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May 30, 1984

Dr. Roy T. Gottesman  
Executive Director  
The Vinyl Institute  
355 Lexington Ave.  
New York, NY 10017

Dear Roy:

I continue to have severe problems with Sharon Campbell's article. This latest version is only a slight improvement over the earlier one. Overall, it remains poorly structured and written, with no focus. At best, it presents some good points (albeit in stream of consciousness style); at worst, the tone slips to condescending and flippant. (I'm still not sure the author has overcome the potential for a libel suit in this piece.) In my opinion, this article says nothing that hasn't been said before (and better) in Fortune or Plastics World. In its present form, I feel it would be of little, if any, use to the VI.

If Ms. Campbell insists on befriending us in this way (and her performance on WINS radio proved that she can be an asset), I suggest she narrow the focus of this piece and concentrate on something that's a little less "old" than the Allied attack. A piece on the lack of coherent toxicity/fire hazard evaluations, for instance, could be particularly useful and timely in our coming work in New York State -- especially with ACSH's imprimatur.

Anyway, Roy, I don't mean to sound like an ingrate, but I don't think this thing can be saved without major overhaul and redirection. Sorry I can't be more positive.



NCJ/gfs

cc: G. R. Snider, Jr.  
T. D. Sinclair - Dow  
M. A. Donahue - Conoco ✓



To: Nora Jacobs  
Tom Sinclair  
Peg Donahue ✓

From: Roy T. Gottesman

May 22, 1984

This is the most recent version of Sharon Campbell's paper for the American Council on Science Health's publication.

Please let me have any comments or changes as soon as possible so that I may convey them to Sharon via Gene Burke.

  
Roy T. Gottesman

RECEIVED

MAY 14 1984

PVC--How Toxic Is the Smoke?

DAVID L. GOTTESMAN

Sharon Lynn Campbell

Polyvinyl chloride (PVC) conduit, when it burns, is little, if any more toxic than ordinary wood smoke. Yet, Allied Tube and Conduit has launched a campaign to scare consumers into buying their more expensive and less durable product instead of PVC.

A great deal of money is at stake here. PVC conduit is a superior product for many uses. Metal conduit and piping corrodes, is expensive to produce and requires expensive trained labor to install. It must be painted or otherwise protected from the elements, and can sometimes cause fires via short circuits. (The MGM Hotel fire in Las Vegas was started this way.) In contrast, PVC does not corrode, costs only 1/3 the price to produce and can be installed cheaply and easily even by do-it-yourselfers. PVC cannot start fires, and burns only as long as a flame is held directly to it. These virtues and others are reflected in the growth of its market share. PVC conduit has risen from a mere 9% in the late '60's to 31% in 1980, with projections of 49% by 1995. In the same time span, steel's share will drop from 68% to 43% by 1995.

To combat this growth, Allied Tube and Conduit has placed a series of ads in such publications as trade journals and the Washington Post discussing "Why you might not escape from a high-rise fire" and the so-called "Intoxication Syndrome." These ads detail the horrendous symptoms that fire victims suffer supposedly due to the presence of burning plastics. They include "conjunctivitis, lacrimation and dyspnea, loss of balance, loss of coordination, numbness, chest pains, headache, dizziness or vertigo and nausea, wheezing, coughs, irregular pulse, burning sensation on the neck, wrist and elbows, severe nerve hemorrhage and edema..." Very scary, until you stop to realize

including campfire smoke. Your eyes are irritated and water, you cough and breathe in gasps, maybe even wheeze a little. If you keep on breathing it, you'll end up killing yourself when your lungs bleed and fill with fluid. You are dizzy, etc. because you might not be getting enough oxygen what with the gasping and coughing. The "intoxication syndrome" is not any collection of symptoms described by the medical profession, and it will be found in no medical dictionaries. It certainly isn't caused <sup>only</sup> by PVC smoke, either!

Other angles to the fear campaign have included charges of water contamination and claims that burning plastics cause firefighters' cancer deaths. The early stories that water piped through PVC conduit would pick up vinyl chloride monomer and other cancer-causing chemicals which the hapless consumer would then drink have been completely disproved and full regulatory and standards approval have been granted for the use of PVC conduit for water.

The issue of firefighters' cancer rates is less clear-cut. Certainly, these people do have a higher cancer rate than people in many other occupations. However, the reasons for this are by no means clear. Tobacco-smoking firefighters would be at greater risk since they would also be breathing in untold quantities of other carcinogens in the course of their careers. However, the source of these other carcinogens is by no means entirely from plastics in general and certainly not from PVC in particular. Yet, despite the total lack of evidence that burning plastics are "causing" firefighters' cancer, Allied Tube and Conduit sends out newspaper clippings that blame it on plastics to support their claims that PVC is just too dangerous to use.

