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Vinyl chloride — still out of control

Although the Food and Drug Administration is developing regulations to protect consumers from vinyl chlorides in packaging, and the Occupational Safety and Health Administration has held hearings to set more stringent guidelines for industrial exposure ("Government-Environment," August 3), new scientific evidence indicates that exposure to vinyl chloride may also cause genetic damage and birth defects, as well as cancer.

Dr. Irving Selikoff told the Senate Commerce Committee's Subcommittee on the Environment that "early findings indicate that vinyl chloride may be mutagenic as well as carcinogenic." Although evidence is currently limited, Selikoff said laboratory tests conducted in Sweden and New York have led him to believe that vinyl chloride is a greater health threat than originally realized.

Another witness, Dr. Joseph Wagoner of the National Institute for Occupational Safety and Health, said that exposure to vinyl chloride also increases the risk of cancer of the respiratory system, blood-forming tissues, and the brain and central nervous system.

The Food and Drug Administration will attempt to limit consumer exposure to vinyl chlorides in packaging. Proposed new regulations would specify that no food or drug may contain more than the smallest detectable level of vinyl chloride. The substance has already been eliminated as a propellant in aerosol cans.

As the government moves to regulate exposure to vinyl chloride, the B.F. Goodrich Chemical Company in Louisville, Ky., announced that eight employees have been placed on leave-with-pay after it was discovered that they are suffering from "liver disorders." All of the men have been exposed to vinyl chloride. Six workers at the plant have already died from vinyl-chloride-induced angiosarcoma (cancer of the liver), but a plant official would say only, "We just know that there are changes in their livers. We suspect it is due to vinyl chloride exposure."

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AVAILABILITY OF POLYVINYL CHLORIDE FOR WIRE AND CABLE THREATENED

Polyvinyl chloride (PVC) is one of the most widely used plastics in the electronics industry, where it is employed principally for insulated wire and cable. It is also used for encapsulation, coatings and plastic parts and hardware. Indirect applications of PVC in the electronic industry include its use in pipes (for water and chemicals), racks, IC carriers and numerous production aids. It is also essential to the automotive, construction, appliance and packaging industries.

A proposed Occupational Safety and Health Administration (OSHA) standard governing working conditions has threatened to shut down the entire vinyl chloride industry, with immediate widespread consequences.

PVC resin—the basic material for the entire spectrum of PVC plastics—is made from vinyl chloride monomer (VCM), whose IUC designation is chloroethene ($\text{CH}_2\text{:CHCl}$). Since its boiling point is -13.9°C , VCM is a gas at normal temperatures. The proposed OSHA standard would require that by October 5, 1974, the VCM content of the air in vinyl chloride plants be reduced from the April 5 emergency standard level of 50 ppm (parts per million) to a "no-detectable" level.

Since the OSHA "no-detectable" level is based on the use of measuring instruments that are sensitive to 1 ppm, in effect it implies a VCM concentration (in air) of less than 1 ppm. Presumably, a VCM concentration of 0.5 ppm would be interpreted as being undetectable.

One of the reasons for the strict VCM exposure standard proposed by OSHA is the recent linking of exposure to VCM with the incidence of a rare form of liver cancer known as angiosarcoma.

Stating that the "zero-detectable" VCM concentration requirement would make it virtually impossible for vinyl chloride plants to operate, the Society of the Plastics Industry (SPI) called the proposed OSHA standard "excessively and unrealistically restrictive." To enable the industry to present plans that would assure worker safety while permitting a vital industry to continue operat-

ing, SPI requested that OSHA hold hearings on the problem. SPI also commissioned the consulting firm of Arthur D. Little, Inc., Cambridge, Mass., to prepare a survey of the economic impact of cutting off the supply of vinyl chloride.

Nearly a thousand representatives of government, industry, organized labor and the medical profession gathered for the subsequent hearings that began on June 25 in Washington, D.C. Extensive testimony was presented during some two weeks of hearings, including questioning of witnesses by members of Ralph Nader's consumer advocate organization.

To summarize briefly, the hearings brought out the fact that exposure to excessive levels of VCM has a high probability of causing cancer in man. Exactly what constitutes an excessive level was not resolved definitely. Industry testimony indicated that reduction of exposure to "no-detectable" levels of VCM is not technologically feasible at the present time but reduction of VCM levels during a two-year period is a realistic probability. The industry proposal for PVC resin plants, as stated by Anton Vittone, chairman of the SPI committee of Vinyl Chloride Monomer and Polyvinyl Chloride Producers and president of B. F. Goodrich Chemical Co., calls for a final ceiling level of 25 ppm, with a maximum daily time-weighted average of 10 ppm to become effective October 5, 1976. The use of practical and effective respiratory protection would be required for levels above 25 ppm.

In an overview of the plastics industry's position with respect to vinyl chloride problems, Jerome H. Heckman, SPI's general counsel, stated that SPI believes it to be essential that any final standard adopted by the government take into balanced account the full spectrum of public and employee health considerations, social and economic impact, and other public-interest factors. At this precarious state of its knowledge, SPI believes that misplaced reliance on mere suspicions rather than proven data, or precipitous and emotional reaction to such incomplete information, together



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with a narrowly construed interpretation of interests, could lead to major economic consequences.

Vince P. Ficcaglia, manager of economic analysis and forecasting for Arthur D. Little, Inc. (ADL), summarized the conclusions of the recently published report prepared for the VCM and PVC Committee, titled "United States Polyvinyl Chloride Resin Industry Impact Analysis." (ADL employed an input/output economic model for its analysis and was able to estimate

the impact on the PVC resin industry itself, as well as its effect on other major segments of the U.S. economy, by defining the interaction of the PVC industry with primary, secondary and final demand markets.) Among the conclusions were the following:

- An immediate shutdown of all PVC resin plants in the U.S., and the subsequent unavailability of PVC resin, could result in a loss of 1.7 to 2.2 million jobs in consuming and related industries and

a loss of domestic production value of \$65-90 billion annually.

- The extent to which materials could be substituted for PVC resin in the immediate term (less than one year), ADL believes, is quite limited and, therefore, would have an insignificant effect on reducing the potential job and domestic production losses noted.

- Because of the high dependence on PVC resin in the building and motor-vehicle sectors, these two segments of our economy would suffer the greatest share of the total impact.

- Unavailability of PVC resin will cause production bottlenecks in terms of insulated wire and cable, flooring, upholstery, and many other materials. The economic impact of loss in production and employment would be felt by all regions of the country.

Among other major points raised by industry witnesses testifying on behalf of SPI was that, on the basis of available evidence, it would appear that the national incidence of angiosarcoma has been underestimated in the past. A medical survey of present and past industry employees shows, in general, no greater incidence of liver abnormality, even among long-term employees, than exists among the general public.

Interestingly enough, although PVC may cause deaths, it also saves lives. The Brunswick Corporation, a producer of catheters and other medical devices made from PVC, testified that a shutdown of the PVC industry could threaten the lives of thousands of Americans who undergo surgery each year, during which such devices are used or implanted.

It is expected that the judge will keep the record open for some time, now that the hearings have been completed. SPI, which stresses that no evidence presented at these hearings should cause the general public any alarm concerning the use of any PVC product, expects to file a wrap-up statement for the record.

The evidence upon which, after review, OSHA may base its judgment has now been established. It is expected that by early September OSHA will issue a proposed final standard for promulgation by October 5. It is SPI's fond hope that the standard will be one that "we can all live with and prosper under."