



INTERNAL CORRESPONDENCE

CHEMICALS AND PLASTICS

RECEIVED

1300 LAKESIDE AVENUE, CLEVELAND, OHIO 44114

To (Name) Mr. H. R. McNair
 Division Chemicals and Plastics
 Location 33rd Floor
 New York Building

Date

July 7, 1976

Originating Dept.

Cleveland Field Sales

Answering letter date

Copy to Mrs. M. E. Jaenke - Cleveland
 Mr. H. E. Klein - NY-31

Subject

THE SHERWIN-WILLIAMS COMPANY

FILE COPY
 DO NOT REMOVE

SEP 7 1976

R N WHEELER JR.

Dear Harley:

Attached is a letter from the buyer at Sherwin-Williams who purchases all Vinyl Chloride resins together with copy of an article which appeared in "New Scientific" magazine 26 June, 1975 issue, stating that PVC powder "must be treated as a health hazard potentially more widespread than VCM itself".

In his cover letter Mr. D. C. Jasmund requests that Union Carbide answer the question about the hazard possibilities of Vinyl Chloride resins directly to their Mr. D. Sarvadi, Sherwin-Williams Company, 101 Prospect Avenue, Cleveland, Ohio 44114.

Would appreciate your passing this request on to the proper individual for answer direct to Mr. Sarvadi, with a copy to me of any reply that is sent.

Pr. Lee McMaster

Charlie
 C. G. Herion

*Lee can you pass to the proper
 party to develop a response.*

CGH:c
 att. (2)

*Thanks
 Dick*

→ RN Wheeler

*Can you provide the
 requested information?
 LPM*

RECEIVED
 JUL 16 1976
 R. W. LASHER

UCC
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The Sherwin-Williams Company
101 Prospect Avenue, N. W.
Cleveland, Ohio 44115

June 30, 1976

Mr. Charlie Herion
Union Carbide Corporation
1300 Lakeside Avenue
Cleveland, OH 44113

Dear Charlie:

Attached you will find a copy of an article which appeared in a Canadian or British publication, I am not sure which.

Our Environmental Control Department has asked that we pass this article to our suppliers and request that they reply to this particular question as soon as possible.

Will you please give us your comments as quickly as possible?

Very truly yours,

CORPORATE PURCHASING DEPT.

Buyer

D. C. Jasmund:ra

cc: DSarvadi

Encls.

PVC dust fells factory mice suggesting new work hazard

Guinea-pigs and rats kept in dusty areas of PVC factories next to regular workers developed pneumoconiosis—the lung disease caused by asbestos, silica, and coal dust. Additional tests show PVC dust to be as biologically active as chrysotile asbestos.

This means that PVC powder—the product of polymerisation of vinyl chloride monomer (VCM)—must be treated as a health hazard potentially more widespread than VCM itself. VCM was discovered last year to be carcinogenic and the chemical industry has made considerable efforts to control this gas. Efforts may now be needed to control PVC powder as well.

Following a report that a 31-year-old worker who had inhaled PVC powder at work for a year developed a new type of pneumoconiosis, Professors N. Frongia, D. Casula, and R. Camba at Cagliari (Italy) University began a long-term investigation of the possible harmful effects of PVC powder. They put rats and guinea-pigs in cages with large windows in the bagging section of a PVC plant in Sardinia. Because PVC manufac-

ture is largely automated, the bagging section is usually the dustiest. The fact that the animals were exposed to the same atmosphere as workers in the plant is an unusual procedure which partly overcomes objections to drawing conclusions from animal experiments about the biological effects of chemicals on man.

The animals were killed after two to seven months of exposure to PVC dust and their lungs examined microscopically.

Reporting their work (Medicina del Lavoro, Sept-Oct 1974) the three professors say: "we are dealing with an authentic pneumoconiosis, or at least with a PVC pneumopathy which suggests very strongly not a few of the significant aspects of pneumoconiosis". Although they admit that much more research has to be done before firm conclusions can be drawn, they say their results form a "highly consistent picture" and are "clearly correlated with the length of exposure to PVC powder".

The second piece of recent research which throws suspicion on PVC powder

happens to live near a BP PVC plant. PVC dust often forms a fine film on the road outside the plant and also finds its way on to the roofs of cars parked nearby and on to washing hung out to dry. Rose's department carries out work on the biochemistry of asbestosis. Putting the two together, he decided that he ought to have at least a brief look at PVC dust.

Rose and Dr Roy Richards used a test that had been found to be a good indicator of the biological activity of other materials such as asbestos. The dust is incubated with red blood cells from rabbits and the amount of haemoglobin released by the dust breaking the cell walls (haemolysis) is measured.

So far only two samples have been tested and so the results are difficult to interpret. However one of the PVC dust samples was found to be as active in the haemolysis test as chrysotile asbestos. When the PVC particles were washed, this activity surprisingly disappeared. Rose and his colleagues tentatively concluded that the biological activity is due to a soluble surface-associated agent. Even more surprising is that the other PVC dust sample showed practically no activity at all.

