.
- Since PVC serves as a sink for excess chlorine generated during the production of soda ash, and since soda ash can be manufactured without chlorine as a by-product, we strongly feel that PVC should be phased out from as many applications as possible.
- At a minimum, other toxic additives, such as heavy metals, phthalates and similar chemicals, must be phased out from inclusion into the PVC matrix.

Thank you for considering our comments.

Hans S. Posselt, Ph.D.
Senior Scientist

Jeff Gearhart
Campaign Director

Ecology Center
117 N. Division
Ann Arbor, Michigan, USA 48104
(734) 663-2400

30 November 2000

Mr L Krämer
European Commission
Environment DG/E3
Rue de la Loi 200
B-1049 Brussels

Dear Mr Krämer

**Re: PVC Horizontal Initiative and Industry Voluntary Commitment**

Having spent some time reviewing the content of the Public Hearing on PVC we would like to present some further data and address some of the issues raised throughout the day.

## 1. Dioxins

Dioxin emissions from different sources are reducing and exposure to dioxins has decreased by between 9 and 12% per year over the last two decades. A study from the USA also concludes that "the Vinyl production chain is estimated to account for less than 1% of total emissions to air, water and land (Anon., 1999).

The emissions from Municipal Solid Waste Incinerators (MSWI) and Hospital Waste Incinerators (HWI) will be reduced even further as the new Incineration of Waste Directive is implemented. For instance the level of emissions from MSWI is expected to be less than 20 g I-TEQ/year.

Within MSWI parameters, such as temperature and oxygen, have a major influence on dioxin formation as the Commission has recognised in its Green Paper. Experiments performed in 1998 and 1999 at the University of Umeå prove that the dioxin amounts formed are correlated to the CO concentrations in the raw off-gas (Wikstrøm, 1999). Experiments with high chlorine content in the feed confirm this correlation (Wikstrøm, 2000). The threshold theory proposed earlier (Wikstrøm, 1996) and cited in the Green Paper, is therefore no longer valid.

The main exposure route for humans is not through incineration but through food consumption (95-98%) and cannot be related to the presence of PVC. Estimated average dietary exposure for consumers within the EU is currently in the range of 1-3 pg TEQ /kg body weight/day. By including PCBs the exposure is calculated to be 2-6 pg TEQ/kg body weight/day (Buckley-Golder, 1999).

AVENUE E. VAN NIEUWENHUYSE 4, BOX 4 B-1160 BRUSSELS
TELEPHONE (32 – 2) 676 74 41 FACSIMILE (32 – 2) 675 39 35

## 2. Plasticisers

Several speakers at the Hearing focussed on the potential endocrine disruption effects of plasticisers and more specifically phthalates. Scientific studies carried out by ECPI show that phthalates used in PVC and the resulting low exposure from these applications pose no risk to humans or wildlife from endocrine activity.

Claims that phthalates might also act via an oestrogenic mechanism are taken very seriously and ECPI has undertaken detailed studies using laboratory animals. These studies confirm that no effects have been witnessed from phthalates.

## 3. Behaviour of PVC in Landfill

At a recent scientific workshop held in Hamburg and attended by scientists from ARGUS,the University of Rostock and the Technical University of Hamburg-Harburg amongst others the following key conclusions were drawn and agreed by all of the parties:

**PVC Polymer:** The PVC polymer was found to undergo no changes under anaerobic conditions. Under aerobic conditions and at elevated temperatures (80°C), a change of the molecular weight distribution was observed (ARGUS/RoU). A release of vinyl chloride was not found under any of the test conditions and at temperatures 20-80°C (TUHH/LiU).

**Stabilisers:** Losses of stabilisers from the PVC polymer matrix itself were generally not investigated. Instead, emissions into waste and leachate were monitored. A superficial leaching of stabilisers from the PVC products appeared probable. The influence of stabilisers on the leachate quality was generally small or indistinguishable from the background contamination. The assays indicated an adsorption of heavy metals and organotin compounds to the solid waste matrix. Furthermore, organotin compounds were found to be subject to dealkylation processes (TUHH/LiU).

