



A Division of The Society of The Plastics Industry, Inc.

*new Free: "Cot" Deaths -
England*

AN-4107

delivered

Roy T. Gottesman
Executive Director

April 30, 1990

TO: H. Patrick Toner

RE: Information on "COT" Death Controversy in England

This is in follow-up to our telephone conversation of April 17th. As I indicated I would do, I telefaxed Harold Clayton, my contact at Hydro Polymers Limited in England and asked that he collect all information available on this subject. Further, I requested that copies of this information be given to me at the PVC '90 Conference in Brighton, England, which I attended last week.

Enclosed with this letter is a copy of all information that I have received which will provide you with the background on this subject. Further, I am advised that there has been no technical report by Barry Richardson and that the paper included in the attachments which is a fax copy obtained by Hydro Polymers in June 1989, was rejected for publication by a British medical journal. At that time, a governmental inquiry was supposed to have gotten started, but Mr. Richardson raised the issue again in February with a member of Parliament, and it was picked up also by a British newspaper at that time.

In the addition to the information in the attachments, a meeting was held at the British Plastics Federation on April 23rd at which time I am advised it was agreed to attempt to provide answers to the questions that have been raised by the Chief Medical Officer, Sir Donald Acheson. Industry has agreed to attempt to provide answers to the questions given in Philip Law's letter of April 4th, although, according to Dr. Malcolm Biggs of Hydro Polymers who attended this meeting, they are not certain that they have all of this information.

Nevertheless, they have agreed that a committee of 5 people including Philip Law of the British Plastics Federation, Dr. Brian Bennett of ICI, Mr. Tom Hyde of Ciba-Geigy, a representative of the British Rubber Association and a representative of the PVC Film Producers Association will meet with the Department of Health on May 3rd. The intent is to provide sufficient input so that a

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committee that has been established by the Chief Medical Officer to be headed by Professor Paul Turner can evaluate all of the available information and determine whether there is any validity to the Richardson hypothesis.

Finally, I call your attention to the information statement published by the Foundation For The Study of Infant Deaths, which indicates that the SIDS rate has remained relatively constant and infant mortality has continued to fall since the use of plasticized PVC.

Harold Clayton or Malcolm Biggs will keep me advised of developments as they emerge on this, and I will see that any information I receive is passed onto you and Bonnie Limbach.

If you have any questions on this, please call.

RTG/pmb
cc: B. Limbach

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12.4.90

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To: BPF MEMBERS INVOLVED IN COT DEATH ISSUE

Gentlemen,

As you know the Chief Medical Officer has asked a group of experts to advise him on Barry Richardson's hypothesis.

The Federation has been invited to attend a meeting of this group on May 3rd (time and location to be advised to us) and has been specifically asked to present the following data in as much detail as possible in the form of a paper:-

1. Dates on the first use of PVC mattress covers.
2. Dates on the first use of foam fillings.
3. The composition of materials used for covers.
4. The composition of materials used for fillings.
5. Any changes in the compositions of these materials, particularly in the use of fire retardants which might have taken place in 1986 and 1987.
6. Sales levels of PVC cot mattresses in the UK together with any regional variations.

The Department Of Health have pledged their confidential treatment of this information. I have naturally accepted the invitation, and I am now taking steps to prepare this paper. Not all of this data will be available from Federation sources, for example The British Rubber Manufacturers Association will be the fount of knowledge on foam fillings. I will be contacting those companies I feel will be best placed to provide this information directly.

I wish to invite you to a meeting of the interested manufacturers at the BPF at 11.00 a.m. Monday 23rd April to review the information which we can collate, determine the composition of our delegation to the Department Of Health and our approach to the Meeting on May 3rd.

Would you please send me a fax advising me of your attendance.

Regards,

A handwritten signature in dark ink, appearing to read 'Philip Law', is written over the typed name.

Philip Law
Head Of Planning and Membership Activities



PVC
Stuurgroep PVC & Milieu

Netherlands
Action Group
PVC and Environment

PRESS RELEASE

Cot Deaths

As a result of reports concerning a possible connection between cot mattresses having a lining of PVC and cot deaths we make the following statement:

The first publications concerning the possible connection between flame retardants made of PVC and cot deaths came out early in 1989 in England, when a scientific investigator at Penearth Research International indicated a possible connection between cot death and flame retarding additives to the PVC lining on cot mattresses.

A publication of the results of research work was rejected by the British Medical Journal due to insufficient scientific foundation. Consequently, the British Ministry of Health, Safety and Environment dismissed the line of reasoning put forward by the researcher. The British Government likewise saw no reason to take any action regarding flame retardants used in the industry.

In June 1989 it was however decided that the laboratory of the British Government should carry out an investigation since it has been considered that every possible indication, no matter how small, should be investigated if it may help to solve the as yet unexplained problem of cot deaths.

