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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-83-144

INLAND MANUFACTURING DIVISION
GENERAL MOTORS CORPORATION
VANDALIA, OHIO
OCTOBER 1974

I. TOXICITY DETERMINATION

Based on the results of an observational and environmental evaluation conducted by the National Institute for Occupational Safety and Health (NIOSH) on February 13-14, 1974 it has been determined that inert nuisance dust, acetone, 1,1,1, trichloroethane and methylene chloride were not toxic in the concentrations used or found at the Injecting Molding Department 770, Building 31, Inland Manufacturing Division of General Motors Corporation, Vandalia, Ohio.

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) Inland Manufacturing Division of General Motors Corporation, Vandalia, 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 80 "affected employees" the employer will promptly "post" the Determination Report in a prominent place(s) near where exposed employees work for a period of 30 calendar 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 substances 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 a request from an authorized representative of employees regarding exposure to dust and solvent used in the Injecting Molding Department 770, Building 31, at the Inland Manufacturing Division of General Motors Corporation, Vandalia, Ohio.

IV. HEALTH HAZARD EVALUATION

A. Description of Process

The Injecting Molding Department makes the rigid fiberglas backing for all General Motors instrument panels. The molding compounds are mixed in a blender. This mixture contains fiberglas in 0.5 cm lengths, polystyrene, styrene, maleic anhydride, dylark dyes, and other minor compounds. The fiberglas and polystyrene are the major solid components of each blend.

By means of gravity, the material was transferred from the blender into a holding container to prevent dispersion of dust into the work room air. The cover over the holding container has two 4" flexible exhaust ducts. The average exhaust velocity at the point of contact between the container and lid was 200-300 FPM.

The blend is introduced into the injection molding machine hopper by means of a vacuum system. A reciprocating screw transfers the blend from the hopper into the mold press barrel. The temperature of the press barrel is maintained at 450°-500°F. The physical form of the solid material is converted into a liquid. The liquid is then injected into the insert mold to form the fiberglas backing required in instrument panels.

The molds are sprayed with a solvent commonly referred to as mold release solvent after every four or five fiberglas forms have been pressed. The solvent prevents the fiberglas from adhering to the mold during continuous use. The mold solvent is a mixture of acetone, 1,1,1, trichloroethane and methylene chloride.

B. Evaluation Design

An initial observational survey of the injecting molding department 770, Building 31, was made on October 11 and 12, 1973 to assess the alleged hazard. The alleged health hazard in the injecting molding machine area was thermal degradation of polymers. The thermal degradation smoke came from burned polymers inside the injection molding machine. This phenomenon is commonly referred to as "burn out" and should be avoided, as it will destroy the panel. A "burn out" is usually caused by mechanical failure or operator error. Since the occurrence of a "burn out" is infrequent and unpredictable, and did not occur while the investigators were at the plant an evaluation for thermal degradation polymers could not be performed. Information gained from employees interviewed indicated that a "burn out" occurs less than once every two weeks. It should also be noted that, except for workers repairing the malfunctioning equipment, no other person is required to remain in the area. It is common practice for the workers to leave their work stations until the obnoxious odor is eliminated.

The above areas were evaluated during the initial visit (October 11 and 12, 1973) and the environmental evaluation was rather limited. Twelve employees were interviewed during the October visit and most of the complaints were directed toward dust exposure in the mixing area, exposure to mold release mist and smoke from "burn outs."

C. Evaluation Methods

In a subsequent visit (February 13 and 14, 1974) additional environmental samples were obtained and medical information was obtained by questionnaire. A total of six air samples were collected in the mixing area - two for respirable dust and four for total dust. The air samples were analyzed by NIOSH's Cincinnnati laboratories. In the injecting molding press area, four personal charcoal tube samples were collected to determine the content of airborne acetone, 1,1,1, trichloroethane and methylene chloride exposure from mold release compound. The charcoal tubes were analyzed by NIOSH's Cincinnati laboratories by the gas chromatographic technique by White, et al.[1]

Employees were asked non-directed questions regarding work related and non-work related health problems. Information regarding their employment history was also collected.