**Plasticisers:** losses of some plasticisers from PVC products were observed in all studies, especially at elevated temperatures and under aerobic conditions.

TUHH/LiU found that depending on their compatibility with the PVC polymer, some plasticisers showed considerably less or more inclination to migration. The view is held that biodegradation is the primary cause for losses. Hence concentrations of phthalates in the leachate are not correlated with the losses but orders of magnitude lower. Furthermore, phthalates and their degradation products were detected in the leachate prevalently during transient periods. As the PVC compound undergoes glass transition upon a critical loss of plasticisers (or sufficient decrease of temperature), migration processes are not expected to continue for an indefinite period (TUHH/LiU).

**Conclusions:** The recent research projects provide a comprehensive base of knowledge regarding the fate of PVC products and their additives in landfills. The remaining questions relate only partly to the fate of additives, but particularly to the relative importance of other waste constituents. Also the comparative relevance of the landfill stage within the whole product life cycle was addressed, for instance, in relation to the service phase. Furthermore, waste management practices, the heterogeneity of landfills and their long-term behaviour were identified as sources of uncertainty. Hence the available studies need to be put into perspective, and an overall evaluation requires an expanded substance flow database.

TUHH/LiU argue that additional measures specifically directed at PVC products in contrast to overall municipal solid waste do no appear necessary, provided that landfills are operated appropriately and responsibly. ARGUS/RoU maintain that the possibility of gaseous emissions needs to be further investigated. All scientific experts agree that future monitoring programmes will have to consider a wider range of target compounds, including their respective degradation products in landfill gas and leachate.

**4. Eco-marketing**

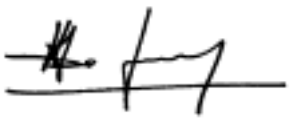
Much to our concern the hearing was also used by some speakers as an eco-marketing exercise to show that their organisations are responsible and environmentally friendly as they have outlawed the use of PVC in both their premises and products. We are confident that PVC is safe and would recommend all organisations to undertake thorough life-cycle analyses before committing themselves to such a policy.

Jonathan Porritt in his Natural Step evaluation of PVC confirms that whilst PVC may fall short of some of the sustainable development criteria in the Natural Step model no other material currently available will succeed in meeting all of the Natural Step criteria.

Finally some of the speakers also made very emotional presentations that made various links to PVC which in reality have not been established. The positions presented by the PVC industry only include thoroughly researched and peer-reviewed data and while we truly empathise with the speakers we feel it is important that the Commission does not act on the basis of these unsubstantiated claims.

If you require any further information on any of the information contained in this letter please feel free to contact me directly.

Yours sincerely



**Jean-Pierre De Grève**
ECVM Director
(On behalf of the European PVC Industry (ECVM, EuPC, ECPI, ESPA)

Message from Elena Porazzi

Egr. Sig. KRäMER
RESPONSABILE DELL'UNITÀ
GESTIONE RIFIUTI (DG AMBIENTE)

EGR. SIG. SCHULTE BRAUCKS
RESPONSABILE DELL'UNITÀ SOSTANZE
CHIMICHE (DG IMPRESE)
200 RUE DE LA LOI/WETSTRAAT 200
B- 1049 BRUXELLES /BRUSSEL
BELGIUM

29 novembre 2000

**Oggetto**: Osservazioni relative al "LIBRO VERDE – *Problematiche ambientali del PVC",* presentato dalla Commissione delle Comunità Europee il 26.07.2000 [COM(2000) 469 definitivo]

Egregi Signori,

In riferimento all'oggetto, la sottoscritta Elena Porazzi, laurata in Scienze Ambientali, è a conoscenza delle proprietà tossiche, cancerogene e mutagene di 1,2-Dicloroetano/Cloruro e Policloruro di Vinile (1,2-DCE/CVM/PVC), chiede alla Commissione delle Comunità Europee di vietare da subito la produzione, l'impiego e il consumo di 1,2-DCE/CVM/PVC.
Le ragioni di questa richiesta sono molteplici e comunque ben illustrate nel documento di Medicina Democratica-Movimento di Lotta per la Salute relativo alle osservazioni e alle richieste da essa formulate all'anzidetta Commissione.
Certo che la Commissione vorrà considerare ed accogliere la mia richiesta porgo distinti saluti.