Up to the present time no indications have been found concerning a possible connection. In view of the information now known the Stuurgroep PVC & Milieu looks forward with confidence to the outcome of the British investigation. Should however the results not indicate anything positive or be available within the envisaged 6 weeks the Stuurgroep and the Dutch government will together decide to carry out their own investigation.

It need hardly be said that the Stuurgroep PVC & Milieu takes very seriously reports concerning a possible connecting existing between PVC and cot deaths. It is of the utmost importance that all possible efforts be made to solve this mystery! All the same it is also very important that in a matter which involves, understandably, a great deal of emotion the facts must be relegated first consideration.

Note for the editor: You may obtain more information from H.J. Moonen, chairman of Stuurgroep PVC en Milieu on tel.no. 020-934844.

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MARCH 17th 1990

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THE LANCET

Cot mattress biodeterioration and SIDS

SIR,—In 1988, various fungi were identified in industrial plasticised polyvinyl chloride (PVC) despite the presence of the preservative 10, 10'-oxybisphenoxarsine (OBPA). Warnings were given that the PVC might also become infected by arsenic-tolerant organisms which might convert OBPA to toxic arsine gas. Mr P. R. Mitchell, a client of our company, inquired whether arsine generation through biodeterioration of such coverings might be a cause of sudden infant death syndrome (SIDS).

50 mattresses used in forty-five SIDS incidents were examined, including 1 cotton covered, 26 PVC covered, 15 PVC covered with exposed foam at one or both ends, and 8 exposed foam; in five incidents 2 mattresses had been used. All mattresses contained *Scopulariopsis brevicaulis*, but only in the area beneath the infant affected by warmth and perspiration. Incubated samples of the infected materials all generated toxic trihydride gases. PVC coverings usually generate stibine (SbH_3) from a fire retardant additive, antimony trioxide, but also phosphine (PH_3) from the phosphate plasticisers that are used when fire resistance is required. Although OBPA is not generally used in cot mattress PVC, tests indicated arsine (AsH_3) generation when it was used; and small amounts of arsine were sometimes identified when it was not, presumably from arsenical impurities in antimony trioxide. Mixtures of gases were often detected. Phosphine generation from PVC was sometimes associated with the development of a pink stain, usually in the shape of the sleeping infant, apparently caused by liberation of phenol compounds from decomposition of phenyl phosphate plasticisers. Only phosphine was generated from infected cotton and foam samples, apparently through biodeterioration of phosphate fire-retardant treatments. Foam samples and the 1 cotton sample were also infected by various other fungi, especially in the area affected by dribble; many of these fungi produce asthmatic reactions.

The generation of highly toxic trihydride gases from cot mattresses is a serious threat to health. The gases are heavier than air, and infants most at risk are those who remain for long periods in their cots, sleep prone in carry-cots, or are heavily wrapped such that they are in long and close breathing contact with accumulations of gas. Heavy wrapping also induces hyperthermia, which prompts an increase in gas generation. Some infants probably survive because the first symptom of poisoning is headache, which results in irritability, dislodgment of bedding, and improved ventilation; infants of low weight cannot dislodge bedding. SIDS occurs mainly in infants up to age 5 months who sleep prone with heavy wrapping and have indications of hyperthermia. SIDS is only reported in western-style communities where foam and PVC covered cot mattresses are used, and has only been recognised since about 1969, following introduction of these materials during the previous 10-15 years.

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It has been reported that SIDS is less likely to occur in first born children, perhaps because mattresses are new and do not become infected while the infant is young and most at risk. 5 first children were involved in the 45 incidents investigated. 2 died on previously used mattresses; 1 of these 2 slept on a mattress immediately after use by an older child. 1 infant died on a new foam mattress that was generating phosphine and 2 died on new PVC mattresses which were affected by exceptionally active fungus and were generating phosphine; two other new mattresses were implicated, both of which were similarly affected.

Infection by *S brevicaulis* is not readily visible in PVC. Severe deterioration, usually associated with phosphate plasticisers, results in brittleness and splitting. In the home the fungus is usually found in protein-containing substances such as cheese and meat, and in damp wool and leather; however, its extracellular enzymes can convert a wide range of compounds containing the elements nitrogen, phosphorus, arsenic, and antimony into the trihydrides ammonia, phosphine, arsine, and stibine. The preferential development of this fungus in cot mattresses should be attributed to the presence of nitrogen compounds in the perspiration. The generation of arsine in this way has been recognised for about 100 years since Gosio¹ discovered that death in children and illnesses in adults were sometimes caused by arsine generated by the action of

S brevicaulis on arsenical wallpaper pigments, although it is now known that arsine could be similarly generated from the horse-hoof size that was commonly used at that time and which contained white arsenic to discourage rodent damage.²

Phosphine, arsine, and stibine are exceedingly toxic with threshold limit values of 0.3, 0.5 and 0.1 ppm, respectively, compared with 100 ppm for carbon monoxide. Relatively high ambient levels prevent the detection of phosphorus, arsenic, and antimony residues at necropsy. However, some pathologists have commented that they usually associate SIDS with abnormal lung colour; this could be associated with local erythrocyte haemolysis due to exposure to these trihydride gases.