D. Evaluation Criteria

The occupational health standards promulgated by the U.S. Department of Labor (Federal Register, June 1974, Title 29, Chapter XVII, Subpart G, Table G-1, G-2 and G-3) and the American Conference of Governmental Industrial Hygienists applicable to individual substances of this evaluation are as follows:

Substances	8-hour-time-weighted Average PPM*
Acetone	1000
1,1,1, Trichlorothane	350
Methylene Chloride	500

* Parts of vapor of gas per million parts of contaminated air by volume at 25°C and 760 mm HC pressure

Substances	8-hour-time-weighted Average mg/M3**
Inert or nuisance dust, total	15 mg/M^3
Respirable Fraction	5 mg/M^3

** Milligrams of particulate per cubic meter of air.

Occupational health standards for individual substances are established at levels designed to protect workers occupationally exposed on an 8-hour per day, 40 hours per week basis over a normal working life time.

E. Evaluation Results and Discussions

Environmental

Results of environmental charcoal tube sampling are contained in Table I. Neither of the two employees monitored for mold release solvent was found to have significant exposure to this mixture of solvents.

Four filter samples were collected for total dust and two for the respirable fraction of the dust. Of the six samples collected none exceeded1mg/M^3 and assuming the dust to be inert all were well below the current Federal Standard for nuisance dust. A summary of the air dust samples is listed in Table II.

Medical

Eight employees were interviewed using a non-directed questionnaire designed to elicit symptomatology possibly related to health problems arising from their work environment. The questionnaire revealed no relevant symptomatology.

Conclusion

Based on the absence of medical symtomatology and the low airborne concentration of the organic vapors, it has been determined that the concentrations measured during this evaluation are not toxic to exposed employees.

V. REFERENCES

1. White, W.D., D.B. Taylor, P.A. Maurer and R.E. Kupel, "A Convenient Optimized Method for the Analysis of Selected Vapors in the Industrial Atmosphere." Am. Ind. Hyg. Assoc. J., Vol. 31, 225-227, March-April 1970.

2. Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Change for 1972, Appendix C, P. 40.

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TABLE I

Summary of Environmental Results at Inland Manufacturing Division of General Motors Corporation, Vandalia, Ohio on February 14, 1974
Injecting Molding Department 770, Building 31

TWA Exposure in PPM *

Type of Sample	Time	Acetone	1,1,1,, Trichloro-ethane	Methylene Chloride
Personal	7:19AM-11:20 M	** <1	<1	<1
Personal	11:21AM- 2:41PM	1	<1	<1
Personal	8:55AM-11:46AM	1	<1	<1
Personal	11:47AM- 2:41PM	<1	<1	<1

* - PPM - Parts of vapor or gas per million parts of contaminated air by volume of 25°C and 760 mm Hg pressure

**- < Less than

Federal Standards:

Acetone	1000 PPM
1,1,1, Trichlorothane	350 PPM
Methylene Chloride	500 PPM

TABLE II

Summary of Air Samples at Inland Manufacturing Division
Of General Motors Corporation, Vandalia, Ohio on February 14, 1974
Injecting Molding Department 770, Building 31

Location	Time	Type of Sample	Dust mg/M3 Total Dust	Dust mg/M3 Respirable Fraction
Mixing Area	7:14AM-11:10AM	General Area	-	0.37
Mixing Area	7:14AM-11:10AM	General Area	0.58	-
Mixing Area	7:09AM- 2:43PM	Personal	0.69	-
Mixing Area	7:13AM-22:44PM	General Area	0.63	-
Mixing Area	4:08PM- 4:48PM	General Area	0.35	-
Mixing Area	4:08PM- 4:48PM	General Area	-	0.37
Federal Standard			15.0	5.0

* Milligrams of particulate per cubic meter of air.