Elena Porazzi

Message from Enrique Iglesias :

Monsieur,

Comme vous le savez, le PVC fait partie de notre vie quotidienne et surtout, ils nous est très utile de par ses nombreuses utilisations.

Comme de plus, avec le procédé VINYLOOP il est totalement reciclable, c'est donc un produit "propre".

Merci d'en tenir compte dans vos décisions et de mettre ce produit en avant car il a beaucoup plus d'avantages que d'inconvénients.

Cordialement

**EUCOMED response**

**to**

**Commission Draft Green Paper "Environmental issues of PVC"**

## 1. About EUCOMED

EUCOMED is a pan-European Association which represents the majority of the European medical technology industry. EUCOMED members comprise companies with European operations and national and pan-European organisations in the medical technology sector. Currently, EUCOMED represents more than 2,500 companies employing approximately 300,000 EU citizens that provide tens of thousands of healthcare products within the EU and globally. More than 85% of these companies are considered to be Small and Medium size Enterprises (SMEs).

## 2. Summary

EUCOMED is primarily concerned with the provision of safe medical technology products and, where this primary objective is maintained, fully supports the principles of environmental protection.

PVC used in medical applications has a minimal overall environmental impact.

EUCOMED stresses the socio-economic importance of PVC in medical applications and the excellent safety record to date.

There is, at present, no scientific justification to restrict the use of PVC in medical devices on environmental or health grounds. Should such use be restricted on the base of groundless and alarmist calls, it will have disastrous consequences to the provision of effective healthcare throughout Europe.

Any future environmental legislation must take into account the importance of PVC in medical applications.

## 3. About this response

This response primary addresses issues concerning human health raised by the Commission's draft Green Paper on the environmental issues of PVC, particularly in section 1 – Introduction, section 3.3 – Plasticisers and section 4 – Waste Management.

## 4. PVC in medical applications

Medical devices containing PVC were originally developed as replacements for those made from natural rubber and glass. PVC medical devices have the advantages of being

- sterilizable
- more transparent
- available in a variety of forms, e.g. highly flexible or rigid
- physically reliable
- chemically stable
- available in a variety of highly engineered forms with carefully designated tolerances
- cost-effective for healthcare budgets.

Fitness for the intended purpose or use is the foremost criterion for material choice. In many products, PVC is the material of choice, because of its unique combination of properties, both for the production phase and the user phase of the product.

In addition, PVC devices often have important functional attributes such as improving the storage of red blood cells.

The amount of PVC used in medical applications only accounts for about 1% of the total PVC manufactured. This percentage, while small, however accounts for many critical and often life-saving products. It is disappointing, therefore, given these important and essential applications for society that the medical uses of PVC are not highlighted in the draft Green Paper.

## 5. The safety record of PVC in medical applications

PVC has been used in medical applications for over 40 years with literally billions of medical procedures involving PVC medical devices having taken place.

The saving of millions of lives and the improvement in the quality of life of many millions more are directly attributable to the use of medical devices containing PVC.

At the present time EUCOMED is not aware of any adverse incident over the past 40 years directly attributable to the use of PVC in medical devices.

PVC medical devices can therefore be said to have an extremely high level of benefit to society coupled with a low level of risk. Many such products fall into the life-saving category.

Indeed, the Medical Device Directive 93/42/EEC lays down essential requirements concerning the safety of medical devices for the patient and users and requires manufacturers to undertake a risk analysis and to reduce risks as far as possible.

The quality of PVC and DEHP in medical devices coming into contact with medicinal products, including blood, is addressed by Monographs of the European Pharmacopoeia which, in turn, are implemented in the national Pharmacopoeia of European Member States.

