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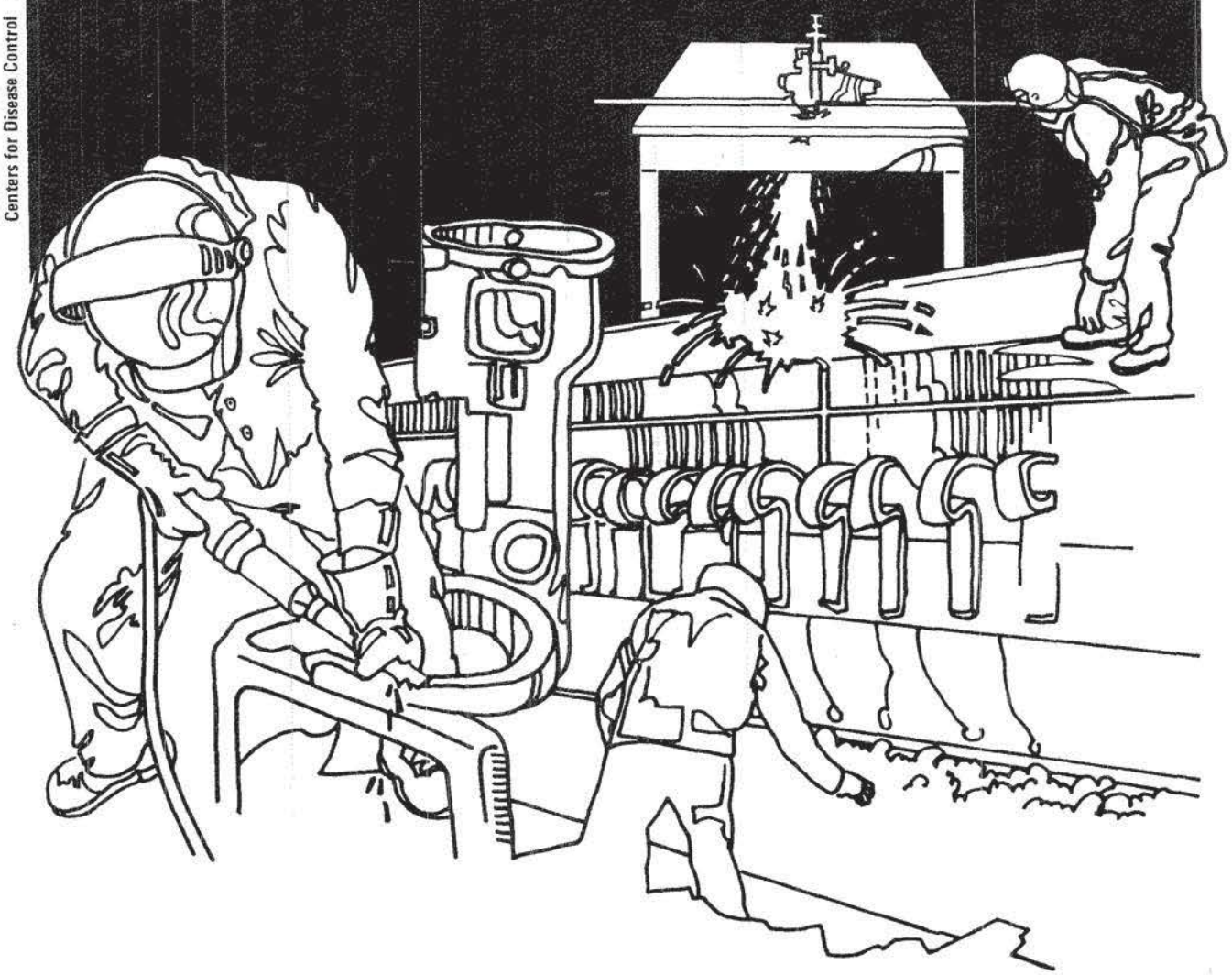

Health Hazard Evaluation Report

80-188-797

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 699(a)(6), which authorizes the Secretary of Health and Human Services, following a written request from 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.

