

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
CENTER FOR DISEASE CONTROL  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
CINCINNATI, OHIO 45202

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HEALTH HAZARD EVALUATION DETERMINATION  
REPORT NO. 74-59-217

GOODYEAR TIRE AND RUBBER COMPANY  
ST. MARYS, OHIO 45885  
AUGUST 1975

I. TOXICITY DETERMINATION

It has been determined on the basis of environmental sampling that exposure to vinyl chloride monomer in the mixing and film casting work areas of the Pliofilm Department does not present a hazard to employee health. Environmental measurements were made in the mixing area on July 26, 1974 and in the mixing area, film casting room and at the base of the polyvinyl chloride resin silo on March 3, 1975. No detectable levels of vinyl chloride monomer were found in any of the areas sampled. The lower limit of detection for vinyl chloride monomer for the sampling and analytical method used is approximately 0.2 ppm.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

- a) Goodyear Tire and Rubber Company, St. Marys, Ohio
- b) Authorized Representative of Employees
- c) U.S. Department of Labor - Region V
- d) NIOSH Region V

For the purposes of informing the approximately 90 affected employees who work in the Pliofilm Department, the employer will promptly "post" this Determination Report in a prominent place(s) near where affected employees work for a period of 30 calendar days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by an employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding potential exposure to vinyl chloride monomer in the Pliofilm Department of the Goodyear Tire and Rubber Company plant in St. Marys, Ohio.

#### IV. HEALTH HAZARD EVALUATION

##### A. Introduction and Evaluation Progress

The Pliofilm Department was first visited by NIOSH investigators in July, 1974. At that time the investigators were conducting follow-up evaluation work in Department 277 and preliminary survey work in several other areas of the plant including the Pliofilm Department. During the July, 1974 visit, air samples for vinyl chloride monomer were taken in the mixing area of the Pliofilm Department. Analysis of these samples detected no vinyl chloride monomer.

Since additional evaluation work was planned for other areas of the plant it was decided to resample the Pliofilm Department during the return visit. This sampling was done during March, 1975.

##### B. Plant Process - Condition of Use

The Pliofilm Department manufactures clear plastic films (polyvinyl chloride and rubber hydrochloride) by the solvent casting method. Of interest to this evaluation were the operations associated with polyvinyl chloride film.

Polyvinyl chloride resin is received primarily in bulk tank car shipments. Resin is conveyed from tank cars to a resin silo by a vacuum system. From the resin silo the resin is transferred by pipe to batch mixing vessels where it is mixed with plasticizers (di-2-ethylhexyl adipate and epoxidized soya oil) and solvent (tetrahydrofuran). A mixer operator controls the blending process which occurs two to three times per shift. The charging of the mixing vessel with resin requires only several minutes to complete. Occasionally, during delays in rail transport, etc., bags of polyvinyl chloride resin which have been in storage at the plant are manually added to the mixing vessels by the operators. The observation/manual charging ports of the mixing vessels are provided with excellent local exhaust ventilation.

From the mixing area the resin-plasticizer-solvent mixture is piped to the solvent casting rooms where the mixture is spread on a continuous conveyor, the solvent evaporated, and the finished film taken up on rolls. This process is contained in a closed system which is only entered for maintenance or to rethread the film take-up system. The

solvent is reclaimed after evaporation from the casting operation and recycled back to the mixing operation.

The tetrahydrofuran reclamation system is housed in an out building somewhat removed from the film compounding and casting building. Pliofilm Department employees make routine but brief process checks in these buildings. (At the request of employee representatives, a single air sample for tetrahydrofuran (THF) was obtained in both the Still House and the Pump House during our March 1975 visit. Only insignificant trace amounts (less than 5 ppm) of the THF were found in either building.)

#### C. Evaluation Methods

Air samples were collected using charcoal filled air sampling tubes which were positioned in the breathing zone of exposed workers and located in work areas where vinyl chloride monomer may have been present. Air sampling rates were approximately 50cc/minute and sample volumes ranged from 0.7 to 14.7 liters. The charcoal tubes were sealed and sent to the NIOSH laboratories in Salt Lake City, Utah for analysis. A total of seven samples were taken (3 in the breathing zone of the mixer operator, 2 near the charging port of the mixer, 1 below the resin silo, and 1 in the solvent casting room).

#### D. Evaluation Criteria

Vinyl chloride is considered a carcinogenic agent. It is suspected to be an etiological agent involved in the development of angiosarcoma of the liver (a rare form of liver cancer). As stated in NIOSH's Recommended Standard for Occupational Exposure to Vinyl Chloride, "there is probably no threshold for carcinogenesis although it is possible that with very low concentrations, the latency period may be extended beyond the life expectancy." In view of these considerations and NIOSH's inability to describe a safe exposure level as required under Section 20(a)(3) of the Occupational Safety and Health Act, the concept of a threshold limit for vinyl chloride in the atmosphere was rejected. As a result, the NIOSH Recommended Standard for Occupational Exposure to Vinyl Chloride states that exposure to vinyl chloride monomer should not exceed levels that are detectable by the recommended methods of sampling and analysis.

#### E. Evaluation Results and Discussion

As previously stated, no detectable levels of vinyl chloride were found in any of the work areas in the Pliofilm Department and it has been concluded that no health hazard from exposure to vinyl chloride exists in the work areas sampled. It should be mentioned that vinyl chloride may be present inside rail cars hauling the resin to the plant. Personnel who perform the unloading operation should wear respiratory protection equipment (approved for use in atmospheres containing vinyl chloride) if it is necessary for them to come in contact with air from inside the rail cars. Also, the discharge air from the vacuum conveyance system should be dispersed at a safe, elevated location.

V. AUTHORSHIP AND ACKNOWLEDGMENTS

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