The statement in 3.3 "…certain phthalates, their metabolism and degradation in products can be adverse factors in human health…and on testicles with DEHP…" is misleading. Those studies that have been carried out have used animals (rats/mice) and scientific consensus suggests that, to date, there is no significant risk in humans. In addition, there is currently no data which implicates DEHP as a human testicular toxin at doses that could be encountered with PVC medical products.

Under 3.3 "Issues for consideration", we suggest that "healthcare implications" should be added to "environmental and economic implications". In view of the importance of PVC medical products to patients, any measures adopted must take into account implications for effective healthcare provision.

## 6. What some recent studies have said about PVC, DEHP and medical devices

Extensive studies over the years support the view that DEHP exposure through medical devices is not a health risk to humans.

In reviewing these many studies, a distinguished, independent panel of leading physicians and scientists, under the auspices of the American Council on Science and Health (the so-called Koop Report[1]), reported in June 1999 that

> *"DEHP, as used in medical devices, is not harmful to humans even under chronic or higher-than-average conditions of exposure. DEHP confers considerable benefits to certain medical devices and procedures, and its elimination without a suitable substitute could pose a significant health risk to some individuals"[1].*

In addition the International Association for Research in Cancer (a body of the World Health Organization) declassified DEHP as a potential human carcinogen on the basis of the scientific evidence available.

## 7. Waste management

Material recycling is not normally a realistic option for medical PVC because of the risk of injury and infection in the waste handling chain. Preference is therefore given to energy recovery, as mentioned in the Green Paper, for medical PVC.

## 8. Socio-economic considerations

As noted above, many millions of lives have been saved or their quality improved due to the use of PVC medical devices. Such products therefore have a high intrinsic value to society. At the same time, because of their ease of manufacture and relatively low cost such devices are economically important in an era where healthcare costs in all countries are under extreme pressure and, demographically, there is a predominantly ageing European population.

---

[1] A Scientific Evaluation of the Health Effects of Two Plasticisers Used in Medical Devices and Toys; A report form the American Council on Science and Health – June 22, 1999 (www.drkoop.com)

Any material utilized in the manufacture of a medical device must allow that device to conform to the essential requirements of the Medical Device Directive (93/42/EEC), e.g. concerning biological safety, etc. PVC can therefore be considered as a regulated material with a long and successful history of use.

Where products for a particular medical application made from alternative materials to PVC are available, and they are not available in many cases, hospitals may simply not be able to afford them due to their sometimes considerably higher manufacturing costs. In addition, if an alternative material to PVC does not offer the required performance for a medical device, it will not be used.

Under “Conclusions” in the draft Green Paper, it is not sufficient to mention only environmental and human health issues. The continued provision of affordable and effective healthcare is of equal importance and should therefore also be highlighted.

## 9. Labelling

Labelling is a critical factor in the safe use of medical devices as required by the Medical Device Directive. The space available for labelling is often limited. In considering any further additions to labelling, e.g. materials marking, great care must be exercised in order to avoid the risks of confusion to users and of detracting from important safety and use information.

Medical PVC waste will not normally be segregated and therefore additional marking will be superfluous for PVC in medical devices.

30 Nov 2000

*Communauté européenne des coopératives de consommateurs*
*European Community of Consumer Cooperatives*

**Euro Coop's Comments to the Green Paper on Environmental Issues of PVC (COM (2000) 469)**

*Euro Coop is the European Community of Consumer Co-operatives, whose members are the national organisations of consumer co-operatives in 11 of the 15 Member States of the EU and in 4 Central and Eastern European countries. Created in 1957, Euro Coop today represents over 3,200 local or regional co-operatives, membership of which amounts to over 19 million consumers in the EU and 2 million in the associated countries of Central and Eastern Europe.*

Euro Coop welcomes the European Commission's Green Paper on Environmental Issues of PVC (COM (2000) 469). Euro Coop believes that it is vital to create an EU strategy on this crucial issue taking into consideration the consumer and environmental aspects. Currently, the Green Paper outlines the problems connected to waste management and the use of certain additives. However, the Green Paper does not address consumer issues or the responsibility of producers.

