

VASSAN

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Bruce Whitney, Esq.
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LAW DEPT.

Dear Bruce:

Here are the three speeches to which I was referring during my telephone conversation today with Thorne Harris, Andy Hanen and Denise Legendre. They include:

1. The Air Products testimony at OSHA hearings in Washington on 28 June, 1974 relative to vinyl chloride, including testimony by John Barr and Dr. Paul Kotin, our medical consultant.
2. A talk to the Society of Plastics Engineers in New York presented in 1975 which discusses how the OSHA hearings came about, the results, and the state of knowledge on vinyl chloride caused cancers at that time. (Oct. - Nov. 1974)
3. A talk entitled, "Who Should Tell The Worker?" which clearly assigns this responsibility to the employer. It also characterizes the nature of the Jimmy Carter administration's OSHA.

I'll look forward to learning how I might be of further help to you. Because I was heavily involved in CMA, AIHC and CIIT efforts to bring science and reason to the regulatory scene beginning with vinyl chloride, I do feel I can be of help to both Air Products and the industry in general in formulating and documenting the basic elements of an effective defense against the complaints described to me.

Incidentally, I will be in California at Catalytica, Inc. from November 27 to December 2. My number there is 415-940-6318 (office) or 408-748-8460 (apartment). Office fax there is 415-968-8754.

Regards,

Dick

Richard Fleming

RF/ta

Enclosures [3]

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THE UNITED STATES
DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
DOCKET OSH-36

Spencer
June 28/74 ✓

TESTIMONY OF
AIR PRODUCTS AND CHEMICALS, INC.

AIR PRODUCTS AND CHEMICALS, INC.
Five Executive Mall Building
656 E. Swedesford Road
Wayne, Pennsylvania 19087

26 June 1974

Testimony of Richard Fleming

Greetings --

I. INTRODUCTION

I am Richard Fleming, Group Vice President of Air Products and Chemicals, Inc. I am responsible for the Chemical Group of our company headquartered at Valley Forge, Pennsylvania. Testifying with me today are Mr. John T. Barr, Technical Manager - Manufacturing and Dr. Paul Kotin, M.D., our consultant on VCM medical matters. Also with me are Dr. A. Ross Adams, General Manager, Plastics Division; Mr. T.L. Carey, Vice President of Manufacturing; and Mr. Joseph T. Sebastianelli, Attorney.

Air Products operates two plants for the production of polyvinyl chloride using the suspension process and located at Pace, Florida and Calvert City, Kentucky. Combined capacity of the two plants is approximately 200 million lbs./year, or approximately 3.5% of the total PVC industry. Air Products also operates a PVC compounding facility at Calvert City, and small PVC plastics fabrication plants at Morristown, New Jersey, Costa Mesa, California, Durant, Mississippi, and Homestead, Pennsylvania. In addition, we now operate a plant at Calvert City for the production of a different class of polymers, sold as water emulsions, which also uses vinyl chloride as one of several monomers for a portion of its output and we have a second plant of this type under construction at South Brunswick, New Jersey. The total

number of employees engaged in all these operations, including all service support and management is about 500.

Air Products is a non-integrated producer of PVC. We purchase all of our raw materials and are only very slightly integrated forward into fabrication using less than 2% of our PVC production. We are about 10th in capacity among PVC producers, but a relatively large proportion of our output is in special types of polymers. Our PVC plants have been operating since 1957 and 1959, each coming to Air Products as part of acquisitions of larger businesses, the Florida plant in 1969 and the Kentucky plant in 1971.

Air Products has participated in industry studies of health hazards of VCM and will continue to do so. Our own medical examination program, which will be discussed later by Dr. Kotin, has covered approximately 480 present employees. We have also studied the mortality experience of all employees who have worked in these plants. We have found no cases of angiosarcoma.

Air Products and Chemicals, Inc. is deeply concerned about the question of appropriate protection of the health of its employees and of all those involved in the VCM-PVC industry. We are participating fully in whatever activities we can recognize as worthwhile in developing facts that permit determination as to what that health protection means in practical terms. We believe in establishing and observing soundly conceived regulations designed to assure safe working conditions.

We are also very concerned that unwisely conceived and unnecessary restrictive regulations not be promulgated. Such regulations work to the disadvantage of all concerned, worker, company, consumer, and the economy as a whole.

II. OBJECTIVES OF TESTIMONY

Thus our purposes here today are as follows:

(a) To present for the public record a resume of our study of the health of our own employee population - and to offer the conclusions our medical consultants have reached from these studies at the present time. This is meant as a contribution to the national study of employee health in the VCM-PVC industry that is so urgently needed to guide the formulation of safe practices.

(b) To offer some perspectives on what we consider some key issues relative to arriving at appropriate regulations.

(c) To provide testimony on what we believe is feasible and workable and why, in the way of regulated occupational exposure.

(d) To offer some detailed comments on the proposed regulation for the consideration of those who will write the final one. These will not be presented orally at this meeting in the interests of time, but will be a part of our written submission.