Penarth Research International
PO Box 142 St Peter Port,
Guernsey, Channel Islands

B. A. RICHARDSON

1. Gosio B. Azione di alcune muffe sui composti fissi d'arsenici. *Riv. Sperimentale*. 1892; 3: 201-30, 261-73.

2. Thom C, Reper KB. The arsenic fungi of Gosio. *Science* 1912; 76: 544-50.

*A Government inquiry, prompted by these findings, was announced on March 9. The inquiry will be chaired by Prof Paul Turner.

The Foundation for the Study of Infant Deaths

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COT
DEATH
RESEARCH
AND SUPPORT

13th March 1990

STATEMENT TO ALL FSID STAFF FOR INFORMATION

"Sir Donald Acheson, the Chief Medical Officer, announced today (9th March 1990) that he has asked a group of independent experts to investigate the claim that the emission of toxic gases from fungal growth on some cot mattresses is a cause of sudden infant death.

The group will be chaired by Professor Paul Turner who is Chairman of the Government's independent expert advisory committee on toxicity and will include experts in toxicology, neonatal pathology, mycology, epidemiology and analytical chemistry.

Announcing the review, Sir Donald said that the sudden infant death syndrome was almost certainly due to many causes and these are little understood. Any new hypothesis therefore warranted careful consideration. The hypothesis - put forward by Mr B A Richardson, Director of Penarth Research International and Mr P R Mitchell, Director of Mitchell Marquees - is that due to the action of certain fungi, soiled cot mattresses may emit toxic gases.

Sir Donald went on: "The death of an infant is a shattering blow to parents. We have a duty to investigate possible causes. But this needs to be done in a way which, on the one hand avoids alarming parents unnecessarily before claims can be properly assessed and on the other, raising hopes that a 'preventable cause' of sudden infant death has been found".

"Mr Richardson's and Mr Mitchell's work which has not been published in the scientific literature, and therefore has not been subject to the usual scrutiny and discussion, is already being assessed by the Laboratory of the Government Chemist. The independent experts will be examining the laboratory findings as well as the work done by Mr Richardson and Mr Mitchell. I have asked the group to report as soon as possible and will make public their recommendations".

In the meantime, Sir Donald has taken advice from a range of experts including neonatal pathologists and paediatricians. He has been advised that no case of cot death in this country due to the toxic gases arsine, stibine and phosphine has been reported. Nor is there any need for parents to take any special action in respect of cot mattresses. Nevertheless, as a matter of prudence he has invited an independent assessment of the evidence".

The above extract is taken from a Department of Health press release, and follows articles in the Daily Express in February 1990. These articles stated that "startling evidence by government scientists has confirmed a possible new link between cot death syndrome and fire resistant mattresses", that "Ministers begin a series of crisis meetings in Whitehall", that "Health Secretary Kenneth Clarke (has) ordered an immediate enquiry into the possible link between cot deaths and fireproof mattresses" and that "Mr Clarke is prepared to order tens of thousands of baby mattresses to be withdrawn from sale if Government scientists confirm a possible link".

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The articles correspond to a theory of a cause of sudden infant death syndrome (SIDS) that was widely reported on television, radio and in the press at the beginning of June 1989. Laboratory work by a chemical analyst, Mr Barry Richardson, suggested that toxic gases were being released when biocides (substances acting against infecting organisms) and fire retardants contained in cot mattress coverings of plasticised polyvinyl chloride (PVC) were acted on by a normal household fungus. He believed that the gases might be a significant cause of SIDS and informed both the Foundation for the Study of Infant Deaths and the Department of Health of his views.

Mr Richardson told a meeting of the Scientific Advisory Committee of the Foundation for the Study of Infant Deaths about his work, and was questioned about it by members. After careful consideration, the Committee formed the view that this was an unproven hypothesis for which no direct evidence existed and that this was unlikely to be a major cause of SIDS.

The infant mortality rate (all first year deaths) has continued to fall since plasticised polyvinyl chloride (PVC) was introduced while the SIDS rate has stayed relatively constant.

However, the toxic gas theory was widely publicised on radio and television and in the press before any scientific confirmation of the laboratory work had been undertaken. The Foundation was concerned that any possible such link with SIDS should be quickly and appropriately investigated and for that reason is at present funding a project in London (£10,000 over 6 months) to undertake suitable tests.

Advice to parents:

The Foundation for the Study of Infant Deaths advises parents that they need not feel that they should take any special action following these claims, and warns them NOT to endanger their baby by wrapping polythene around the mattress as has been suggested by Mr Richardson.

For further information please contact:

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Tracy Lamb (Research and Information Officer)
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(ENDS)

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