It is vital that the stakeholders are properly involved in solving the problems connected to PVC. This can only be done by providing the necessary information to the consumers in order for them to play an active role in the use and in the management of PVC. As well, it is vital to hold producers financially and legally responsible for the impacts of PVC and PVC waste to the environment and to human health in order to promote a more sustainable behaviour.

It is apparent that an integrated approach to PVC is needed in order to develop the necessary measures to ensure a high level of protection of human health and the environment. By only introducing means solving the problems, when damaged have already been done, will not solve the problems connected to PVC in the long run, neither will ad hoc initiatives and voluntary agreements. Therefore, it is necessary to have a legislative framework that is based on consumer protection, the precautionary principle and producer responsibility.

Presently, initiatives have been taken ad hoc by companies to address the issue of PVC. As such, some of Euro Coop's member organisations have taken initiatives to remove PVC from certain products. The Danish organisation FDB and the Swedish one KF have both taken initiative to push manufacturers to find substitutes for phthalates used in baby toys, which can be put in the mouth. None of the two organisations are selling these kinds of toys in their co-ops. The Spanish organisation HISPACOOP also has a clear policy that products for children cannot be produced with PVC. For the packaging of own brand products it is the aim to change it little by little to non-PVC. This has happened in both FDB and the Italian organisation ANCC, where, for instance, the wrapping used for fresh meat products is PVC - free.

Turning to the questions raised in the Green Paper Euro Coop has the following comments to make:

**1. Lead and cadmium:**

Cadmium and lead in PVC products should be phased out as soon as possible. This should be part of a legislative framework.

**2. Phthalates:**

The precautionary principle must apply. Therefore the use of phthalates as plasticisers in PVC should be banned through permanent legislation, when there is a potential risk to human health or to the environment, as for example in young children's toys.

Rue Archimède 17, bte 2
B-1000 Bruxelles
Tél. : +32.2.285.00.70 - Fax. : +32.2.231.07.57
http://www.eurocoop.org
*E-mail: info@eurocoop.org*

**3. Waste:**

Euro Coop believes that a legally binding framework will be the best approach to secure a proper handling of waste. Nevertheless, the legal framework should not only focus on waste and use of certain additives but also address the whole life cycle of PVC. It is important that the use of PVC is minimised as much as possible. It should be a key concept in the EU's approach to PVC. In addition, the industry must be financially responsible for setting up mandatory collection systems for products containing PVC and heavy metals. Furthermore, the precautionary principle must apply where there is a potential risk to human health and to the environment. In these cases the use of PVC or harmful substances in specific products must be banned and substituted for safer alternatives. As well, other products should be labelled if PVC is used in the product or the packaging in order to facilitate the separation of PVC waste from the general waste stream, but also for the consumer to be able to choose between products.

**4. Horizontal Issues:**

Euro Coop is disappointed that the Green Paper is only considering a substitution policy as part of an IPP for specific PVC applications, which cannot be separated from the general waste stream, such as, in packaging, motor vehicles, and electrical and electronic equipment. Since Euro Coop feels that an Integrated Product Policy (IPP) approach, included in a legislative framework, is a key tool in addressing the PVC issues. Euro Coop believes that many of the current problems, for instance, connected to waste, could be avoided by actually trying to find a way to integrate the environmental costs in to the price of a product. It would allow for a more fair competition between less environmentally friendly products and more environmentally friendly products. At the same time it will allow the consumers to make a choice and to develop a more sustainable consumption pattern. An IPP would encourage producers to find safer substitutes for their products, as it would not pay off to use PVC. As a consequence, PVC would be used to a lesser extent in various products and packaging than is the case today.

**Euro Coop Secretariat** **29 November 2000**

Message from Fernando Rey

Deseo enviarles mi opinión favorable sobre el PVC que es un producto que reúne varias características importantes y positivas:

1) Es un producto indispensable para el normal desarrollo de nuestra vida cotidiana. Su aplicación en medicina, construcción e industria lo hacen de primera necesidad en el mundo actual.