One possibility is that the two samples were from different processes which produced different size particles, with different biological activities. Large dust particles do not reach the lung, which suggests they may be less dangerous than small ones. The particles in the Italian factory were very small—about 1 micrometre in diameter.

The significance of these two pieces of research, if their results are confirmed by further experimentation, could be immense. PVC powders are handled by a much larger number of workers than VCM. Workers in practically every plant making goods from PVC powder are potentially at risk. Further, the discharge of PVC dust from factories is by no means a rare event, so communities near PVC plants might also be at risk.

Lawrence McGinty

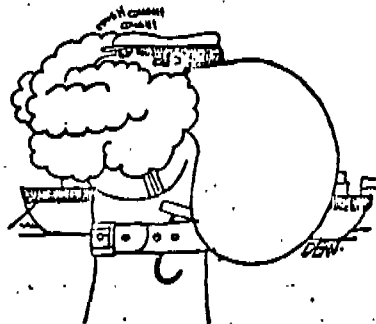
Will dockers black PVC powder?

London dockers are to reconsider a total ban on the handling of cargoes of PVC powder. The National Association of Stevedores and Dockworkers (NASD) originally refused to "black" PVC cargoes following the refusal of some dockers at the Royal group of docks to unload bagged PVC. But armed with the new evidence that is emerging about the hazards of PVC powder the issue will be raised again.

Last January one gang of dockers refused to unload about 80 tonnes of bagged PVC from two barges onto a Romanian ship. According to one of the dockers involved, the cargo had been lying in the barges for a year and many of the bags were rotten. The refusal was prompted by publicity, especially on TV, surrounding the discovery that vinyl chloride monomer—from which PVC is made—causes liver cancer. But the dockers were also suspicious that the PVC powder itself might be a health hazard.

A Factory Inspector had the cargo analysed and he assured the dockers that there was no measurable vinyl chloride monomer in the PVC and that PVC powder itself is harmless. (Evidence that PVC powder could cause pneumoconiosis had been published three months earlier.) Similar assurances came from Robert Murray, the TUC's medical advisor.

After eight days the cargo was unloaded from the barges by other dockers. "The dust was just every-



where; people were smothered in it," says one docker.

This was the first cargo of PVC to pass through the Royal docks, but employer's assurances that any future cargoes would be in hessian, not paper, bags indicates the possibility of future cargoes.

Now the dockers who originally refused to handle the cargo are raising the question again. This time they have the admittedly preliminary findings of the Italian and Cardiff research to back up their claim that PVC dust could be a health hazard. Their intuitive feelings about PVC powder, which must be seen against a long history of "unscientific" bans on dangerous cargoes (asbestos for example) long before medical evidence of ill-effects appeared, could well be a better guide to action than the Factory Inspector's reassurances. L.M.

French court backs breeder

Two environmental groups were refused an injunction to stop *Électricité de France* from building a fast breeder reactor at Bugey. The court ruled that there had been no infringement of property or of a fundamental right.

The environmentalists had argued the clean air and lack of pollution is a legal right. *Électricité de France*, on the other hand, argued that "quality of life" is neither a public right nor an essential liberty, but rather an aspiration.

Testing technology

"The Police Department yesterday omitted the following message on teletype machine: 'This is a message for L.I. press only. If you receive this message, you need a repair.'" —New York Times, 6 May



INTERNAL CORRESPONDENCE

CHEMICALS AND PLASTICS

SOUTH CHARLESTON PLANT P. O. BOX 8004, SOUTH CHARLESTON, W. VA. 25303

To (Name) Mr. S. A. Mortimer
Division
Location

Date August 6, 1976

Originating Dept.

Answering letter date

Copy to Mr. J. B. Hollingsworth
Dr. T. T. Szabo
Dr. D. Heywood

Subject Proposed Letter to
Sherwin-Williams Company

Attached is a proposed letter to be transmitted to Sherwin-Williams Company and/or other customers who may be concerned about the recent discussions of PVC-caused pneumoconiosis.

A handwritten signature in cursive script, appearing to read "R. N. Wheeler, Jr.", written over a horizontal line.
R. N. Wheeler, Jr.

RNWJr. /pm
Attachment

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UNION CARBIDE CORPORATION
CHEMICALS AND PLASTICS

P.O. BOX 8004, SOUTH CHARLESTON, W. VA. 25303

SOUTH CHARLESTON PLANT

August 6, 1976

Mr. D. Sarvadi
Sherwin-Williams Company
101 Prospect Avenue
Cleveland, Ohio 44114

Subject: PVC Dust

Dear Mr. Sarvadi:

PVC dust in the work place does not appear to be a serious hazard if workers are protected by respirators when the level in the air exceeds the OSHA limit of ten milligrams per cubic meter. Union Carbide Corporation has manufactured vinyl chloride resins for forty years and during that period there have been no worker cases of pneumoconiosis related to PVC dust. Periodic employee medical examinations include specific tests for this disease.

