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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-72-155

INLAND MANUFACTURING DIVISION
GENERAL MOTORS CORPORATION
VANDALIA, OHIO

NOVEMBER 1974

I. TOXICITY DETERMININATION

It has been determined that methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), toluene, N-butyl acetate, xylene and cyclohexanone are not toxic at the concentrations measured at the vinyl paint lines, Dept. 760, Building 31 during normal operations. This determination is based upon results of environmental measurements in the workplace and employee private interviews. During the environmental evaluation (February 13-14, 1974) no significant symptoms were reported by interviewed employees and airborne concentrations of the organic vapors were well below levels believed to be toxic to employees.

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 10 "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 paint spray solvents in use at the vinyl paint line, Dept. 760, Building 31, at the Inland Manufacturing Division of General Motors Corporation, Vandalia, Ohio.

IV. HEALTH HAZARD EVALUATION

A. Description of Process

The vinyl paint lines manufacture instrument panel pads for General Motors automobiles. Three paint lines are in use. Two of the lines were located side by side while the third line was located 5 feet west of line 1.

The paint is sprayed on the vinyl sheet with an automatic sprayer in a water-wall type paint booth. A clear lacquer is then sprayed on the vinyl sheet in a similar type booth. The painted vinyl proceeds through a long exhaust drier, is cut and then stacked onto a pallet.

B. Evaluation Design

An initial observational survey of the vinyl paint lines was made on October 11 and 12, 1973 to assess the alleged hazard. During this visit air sampling tubes containing activated charcoal were saturated with airborne solvent vapors. The saturated charcoal tubes were analyzed qualitatively and found to contain methyl ethyl ketone, methyl isobutyl ketone, toluene, N-butyl acetate, xylene and cyclohexanone. In conjunction with enviromental sampling six employees were interviewed in a non-directed manner.

C. Evaluation Methods

On February 13 and 14, 1974 a follow-up environmental survey was conducted. Employees' exposures to organic vapors were measured using a MSA vacuum pump operated at 0.5 cubic foot per hour. Four breathing zone and four work area air samples were obtained using charcoal air sampling tubes. These were collected on the first shift from approximately 7:45 a.m. to 2:40 p.m. The charcoal tubes were analyzed at NIOSH's Cincinnati laboratories by the gas chromatographic techniques reported 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, October 1972, Title 29, Chapter XVII, Subpart G, Table G-1) 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*
Methyl Ethyl Ketone	200
Methyl Isobutyl Ketone	100
Toluene	200
N-Buytyl Acetate	150
Xylene	100
Cyclohexanone	50

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

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

E. Evaluation Results and Discussions

1. Environmental

Results of environmental sampling are contained in Table I. When two or more hazardous substances are present, their combined effect rather than that of either individually, should be given consideration. In the absence of information to the contrary, the effects of different hazards should be considered additive.[2] The sum of the fractions, concentration over occupational health standard for each substance ($C_1/T_1 + C_2/T_2 + C_3/T_3 + C_n/T_n$) should not exceed unity. Using the previously mentioned relationship neither of the two employees sampled were found to have significant ($C_1/T_1 + \ldots + C_n/T_n > 1$) exposure to this mixture of solvents.

2. Medical

Seven of the ten employees in the area were interviewed using a non-directed questionnaire designed to elicit symptomatology possibly related to health problems arising from their work environment. An analysis of the questionnaire responses indicated that two of the seven employees complained of sinus problems. The remaining five employees reported no complaints that they believed were job related. These complaints were judged not to be significant or related to solvent exposure or to any other occupational exposure.

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 Changes for 1972. Appendix C, P. 40.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

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TABLE I

SUMMARY OF ENVIRONMENTAL RESULTS AT INLAND MANUFACTURING DIVISION
OF GENERAL MOTORS CORPORATION, VANDALIA, OHIO ON FEBRUARY 14, 1974
VINYL PAINT LINES, DEPT. 760, BUILDING 31

Job Classification	Location	Time	Type of Sample	TWA Exposure in PPM[a] Methyl Ethyl Ketone	Methyl Isobuytl Ketone	Toluene	N-butyl Acetate	Xylene	Cyclohexanone	Combined Exposure Weighting
Load & Unload Operator	Line (1)	7:47AM-11:23AM	Personal	2	3	4	<1	3	<1	0.12
Load & Unload Operator	Line (1)	12:00N - 2:36PM	Personal	2	3	3	<1	2	<1	0.10
Paint Operator	Line (2)	7:57AM-12:52PM	Personal	3	2	4	<1	2	<1	0.10
Paint Operator	Line (2)	12:53PM- 2:33PM	Personal	<1	<1	<1	<1	<1	<1	<0.06
	Line (3)	8:02AM-12:57PM	General Area	1	1	2	1	3	<1	0.08
	Between Line 1-2	8:10AM-12:54PM	General Area	<1	1	1	<1	2	<1	0.06
	Line (3)	12:58PM- 2:37PM	General Area	<1	<1	2	<1	<1	<1	0.06
	Between Line 1-2	12:55PM- 2:35PM	General Area	<1	<1	<1	<1	<1	<1	0.06

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

Federal Standards:	methyl ethyl ketone	200 PPM
	methyl isobutyl ketone	100 PPM
	toluene	200 PPM
	N-butyl acetate	150 PPM
	xylene	100 PPM
	cyclohexanone	50 PPM
	Combined Exposure	1.0