HE 80-188-797
January 1981
Metamora Products Corporation
Elkland, Pennsylvania

NIOSH INVESTIGATORS:
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I. SUMMARY

On July 3, 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request for a health hazard evaluation from employees of Metamora Products Corporation, Elkland, Pennsylvania to assess exposures to organic solvents and dust in the injection molding area. On August 18, 1980, bulk samples of the material used in the injection molding area were collected to determine which organic compounds are evolved when heated to 400°F. Informal non-directed interviews were conducted with twenty workers on the first and second shifts. On September 17, 1980, environmental measurements were made to determine employee exposures to acrylonitrile, styrene, 1,3-butadiene and total particulates.

On the day of sampling, levels of acrylonitrile, styrene and 1,3-butadiene were not detectable. Total particulate concentration determined for a grinder operator was 0.7 mg/M^3 (milligrams of substance per cubic meter of air). The ACGIH TLV is 10 mg/M^3 for an 8-hour time-weighted average (TWA). Two of the twenty employees reported occasional dryness of the nasal mucous membranes. Apart from these symptoms, no other work-related health symptoms were elicited.

Based on the results of this survey, NIOSH concludes that a health hazard did not exist in the injection molding operations at the time of this study on August 18 and September 17, 1980. Recommendations to aid in providing a safe and healthful working environment are presented in Section VI of this report.

KEYWORDS: SIC 2821, acrylonitrile, styrene, 1,3-butadiene and total particulate.

II. INTRODUCTION

In July, 1980, NIOSH received a request from employees of Metamora Products Corporation, Elkland, Pennsylvania to evaluate employee exposures to organic solvents and dust in the manufacturing of plastic items in the injection molding area. The request was submitted after an employee had been diagnosed as having a work-related respiratory disorder.

III. BACKGROUND

The injection molding process consists of plastic pellets fed from a vacuum loading system into a heated cylinder where they are reduced to a molten state. Either virgin pellets or a combination of virgin material, reground scrap material, and/or reprocessed material are used for charging the presses. The temperature at which the charged material was heated varied according to the item being molded and the type of plastic used. The approximate cylinder temperatures used for the various plastic range from 300°F.-400°F.

The plastics used are polyvinyl chloride (PVC), polypropylene, polystyrene and polyethylene. However, PVC is used less than any other plastics.

Interim Report #1 was distributed on August 29, 1980 reporting the findings to date and the future actions to be taken.

IV. ENVIRONMENTAL DESIGN AND METHODS

Acrylonitrile, styrene and 1,3-butadiene vapor levels in air, which could be liberated from heating the plastic materials, were determined by collecting personal air samples on charcoal tubes using a Sipin pump operating at 100 cc/minute flow rate and were analyzed by gas chromatography.

One personal breathing zone air sample for total particulate was collected by using MSA, model G, battery-operated vacuum pump with pre-weighed M-5 filter at a flow rate of 1.5 liters/minute. The sample's weight was determined using a Perkin-Elmer Balance AD-2 to an accuracy of 0.01 mg.

Informal non-directed interviews were conducted with workers on the first and second shifts engaged in injection molding and related processes, with special emphasis on symptoms from the upper and lower respiratory tracts and symptoms and signs of allergic responses. The attending physician of one of the workers was interviewed.

V. RESULTS AND DISCUSSION

Results of environmental samples collected for acrylonitrile, styrene, 1-3 butadiene and total particulates are shown in Table I. All air levels were well below the recommended environmental criteria, and as such, they are not considered to present a health hazard.

Metamora Products Corporation currently has no medical program. Twenty injection mold operators were interviewed by a NIOSH physician. The participants were all females, 20-40 years old, and had been employed at the plant 1-4 years.

Two employees reported occasional dryness of the nasal mucous membranes. No other work-related health symptoms were elicited.