2) Es un producto reciclable y cuyos deshechos pueden ser tratados en forma ecológica.

3) Es un producto con un bajo contenido de hidrocarburos y consumo de energía en el proceso de fabricación.

Por éstas razones entre otras deseo expresar mi opinión positiva del PVC ante vuestra institución.

Message from Ferruccio Trifirò :

Università di Bologna, 29/11/00

A: Mr. Schulte-Brancks
Head of the Chemical Unit (DG Enterprise)

Mr. Kramer
Head of the Waste Management Unit (DG Environment)

**Oggetto: Processo di consultazione sul Libro Verde sul PVC.**

Egregi Signori,

mi chiamo Ferruccio Trifirò e detengo la cattedra di Chimica Industriale presso la Facoltà di Chimica Industriale dell' Università di Bologna dal 1976 e sono attualmente il Direttore del Dipartimento di Chimica Industriale e dei Materiali .

Desidero esprimere i miei commenti sul "Progetto di LIBRO Verde, Problematiche Ambientali sul PVC" documento COM/2000/469 del 26/7/2000.

Quale Docente Universitario, ho avuto molte occasioni di contattare tutta l' Industria appartenente alla "catena" del PVC e le associazioni che la rappresentano: ECVM, Consiglio Europeo dei Produttori di Vinile, ECPI, Consiglio Europeo dei Produttori di Plasticanti, ESPA, Associazione Europea dei Produttori di Stabilizzanti, EUPC, Associazione Europea dei Convertitori di Materie Plastiche.

Sulla rivista di cui sono direttore "La Chimica e L' Industria" è apparso un articolo in seguito ad una intervista con la Dott. sa Giovanna Galliani, responsabile del Centro di Informazione del PVC, la sezione Italiana dell' ECVM. Su questo articolo, che trovate allegato, viene illustrato il punto di vista delle 4 Associazioni sui 5 studi Iniziativa Orizzontale, sul Libro Verde pubblicato in seguito a questi studi e soprattutto l' Impegno Volontario che l' Industria del PVC ha reso pubblico nel Marzo 2000.

Relativamente agli Stabilizzanti, vorrei sottolineare il contributo offerto da un' azienda che opera a S. Giorgio di Piano, in provincia di Bologna: la Reagens SpA. Questa azienda è membro attivo dell' ESPA dal 1979, e ha inviato, il 3/10 u.s. alla Commissione Europea una serie di commenti sul Libro Verde, che potete trovare nella lettera allegata. Tali commenti riguardano principalmente il settore degli Stabilizzanti Termici, prodotti dalla Reagens fin dai primi anni '50.

Vorrei ora dare un mio personale parere ai punti trattati nel Libro Verde.

Io credo che l' impatto ambientale nella produzione del PVC sia essenzialmente legato allo smaltimento dei manufatti alla fine del loro ciclo di vita. Infatti durante la produzione del monomero, la polimerizzazione, la produzione degli additivi e l' aggiunta degli stessi al polimero per la produzione del manufatto finito, a seguito di una continua ottimizzazione dei processi avvenuta in questi ultimi anni, l' emissione all' ambiente esterno e l' esposizione dei lavoratori soddisfano gli standard di " Risk Assesment " imposti dalla comunità Europea. Inoltre il rilascio di additivi e dell' eventuale monomero durante il ciclo di vita del prodotto è praticamente nullo.

Pertanto un' analisi dell' impatto ambientale del PVC deve concentrarsi sullo smatimento e sul riciclo dei prodotti a fine vita. Lo smaltimento, comunque, è un problema non solo del PVC ma di qualsiasi prodotto ad esso alternativo nei diversi usi.

La collocazione in discarica, che é una delle tecniche più utilizzate, non presenta problemi di rilascio di Pb, Cd e Sn impiegati come Stabilizzanti, ma solo di un parziale dilavamento superficiale degli Ftalati, usati come Plastificanti, che sono in gran parte biodegradabili.