A contributing fact is that to cause pneumoconiosis a dust particle must be small enough to make its way into the lungs. This respirable dust size has been defined as five micrometers or less. Union Carbide Corporation PVC resins produced by the Solvent, Nonsolvent (Bulk) and Suspension processes contain less than 0.5% of particles in this size range; thus, these materials pose a minimum potential hazard. Dispersion PVC resin, however, could be a hazard since its particle size range is 0 to 10 micrometers with a major portion less than three microns.

The article appearing in New Scientist June 26, 1975 entitled "PVC Dust Fells Factory Mice Suggesting New Work Hazard" indicts all PVC resins, whereas the investigative work was very limited. The two investigations cited should be considered separately since they are only vaguely related.

The first investigation involved exposing guinea pigs and rats (no mice) in the bagging section of a PVC plant in Sardinia for two to seven months. Professors

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Frongia, Casula and Camba report an authentic pneumoconiosis or at least very similar. They note that the dust particles are about one micrometer in diameter (an emulsion or dispersion-type PVC). The Manufacturing Chemists Association is attempting to get full details on Professor Frongia's work. PVC-related pneumoconiosis has also been noted by Jerzy Popow, "Influence of Polyvinyl Chloride Dust on the Rat Respiratory System" (Roczniki Akademii Medycznej Supplement 24, 1969) and B. Azende, et al. "Pneumoconiosis Developing After Inhalation of Polyvinyl Chloride", (Orv. Hetil. 112:85-6 January 10, 1971).

Based on the available scientific data, Union Carbide Corporation believes that exposure to excessive concentrations of respirable PVC dust could lead to pneumoconiosis. We recommend that respiratory protection be used most particularly in dusty areas involving dispersion vinyl resins.

The second investigation involving the haemolytic activity of PVC dust points out that one PVC sample destroyed red blood corpuscles similar to chrysotile asbestos, a test standard, while a second sample showed no such activity. When the first sample was water washed it too lost its ability to destroy red blood corpuscles. The addition of a washed aliquot from the first PVC sample to cultures of lung fibroblasts and incubating them 24 days yielded no significant results. (The work is more fully discussed in Nature 256, 1975, pp. 664-665). The conclusions of the work were that certain forms of PVC dusts exhibit a high haemolytic potential because of the presence of a readily soluble surface-associated agent and that the introduction of a washing procedure would certainly reduce or abolish the haemolytic activity of the material. It is unfortunate that no tests were done on the water extract from the PVC sample and that its identity and source were not established. More work is in progress.

The significance of this work is difficult to evaluate; however, the following items seem pertinent:

1. Haemolytic activity on the part of a particular material may indicate that it could lead to anemia or similar disorders if it were introduced into the blood stream.
2. The agent causing the haemolytic activity noted in the study was not PVC itself but a water soluble agent left as a residue on the resin particle by the manufacturing process.

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3. Ingestion or inhalation of PVC dust could provide a pathway for the water extract of the resin to enter the blood stream, but the liklihood of sufficient resin intake to cause damage by either route is slight if normal, good manufacturing practice prevails.

If one assumed that haemolytic activity was a serious problem with PVC, then washed resins with a minimum of surfactant or suspending aid used in the process should be used if possible. Resins worth considering are:

1. Union Carbide Corporation's solution vinyl resin has no surfactants or suspending aids used in its manufacture and it is given two water washes prior to drying and packaging.
2. Union Carbide Corporation's nonsolvent vinyl resin has no surfactants or suspending aids used in its manufacture and it is given one water wash prior to drying and packaging.
3. Suspension vinyl resins including Union Carbide Corporation's, contain small amounts of suspending aids and surfactants. Most of these, such as methyl cellulose, hydroxy ethyl cellulose and polyvinyl alcohol, are acceptable for food applications and haemolytic activity is doubtful.
4. Dispersion and emulsion vinyl resins including Union Carbide Corporation's, contain appreciable amounts of (1 to 3%) surfactants which are readily extracted from the resin by water. Food grade surfactant systems would be less likely to show haemolytic activity than non-food grade, but it would be very difficult to forecast the activity of ~~these~~ complex molecules.

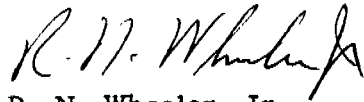
In summary, Union Carbide Corporation does not believe that pneumoconiosis caused by respirable PVC dust is a serious problem if good dust control procedures are followed. It believes that dispersion vinyl resins are the subjects of the tests discussed in New Scientist and there is an indication of a possible problem with these resins.

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Letter to Mr. Sarvadi
August 6, 1976
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Union Carbide Corporation will continue to work actively in seeking health and safety data related to its products and make this available to its customers.

Very truly yours,



R. N. Wheeler, Jr.

RNWJr. /pm

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