The attending physician stated that a 25 year old, previously healthy male employee working as a utility operator had developed allergic alveolitis after six months on the job. The diagnosis had, in the opinion of the attending physician, been well established. However, the offending agent had not been identified. This employee's job at the plant occasionally involved the cleaning out of residues of overheated plastics in the injection molds. He also lived and worked on a farm with potential of exposure to a variety of organic allergens. He had not worked at the plant for the last six months, during which time his respiratory symptoms had decreased and his pulmonary function and chest x-ray had improved. The attending physician advised the employee to seek employment other than a plastics company. The employee followed the advice of the attending physician.

Based on the environmental sampling results, employee interviews and available toxicological information, NIOSH concludes that a health hazard did not exist in the injection molding operations at the time of this survey. The cause of the former employee's illness could not be determined; none of the substances present at the time of our investigation is known to cause allergic alveolitis.

VI. RECOMMENDATIONS

1. An educational program should be instituted so that employees are made aware of the hazards associated with the materials used at the plant.

2. Good personal hygiene and good work practices should be observed by all employees. Washing of hands before smoking, eating and drinking will help reduce the risk of contamination.

3. All local exhaust ventilation systems should be serviced regularly to insure that they are operating at maximum efficiency.

VII. REFERENCES

1. Occupational Disease: A Guide to Their Recognition. DHEW (NIOSH), U.S. Government Printing Office, 1977.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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IX. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 22161.

Copies of this report have been sent to:

1. Metamora Products Corporation, Elkland, Pennsylvania
2. Authorized representative of employees, Metamora Products Corporation
3. NIOSH, Region III
4. OSHA, Region III

For the purposes of informing the affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees, for a period of 30 calendar days.

TABLE I

Results of Breathing Zone Samples For
Acrylonitrile, Styrene, 1,3-Butadiene and Total Particulate

Metamora Products Corporation
Elkland, Pennsylvania
HE 80-188

September 17, 1980

Job and/or Location	Sampling Period	Sample Volume (Liters)	Acrylonitrile (mg/M^3*)	Styrene (mg/M^3)	1,3-Butadiene (mg/M^3)	Total Particulate (mg/M^3)
Injection Molding Operator #2	8:10 - 15:01	34.9	ND**	ND	ND	-----
Injection Molding Operator #3	7:12 - 15:02	40.3	ND	ND	ND	-----
Injection Molding Operator #4	8:15 - 15:02	42.1	ND	ND	ND	-----
Injection Molding Operator #5	8:17 - 15:03	41.6	ND	ND	ND	-----
Injection Molding Operator #5	8:18 - 15:03	35.7	ND	ND	ND	-----
Injection Molding Operator #6	8:20 - 15:05	39.6	ND	ND	ND	-----
Injection Molding Operator #7	8:22 - 15:06	41.7	ND	ND	ND	-----
Injection Molding Operator #7	8:24 - 15:06	40.6	ND	ND	ND	-----
Injection Molding Operator #8	8:26 - 15:07	40.9	ND	ND	ND	-----
Injection Molding Operator #9	8:27 - 15:08	42.2	ND	ND	ND	-----
Injection Molding Operator #10	8:35 - 15:09	37.5	ND	ND	ND	-----
Injection Molding Operator #3	16:04 - 22:16	36.3	ND	ND	ND	-----
Injection Molding Operator #4	16:05 - 22:12	37.4	ND	ND	ND	-----
Injection Molding Operator #5	16:16 - 22:20	37.3	ND	ND	ND	-----
Injection Molding Operator #5	16:17 - 22:16	36.5	ND	ND	ND	-----
Injection Molding Operator #7	16:09 - 22:15	37.7	ND	ND	ND	-----
Injection Molding Operator #8	16:10 - 22:19	37.6	ND	ND	ND	-----
Injection Molding Operator #9	16:11 - 22:14	35.9	ND	ND	ND	-----
Injection Molding Operator #10	16:13 - 22:18	36.4	ND	ND	ND	-----
Grinder Operator	8:37 - 15:10	59.0	-----	-----	-----	0.7
Environmental Criteria (mg/M^3), as an 8-hour TWA			45	420	2,200	10
Limit of Detection (mg/M^3)			0.001	0.01	0.05	0.01

* mg/M^3 = Milligrams of substance per cubic meter of air

**ND = Less than detectable limits

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