

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

HEALTH HAZARD EVALUATION DETERMINATION REPORT 74-125-215
MONAGHAN COMPANY
DENVER, COLORADO
JULY 1975

I. TOXICITY DETERMINATION

Based on the results of environmental measurements, employee interviews, limited physical examinations, the observation of work practices, and a review of the toxic properties of substances utilized in the workplace, it has been determined that a health hazard did not exist at the times (December 4 and 11, 1974 and May 6, 1975) these evaluations were carried out. All environmental measurements for vinyl chloride were below the detectable limit (0.2 ppm) for the method utilized.

II. DISTRIBUTION AND AVAILABILITY

Copies of this hazard evaluation determination 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) Monaghan Company
- (b) U.S. Department of Labor - Region VIII
- (c) NIOSH - Region VIII

This report should be posted in a prominent place accessible to the workers for a period of approximately thirty days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any 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 received such a request from management at Monaghan Company, Denver, Colorado, to evaluate the potential exposure to vinyl chloride associated with the production of polyvinyl chloride (PVC) tubing from powdered and pelletized PVC.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

The Monaghan Company is housed in one building which is divided into two sections. One section, the Mold Room, contains extrusion equipment which forms tubing from powdered or pelletized PVC. Polyethylene continuous blow extrusion equipment, and high impact styrene injection molding machines are also utilized in this area. The other section is an assembly and packing area. PVC wrap is used to pack the finished products. PVC is the only substance common to both areas.

B. Evaluation Design

This plant employees approximately 90 production workers, 24 of whom work in the Mold Room. In that area four twelve-hour, three and one-half day shifts per week are worked. The Assembly-Packing area normally works only the day shift. Environmental samples were taken in all plant areas where powdered, pelletized, or film PVC are mixed or heated. Various time intervals ranging from 2 to 4 hours were utilized in sampling. All samples were analyzed in the NIOSH Salt Lake City laboratory. For the actual concentrations obtained refer to Table 1.

C. Evaluation Methods

Vinyl chloride samples were taken on organic vapor sampling tubes, using low volume pumps. Both personal and general room samples were collected. All samples were refrigerated immediately prior to shipment to the Salt Lake City laboratory.

Brief non-directed medical interviews and when deemed advisable limited cutaneous, eye, nose, and throat examinations were carried out by a NIOSH physician. Interviews were conducted in private with all first and second shift Mold Room employees on May 6, 1975.

D. Evaluation Criteria

Vinyl chloride is considered a carcinogenic agent. It is suspected of being the etiological agent 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 might be extended

beyond the life expectancy." In view of these considerations and NIOSH's inability to describe a safe exposure level as required in Section 20(a)(3) of the Occupational Safety and Health Act, the concept of a threshold limit for vinyl chloride gas 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

All vinyl chloride concentrations were below NIOSH detection limits of 0.2 ppm.

A total of 13 Mold Room employees were interviewed and where indicated received limited cutaneous and/or eye, nose, and throat examinations. The average age of these employees was 27 (median 22, range 19-57). The total duration of employment with the Monaghan Company was approximately 1 1/2 years (range 4 months to 6 years). Eight had worked in no other plant area since entering the companies employment. Only two persons had a year or more in other plant areas.

Interviewing was conducted in a non-directed manner to elicit any symptoms, medical problems, or complaints that the employee might think pertinent to his job.

Five employees related absolutely no health related problems. Four individuals complained of excessive dryness of the hands and a fifth employee was noted on examination to have this problem although he was totally asymptomatic. In no case was the cutaneous dryness severe enough to have resulted in fissuring or signs of inflammation characteristic of hand eczema or dermatitis. Since the dryness produces minimal discomfort and is cosmetically noticeable, several employees have been using various hand lotions to combat the problem. No single obvious cause for the dryness was discerned. Several employees had their hands in water frequently during the shift in order to test hose for leaks and this can easily lead to excessive dryness especially in a climate with the low humidity of the Denver area. It seems unlikely that the very small amount of solvent occasionally used to clean the mold faces could contribute significantly to the problem. It is more likely that the warm newly molded components are slightly hygroscopic immediately following extraction from the molding machines and that repetitive contact with these products may be sufficient to reduce the water content of the epidermis.

Two individuals complained of sporadic eye irritation and one uses eye drops to relieve these symptoms. In neither instance was the eye irritation related to any specific machine or process such as mold cleaning, machine purging etc. One individual noted occasional nausea especially apt to occur during inclement weather when the outer plant doors remained closed. One long term smoker described symptoms suggestive of chronic bronchitis. However, these symptoms preceeded employment with the company. No symptoms suggesting liver disease were elicited.

F. Recommendations

1. Any change in the extruding operations should initiate another industrial hygiene survey to see if there is an exposure to vinyl chloride.
2. A hand cream or ointment with good occlusive properties is recommended to combat skin dryness. Eucerin^R Protective Ointment (Beiersdorf Incorporated, South Norwalk, Conn. 06854), an inexpensive and non-prescription product, is especially worthy of trial. Several applications per shift should suffice to prevent this complaint.

V. AUTHORSHIP AND ACKNOWLEDGMENT

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Acknowledgments

The authors wish to express appreciation to Dr. Russell Hendricks and his staff for laboratory analyses. The authors also thank Mr. Dennis Craft and Mr. Robert Warren at the Monaghan Company for their assistance with these evaluations. The assistance of Co-step Medical Officer, Kenneth Roseman, is also acknowledged.

TABLE I

Breathing Zone and General Room Concentrations of Vinyl Chloride

MONAGHAN COMPANY

Denver, Colorado

December 11, 1974

<u>Sample Number</u>	<u>Job</u>	<u>Sample Vol./Liters</u>	<u>Vinyl Chloride ppm</u>
1	-----	(blank)	< 0.2
2	-----	(blank)	< 0.2
3	PVC Sealer Station	3.12	< 0.2
4	PVC Sealer Station	3.65	< 0.2
5	Quality Control Inspector	2.98	< 0.2
6	Operator Panel (General Room)	3.57	< 0.2
7	Foreman of Sealing Operation	2.05	< 0.2
8	Extruder #1 Head (General Room)	3.54	< 0.2
9	Extruder #1 Operator	3.36	< 0.2
10	Quality Control Inspector	3.59	< 0.2
11	Foreman of Extrusion Area	3.44	< 0.2
12	PVC Sealer Station	2.96	< 0.2
13	Extruder #1 Operator	2.18	< 0.2
14	Operator Panel (General Room)	1.91	< 0.2
15	Extruder #1 Head (General Room)	1.08	< 0.2