III. EARLY TOXICOLOGY

In much of the information presented prior to and during these hearings it has been or will be stated by many observers that general concern about human exposures to vinyl chloride have passed through three distinct phases as follows:

Phase 1 - fire and explosion concerns and narcotic effects;

Phase 2 - concerns regarding AOL; and

Phase 3 - concerns regarding carcinogenicity.

Phase 1 concerns were the only ones of significance from the inception of manufacture and polymerization of vinyl chloride in Germany in the early 1930's until the early 1960's, a period of 25 - 30 years. During this period, VCM was used as an anesthetic, such was the understanding of its toxicology during this time. A number of toxicological studies made in this period show only minor effects from exposures to what were usually high dosages for relatively short periods of time compared to the more recently published information concerning longer term exposures.¹ It is perhaps pertinent to note that many more persons have been injured or killed as a result of flammability and narcotic hazards than from any recognized toxicological effects of vinyl chloride.

AOL was first observed in PVC workers in 1960-1962 both here and abroad and in about 1966 a causal relation between VCM exposure and AOL was established. Since AOL occurrence

1. Documentation of the Threshold Limit Values for Substances in Workroom Air. American Conference of Governmental Industrial Hygienists (3rd Ed. 1971).

was almost exclusively among reactor cleaners who came into frequent physical contact with VCM, precautions were taken to limit or eliminate this and the incidence of AOL declined markedly. These and other plant and operational changes resulted in lower exposure of operating personnel generally to VCM concentrations.

IV. EXPOSURE EXPERIENCE

Industry conducted toxicology studies, exemplified by those extensively reported by Dow, showed that lower exposure levels were necessary to avoid the possibility of toxicological effects of chronic exposure. Specific standards of 500 ppm TWA and then a 500 ppm ceiling were set by ACGIH and later by OSHA and met by industry.

The actual levels of VCM in plant atmospheres to which workers were actually exposed is not a matter of record. The need for such information was not understood and the instrumentation to readily measure it was not available for most of the period of historical operation. Attempts now to reconstruct historical exposure levels are admittedly crude but they are nonetheless instructive. The lower explosive limit for VCM in air at ambient conditions is 3.6%, i.e. 36,000 ppm. In the phase 1 period this was the absolute upper limit of concern to plant operators. Even with a safety factor of 10, levels of 3,600 ppm would have been tolerated if no

other problems were found or expected. It is reasonable to expect that such levels were encountered at times in early operations by some individuals.

It is very difficult to reconstruct the pattern or frequency of early peak levels of exposure in any reliable way. It has seemed more realistic, and perhaps more pertinent, to attempt estimates of the average, long term continuing exposure to which an individual was subjected. Thus TWA data have been used to characterize the cumulative long term dosage thought to have been experienced by workers in PVC plants.

The Chemical Industry Association of the UK has recently stated their estimates of the average TWA exposure of workers in UK plants. These estimates show the following variation over time:

	<u>Average TWA</u>
1945 - 1955	1000 ppm
1955 - 1960	400-500 ppm
1960 - 1970	300-400 ppm
mid 1973	150 ppm
now	50 ppm

Since the technology and equipment used in UK operations, and the economic and safety considerations concerning VCM loss control were not appreciably different from those prevailing in the U.S. or other parts of the world, one could reasonably expect similar estimates to characterize operations in this country. In fact, it is our judgement that these figures are reasonable estimates of what prevailed, on average, in

this country. Our estimates for our own plants are about the same as this table. Note that these are average figures so that some plants must have been higher at least part of the time. Furthermore, it seems clear that within those plants some individuals probably had even higher exposures.

V. CURRENT SITUATION

The recent liver cancer findings are the legacy of this type of exposure. Each case found to date has involved an individual who has worked through periods of high level exposure by any current day measure, and all have worked for some time in jobs where the highest individual exposures have been encountered.

Thus far the extensive search of the human experience for angiosarcoma among workers in VCM-PVC has turned up 19 cases since 1961. Of these, 13 are in the U.S., found among the employees of 15 VCM plants and 36 PVC plants. Of the 13 cases, 7 have occurred at one PVC plant, 3 at another. A U.S. total of 4 PVC-VCM plants have had known cases. There are thus 47 plant populations who have no record of angiosarcoma although they have lived through periods of exposure well above levels no one would tolerate in the light of current information.

There is a considerable body of animal exposure data to show decreasing hazards with decreasing exposure levels of VCM. Moreover, the human experience in its plants reported by Dow at the February hearing has shown no incidence of angiosarcoma among its

workers from long term average exposures of between 100 ppm and 200 ppm/TWA. Air Products own health studies show one case of ADL and no other health problems related to exposure in our operations to date.

Although exposure levels in fabricating plants have generally been very low, exposures in a few jobs in these plants have historically probably been of the order of 15-25 TWA. Until the recent announcement of the GE wire coating case, and the case of the accountant at a vinyl sheet producing plant there were no reported angiosarcoma cases among fabrication plant employees. As we heard in yesterday's testimony, any relationship between these cases and exposure to VCM remains conjectural at this time. Careful study of the very large body of human experience already available in the history of PVC fabrication operations is clearly warranted and can shed important light on the hazards of relatively low level exposure.