L'incenerimento, qualora venissero utilizzate le migliori tecnologie di combustione ed impianti di abbattimento o distruzione delle emissioni, presenta un impatto ambientale controllato. In particolare i metalli pesanti sono trattenuti nel "fly ash" (ceneri volatili) abbattuto dei precipitatori elettrostatici. Il "fly ash" deve essere collocato o in discariche speciali come quelle realizzate all'interno delle miniere di sale, o deve essere sottoposto a trattamenti di inertizzazione per evitare il dilavamento dei metalli. HCl prodotto può essere inertizzato come $Ca\ Cl_2$, o recuperato come soluzione di HCl o infine come materia prima per impianti di produzione di Soda. Un processo di combustione BAT (Best Available Technology) emette da 1 a 10µmg/Nm3 di TEQ (Tossicità Equivalente) di diossine e furani . Le diossine e i furani possono essere abbattuti fino a livelli di 0.01 ngTEQ/Nm3 mediante diverse tecniche di depurazione dei fumi tra le quali quelle catalitiche che sono le più efficienti.

Va infine ricordato che la formazione di diossine e furani dipende dalle condizioni di esercizio durante la combustione e non è direttamente e quantitativamente correlato alla presenza di PVC nei rifiuti da incenerire.

Infine nel riciclo meccanico é necessario realizzare operazioni "Closed Loop" per evitare la dispersione nell'ambiente di metalli pesanti.
Le industrie collegate alla produzione di PVC hanno dimostrato in questi ultimi anni una grande disponibilità e capacità di innovazione migliorando l'ecoefficienza di processi e i prodotti. Nello stesso tempo le tecnologie di incenerimento e le tecnologie di depurazione dei fumi hanno avuto enormi miglioramenti. Tutto ciò è molto ben evidenziato nel documento relativo all' Impegno Volontario, prodotto dall' Industria del PVC nel Marzo 2000. Un capitolo di questo documento è dedicato agli Stabilizzanti Termici. Le industrie interessate, infatti, sono già riuscite con successo a trovare alternative al Cadmio e stanno impiegando risorse per la progressiva sostituzione del Piombo nelle applicazioni dove ciò e tecnicamente possibile.

Proprio sugli Stabilizzanti Termci vorrei spendere qualche parola .

Composti al Cadmio: quelli utilizzati nella stabilizzazione termica del PVC, non sono classificati Tossici per la salute umana ma Nocivi, secondo la direttiva 67/548. Tengo a ricordare che tale direttiva non si basa sul Rischio, ma sulla Pericolosità.
Su tali composti, la cui quantità è ormai diventata trascurabile in Europa (31 ton equivalenti di Cd metallico nel 1999), è stata completata una valutazione del Rischio, secondo la direttiva 793/93 e si è dimostrato che il Rischio è inesistente.
Per il principio di sostituibilità tecnica, l' industria ha comunque deciso di eliminare gli stabilizzanti al Cadmio dal Marzo 2001. Il PVC contente Cadmio, già in uso, dovrebbe essere riciclato senza esitazioni.

Composti al Piombo: nel 1998, su 1.650.000 ton di Piombo immesse nel mercato Europeo, 51.000 sono state destinate al PVC, il 3.1%. I composti al Piombo, usati come stabilizzanti termici nel PVC, sono legati irreversibilmente alla matrice ed il loro rilascio durante l' uso del manufatto è praticamente nullo. E' importante ricordare che i tubi in PVC stabilizzati in Piombo sono approvati

per l' acqua potabile dall' Organizzazione Mondiale della Sanità poiché viene rispettato il limite di 10 microgrammi/litro. Nel 1994, l' OECD organizzò un processo di "Risk Assessment", a livello mondiale, per tutte le applicazioni del Piombo. L' uso nel PVC fu considerato sicuro e non fu prescritta alcuna restrizione in quel settore. A livello Europeo sta anche partendo un' iniziativa per una "Risk Assessment" volontario, basato sulla direttiva 793/93.
Nell' ambito dell' Iniziativa Volontaria, infine, l' Industria del PVC si impegna a ridurre gli stabilizzanti al Piombo in Europa dalle attuali 120.000 tonn/a a 80.000 tonn/a nel 2010.