Misleading publicity is bad enough, but another action by Allied Tube and Conduit has led to a lawsuit by Carlon, a manufacturer of thin-walled PVC electrical conduit for extreme irregularities in the way PVC was kept off of the list of approved materials in the National Electrical Code (NEC). What happened was this:

The NEC is created by the National Fire Protection Association (NFPA). It is a set of standards which do not by themselves carry the force of law, but which are almost always adopted by local governments by reference. This then gives them the force of law, and they become part of the local building codes. Products not permitted in the NEC thus suffer a serious marketing setback. The NEC is updated periodically by the NFPA. Representatives of manufacturers, experts in the field and consumers meet and vote on proposed changes. A voting membership can be purchased by anyone, including you, for \$50.

As reported in the February 7, 1983 issue of Fortune, in 1980 Allied Tube and Conduit bought up memberships for sales people and other employees, and with that voting power, prevented the Carlon product from being approved. Many members of the NFPA were outraged besides the Carlon people. Carlon promptly brought suit against both Allied and the NFPA. The NFPA has been dismissed from the suit, which will go to court sometime in 1984.

No good tests available

The factor that makes the whole controversy almost ludicrous is the fact that no one knows yet how to effectively test any material and rate its relative toxicity. The problem is that there are currently at least six widely-used tests, each with its own shortcomings and strong points, and none of which approximates a real fire situation. Each fire is a unique set of circumstances, creating great difficulty in devising appropriate tests. Research is currently underway to do just this so that we can begin to gather the data that we need to select the safest materials for our buildings.

In the meantime, some states, including New York have decided to select one test to use until the ideal test is developed. A consultant at Arthur D. Little, Dr. Rosalind Anderson, researched the subject, selected one test as the best available for New York State's particular purposes, and made the significant recommendation that the data from that test be used only

to build an information base for consumers to use in selecting materials. Like nearly everyone else knowledgeable about the issue, she feels that the tests are inadequate for developing regulations.

Nevertheless, regulations are being proposed. Basil A. Paterson, the Secretary of State of New York stated "Neither building codes nor fire regulations seem to have taken much account of the dangerous aspects of plastics. Such codes and regulations are ~~in~~adequate. Many buildings were made to withstand fire rather than smoke, but some flame retardants minimize burning and maximize smoke. Those codes and regulations, based on heat generated fires, may not be sufficient for smoldering plastic." A resolution passed by California in August 1982 directs the state to develop toxicity testing systems and standards to be adopted into the building codes. A panel headed by the Director of New Mexico's Construction Industries Division recommended severe limitations on the use of PVC electrical conduit. The City of Tulsa, Oklahoma, denied approval of PVC conduit, stating "The danger of PVC, particularly under fire conditions, are (sic) well known because of the hazardous, disastrous, death dealing products of combustion." Most recently, New York State Senator Israel Ruiz Jr. proposed a bill to ban PVC in wire insulation in New York State.

Following that bill's introduction, Dr. Roy T. Gottesman of the Vinyl Institute commented that "The bill is based on a series of false suppositions that have no scientific basis. The bill claims that PVC emits toxic smoke when it burns but fails to point out that anything that burns, including such natural products as cotton, wool rugs and wood, emits toxic smoke. A press release on the bill is filled with exaggerations and errors of facts and could not stand up under any reasonable level of scientific scrutiny."

ACSH took a close look at the "scientific evidence" for the extreme toxicity of PVC smoke. This evidence was primarily produced by three organizations: the Dr. Yves Alarie research group at the University of Pittsburgh's School of Public Health, the Washington-based Foundation for Fire Safety,

None of these were able to show ACSH any convincing evidence supporting their contentions.

### The "Evidence"

A review of seven papers produced by the Alarie research group showed severe shortcomings in many cases. Ph.D biochemist Gerald Campbell commented that the papers produced from 1977 to 1979 were very weak. There was no negative control to see if the heat and lack of humidity caused by running the air the animals breathed through the hot furnace might cause lung damage all by itself. There were a number of internal inconsistencies and unsupported assumptions that let them lump in not one, not two, but three fudge factors needed to make the PVC smoke look even just a little more toxic than the smoke from the commonly used standard, douglass fir. There were many more shortcomings and errors with these early papers.

The work from 1979 on was somewhat better, but the Alarie researchers still had some very odd assumptions and lacked some comparisons that could have easily been done (and would have shown that PVC isn't quite as bad as they say.) Their 1983 paper is the best of all. ~~Interestingly,~~ Significantly it refrains from labeling PVC as deadly. In fact, it is merely a measure of how good a particular test is. All in all, the Alarie research fails to support claims for extreme toxicity from PVC smoke.