Exposure levels in VCM plants are generally considerably lower than in PVC plants because of the continuous process technology of the monomer operations and the generally outdoor construction of these plants. Only one angiosarcoma case has been found among VCM workers and this man is reported to have worked on very high exposure tasks related to sampling and catalyst tube cleaning. He also worked in PVC for the final year of his working life.

All of these considerations lead to the idea of a relatively safe but readily measurable level of VCM in a work environment.

We therefore support the proposal for a 25 TWA exposure level effective October 5, 1974. As we will show later, we believe that this level is also feasibly attainable, though a difficult and expensive one to continuously meet 100% of the time, as we would hope to do under such a regulation. Lower levels, proposed for later achievement, are much more difficult and much more speculative as to achievement at this time in our view. This too will be elaborated on by Mr. Barr.

VI. EFFECT OF STANDARD ON OPERATIONS

Any level of exposure that is required by a new standard that is below current achievement confronts a producer with essentially three alternatives:

- 1) Since he does not meet the standard, he can shut down and abandon the business. The economic consequences of this on the producer and his employees are apparent. The effect on his customers depends upon what alternative sources of material they can find. SPI testimony covers this in some detail.

- 2) He may make changes, involving capital expenditure or otherwise, to bring his operations into compliance. Depending on the severity of the standard this will take more and more fundamental and expensive changes and thus longer and longer times, and may reduce output although not stop it entirely.

- 3) He may decide to replace his current plant with a new one designed to meet the new standard. This route, of course, requires the most in time and capital money.

of future achievable VCM levels in plant air and how likely it is that excursions in these levels will unpredictably occur from time to time. Replacement of older equipment with newer types, designed with minimum leakage in mind, depends upon availability and deliverability of such replacements. Delivery of even an exhaust fan takes months in the current high capital spending environment. Major equipment takes many more months.

Although we at Air Products are not at all satisfied with our ability to guarantee conformance with the current emergency standard, we support the 25 TWA proposal for October 5, 1974. We need the delivery of new equipment to meet this level but have some confidence that we can meet it. The concept of a ceiling level, and how it is to be measured and administered requires clarification in the proposed standard, and Mr. Barr will cover this in our more detailed comments to follow.

Alternative 3 requires some comment. For any producer of PVC other than one who also produces VCM this is not currently a realistic alternative. Air Products for some time has been attempting to develop an assured source of supply for enough VCM to build a new, modern PVC plant. We are naturally reluctant to do this without such a source. Two years of contact and/or negotiation with every conceivable supplier has yielded nothing of substance. We can foresee no change in this situation for some time, at least until substantial new VCM capacity is announced for merchant sales and is nearing production. No such plant, which takes three years to build, is now in prospect. Under these circumstances, should any significant part of the industry be forced to shut down by unrealistic regulation, greatly increased concentration of the industry will surely result.

VII. VENTILATION CONSIDERATION

Any estimate of achievable levels in the plant atmosphere is of course dependent on the degree of plant ventilation permissible as well as on the degree to which VCM is released. Virtually all of the testimony presented in this hearing will be based on the basic presumption that very extensive use of strong ventilation is acceptable. This is so because no practical technology exists for the removal of VCM from large volumes of plant air. It seems clear from current information

that this presents no real problems but it must be recognized that unrealistic actions in the way of external environmental regulation can negate practicality just as easily as unsound in-plant regulations.

VIII. FABRICATION SITUATION

Consideration of fabricating operations as potentially regulated ones must also be given. There are sufficient data now becoming available to warrant a judgment that if resins containing not more than 0.05% by weight of uncombined VCM are shipped from the polymer plants that there is no need to regulate warehouses, shipping facilities or fabrication operations. Data to support this will be offered by Mr. Barr. There are two possible places in fabrication operations that should have some elementary precautions in effect, however. Such precautions seem to be already adequately covered by existing OSHA requirements.

At the point where the PVC container is first opened, the contained air, although quite small in volume, and in absolute VCM content, may be high in VCM concentration. In an impervious container such as a tank car or a silo the concentration will usually be above the corresponding ppm of free VCM in the resin. In a porous container, like a paper bag, the concentration in the contained air will be very noticeably lower. In either case, this air should be exhausted outside of the work area by

appropriate ventillation means. In a similar way, gases evolving from the first heating and exposure of the molten resin should be similarly vented. With these simple precautions the atmosphere in the fabricating work space may be expected to be at levels not exceeding 2 ppm and probably very much lower. TWA's for such plants might be expected to average 1 or less for the employees involved.

We therefore recommend that fabrication facilities processing resins of less than 0.05% uncombined VCM be considered non-regulated areas within the meaning of the proposed standard.

I would now like to introduce John T. Barr, Technical Manager for Chemical Group manufacturing.