Composti Organici dello Stagno: nel Libro Verde è riportato che i composti di Ottil Stagno presentano tossicità per il sistema immunitario, ma questa affermazione non sembra documentata da riferimenti bibliografici. Le industrie produttrici di questa classe di prodotti, tra le quali anche la Reagens SpA, si sono consorziate autofinanziando studi tossicologici che non hanno mai mostrato queste evidenze.

Distinti Saluti

Prof. Ferruccio Trifirò
Direttore del Dipartimento di Chimica Industriale e dei Materiali
Facoltà di Chimica Industriale
Università degli Studi di Bologna

**Green paper on environmental issues of PVC**

**Statement of Feugrès (Fédération Européenne des Fabricants de Tuyaux en Grès)**

For the purpose of sewage disposal a construction product which can completely substitute the use of PVC are clay pipes.
The Green paper of the Commission does not fully address the substitution issue.

It should be stressed that clay pipes do not pollute the environment with toxic substances. The material is recognised world-wide as a product with environmentally friendly properties.

These properties are:

- the limited use of raw materials in the production process;
- a low level of energy consumption in the production process;
- low emission levels during the production process
- its longevity;
- its recycling possibilities.

The basis for the production of clay pipes is clay, which abounds in nature. As these products have a long durability for use, usually more than 100 years, they are taken as a model for the expense of materials and for the assessment of technical qualities. Since 1992 there exists a European Standard EN 295 (parts 1-7) for the production and the use of clay pipes for sewage disposal. In this standard the most important qualifications of the product, e.g. mechanical quality, corrosion resistance, resistance to mechanical wear and durability are regulated. In comparison with PVC products clay pipes meet the necessary technical demands much better.

The energy needed for the production is around 6,26 GJ/t, this concerns the production processes forming, drying and firing.

Clay pipes are produced in several countries of the European Union, especially in the United Kingdom, Germany, Belgium, the Netherlands and Italy. In the production process of construction products a complete cycle of recycling is possible, that means that ceramic pieces can be completely recycled and reused for new products.

The possible potential for substitution comprises construction components for private as well as for public sewage disposal.

Comments by Federation of Norwegian Process Industries :

on the Green Paper on Environmental Problems posed by PVC - COM (2000) 469.

The Federation of Norwegian Process Industries welcomes the opportunity to comment on the Green Paper. Representing several sectors of the processing industries we are not in the position to give detailed comments on all the Green Papers' Issues for consideration and the respective questions. We will, however, emphasize on a few fundamental principles related to the Green Paper.

Life Cycle Assessment
The assessment of any substance or material should be based on the life cycle health and environmental risks and benefits.

Alternatives to be equally assessed
Assessment of substances or materials with the aim of introducing for risk reduction action, like restrictions on handling and use or phase out, should include a risk assessment of the alternatives/substitutes, based on similar principles and methods.

Voluntary instruments by industry should always be considered
When assessing options of instruments in the environmental policy, voluntary initiatives included negotiated agreements with industry should always be considered. A voluntary approach is specifically relevant for Question no 1 in the Green Paper, related to lead.

Assessment of risk and risk management of substances shall be based on existing Community instruments The risk assessments of certain phthalates are already covered by the four priority lists of substances for risk assessment under Council Regulation 793/93. Any risk assessment of the phthalates already under risk assessment or any other phthalate used as plasticiser in PVC should be assessed by Council Regulation 793/93, not by a parallel risk assessment for the specific use in PVC. Parallel risk assessment will only undermine the existing instrument and duplicate work and spending of scarce resources in industry, academics and authorities.

This comment is relevant for Question no. 2.

Yours Sincerely
PIL - Federation of Norwegian Process Industries
Trygve Østmo
Director Environmental Affairs