As weak as the research from the Alarie group is, the Foundation for Fire Safety's work is even worse. The Foundation claims in their May/June 1983 newsletter that "As most readers are aware, the Foundation for Fire Safety was founded in part to help fill the vacuum left by the federal government when they opted to discontinue many of the ongoing fire research and study programs." Interestingly, however, in an interview published in the December 12 1983 issue of Consumer Newsweekly, Gordon F. Vickery, the founder and president of the Foundation comments that "A Democrat who's out of work in Washington DC and has a year's lease on a condominium becomes very innovative."

PVC/7/Take 3/Campbell

studies done by firefighters with \$15,000 gas chromatographs in the fire stations. This is an irresponsible suggestion for a scientist to make; gas chromatographs are exceedingly touchy machines, requiring careful and complicated preparations for both the samples and the instrument to get meaningful results. Accredited medical laboratories are able to do this but it is doubtful that firefighters would be able to perform this work without expensive training and equipment and without hindering the firefighting part of the job.

Even worse, the public information published in the Foundation's newsletter sometimes contains major factual errors. Dr. Birky is a toxicologist, yet he states incorrectly that "the major products of polyvinyl chloride (PVC) combustion are hydrogen chloride (HCl) and benzene...Furthermore, exposure to benzene can lead to aplastic anemia which is believed to result in the development of leukemia." While this is frightening to the reader, it is also very wrong. The fact is, the major products of PVC combustion are carbon monoxide (CO) and HCl, with benzene being only a very tiny fraction of the total gases given off. The doses of benzene that can lead to aplastic anemia are very large indeed, and aplastic anemia very seldom if even causes leukemia.

The Foundation for Fire Safety ties with the Public Interest Scientific Consulting Service, Inc. for bad science. The president, Dr. Deborah N. Wallace, claims to have several active research programs underway, but refused to talk with ACSH about them or anything else. Her credentials as an expert on PVC toxicity are weak; her Ph.D is in marine biology, her thesis unpublished, and most of her work experience has been as an environmental biologist working for utility companies. Not surprisingly, in testimony on PVC issues, she has been repeatedly caught with her ignorance and biases showing. Many of her conclusions about causes of death have been based only on superficial evidence, such as the "pattern of symptoms," "reading four autopsy reports," and "medical records (without X-rays)." The National Institute for Occupational Safety and Health (NIOSH), a highly-respected research arm for the Occupational

causes of cancer as ~~unscientific~~ <sup>not epidemiologically sound</sup> and the conclusions <sup>could not be supported by the data</sup>

The poor quality of her work was particularly evident in a videotape of a demonstration designed to show reporters how toxic smoke from burning plastic is. This amateurish production showed Dr. Wallace demonstrating the dangers by collecting smoke with a funnel from plastic cooked on a barbecue grill. She measured the quantity of toxic gases with detector tubes. On camera, she did not tell the reporters that the toxicity of anything, including water, depends on the concentration of the substance which is not accurately measured by collecting smoke with a funnel. Nor did she tell them that detector tubes are so notoriously inaccurate that the OSHA inspectors are not allowed to issue a citation based on their readings. The entire demonstration proved absolutely nothing, which was also not mentioned on camera.

Other evidence: Neutral on PVC hazard  
A careful literature search revealed few papers on PVC toxicity, which shows that it is hardly a major safety issue in most reputable experts' minds. What information there was showed that while there was a definite effect of the smoke on animal's physiology no one has been able to show that it is particularly more dangerous than burning wood, or that in a fire situation PVC smoke is a significant factor in our death rate. We have already seen that there is no good test available to realistically compare relative toxicity of different materials, but there are even more reasons why it is highly unlikely that regulating the use of plastics in general or PVC in particular will have any effect on our fire death rate.

Modern Plastics reported in their March 1982 issue that "Vinyl and other plastics account for about 70% of electrical pipe and tubing (including electrical conduit) used in construction in Sweden compared with only 8% in the U.S., yet official Swedish fire statistics show that the death rate attributable to fires is far lower than it is in the U.S. In Japan, which used more plastics in its buildings and where the hazards generally are much greater, the seeming paradox is that per capita fires are a fraction of ours."

PVC, 9/ Campbell, Lake 3

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All in all, the evidence fails to show that PVC is any extraordinary hazard in fire situations. We do, indeed have one of the highest fire death rates of the industrialized nations, and we should be trying to save the approximately 5,000 people who die each year in fires. Yet, it appears that Allied Tube and Conduit has succeeded in pulling a smokescreen over our eyes and diverting us from concentrating on the factors that will help save lives.

Ending could go on to discuss those factors that will help save lives, or we could plan a follow-up piece for the next issue discussing the steps we need to take. It comes under the same heading as the seatbelt piece; how we need to use ordinary, everyday and effective tools to save lives. Fire drills, smoke detectors and sprinklers aren't glamorous, but do work if used properly.